UNDERSTANDING VULNERABILITY AND IMPACT OF FLOOD ON LIVELIHOOD AND PUBLIC HEALTH FACILITIES: A CASE STUDY OF BALLIA DISTRICT IN UTTAR PRADESH

A Dissertation Submitted to Jawaharlal Nehru University in Partial fulfillment of the requirement for the award of the degree of

Master of Philosophy

SHISHIR KUMAR YADAV

Centre of Social Medicine and Community Health
School of Social Sciences
Jawaharlal Nehru University
New Delhi-110067
India
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CENTRE OF SOCIAL MEDICINE & COMMUNITY HEALTH
SCHOOL OF SOCIAL SCIENCES
JAWAHARLAL NEHRU UNIVERSITY
New Delhi- 110067

CERTIFICATE

This dissertation entitled **"Understanding Vulnerability and Impact of Flood on Livelihood and Public Health Facilities: A case study of *Ballia District* in Uttar Pradesh"** is submitted in partial fulfillment of the requirements for the award of the degree of Master of Philosophy, of Jawaharlal Nehru University. This dissertation has not been submitted for any other degree of this University or any other University and is my original work.

Shishir Kumar Yadav

We recommended that this dissertation be placed before the examiners for evaluation.

Prof. Ritu Priya Mehrotra
(Chairperson)

Dr. Sunita Reddy
(Supervisor)

Tel.: (011) 6107676, 6167557/2420, 2472 Gram: JAYENU Fax : 91(011) 6165886, 6198234

CONTENT

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List of Abbreviations

ANM	Auxiliary Nursing and Midwife
ASHA	Accredited Social Health Activist
CHC	Community Health Centre
DDMA	District Disaster Management Authority
FAO	Food and Agricultural Organization
MNREGA	Mahatma Gandhi Rural Employment Guarantee Act
NDMA	National Disaster Management Authority
OPD	Outpatient Department
PHC	Primary Health Centre
SDM	Sub District Magistrate
SDMA	State Disaster Management Authority
UP	Uttar Pradesh
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization

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Chapter 1

Introduction

1.1 Background of the study

Flood is defined as overflow of water from river or other bodies of water due to excessive rainfall or other inputs of water. It occurs when a river or stream break out through their natural or artificial bank due to heavy rainfall, melting of snow, dam failure etc. Usually, inundation is temporary and the land is adjacent to and inundated by overflow from a river, stream, lake, or ocean (Jain et al., 2007). This kind of flood occurrence is influence by natural phenomena. Further, flood occurs due to human involvement like population pressure, deforestation, urbanization, easy accessibility of land in low-lying flood prone areas, lack of flood control measures, etc. Flood can be local, riverine, coastal, and flash on the basis of its location. Local flood occurs due to heavy and prolonged rainfall during the rainy season. Sometimes, it is caused by seasonal storms and depressions also. River flood occurs due to heavy rainfall or snow melting in upstream areas, or tidal influence from the downstream. Rapid onset or flash floods occur mainly in steep rivers with small and steep mountainous catchments after periods of intense rainfall. These floods are accompanied by a rapid rise and fall in water levels. The sudden onrush of water from mountains and high-flow velocity causes intense damages to crops and property and greater direct loss of life than slow-onset floods. According to a study by the United Nations (UN), floods claimed an average of 22,800 lives annually and caused an estimated damage of US$ 136 billion to the Asian economy (UNESCO, 2003). River floods inundate the largest areas of land and destroy more lives and property than any other form of flood (International Federation of Red Cross and Red Crescent Societies, 1999).

Floods are the most frequent natural calamities faced by India (Jain et al., 2007, p.874; Gupta et al., 2003, p.200) in different magnitudes, year after year (see Table 1.1). The main causes of floods in India are inadequate capacity of river sections to high flows, silting of river beds, and drainage congestion. The frequency of floods in India is more than half of the total number of floods occurring in Asia in each decade (Parasuraman & Unnikrishnan, 2000). Every year millions are rendered homeless due to floods and lakh of hectares of crops are damaged (Arya, 2007, p.2).

Twenty-three out of thirty two-states/union territories in the country are subject to floods and 40.0 million hectares of land, roughly one-eighth of the country's geographical area, is prone to floods (Arya, 2007, p.1; Gupta et al., 2003, p.200). According to the *Rashtriya Barh Ayog* (National Commission on Flood), the area prone to floods in India is 40.0 million hectares (Ministry of Water Resources, 2009). The average area annually affected by floods is 7.52 million hectares out of which the agricultural area is 3.52 million hectares. Roughly 30.0 million people in the country are affected by floods and more than 1500 lives lost each year. Assam, U.P. and Bihar are among the most flood prone states in the country (Jain et al., 2007, p.877).

Table 1.1 People affected, lives lost, and economic damages due to disasters in India (1980-2010)

Year	Type of Disaster	People affected	Lives lost	Economic Damage (US$ 1000)
1980	Flood	30,000,023		
1982	Drought Flood	100,000,000 33,500,000		
1984	Epidemic		3290	
1987	Drought	300,000,000		
1988	Epidemic		3000	
1990	Storm			2,200,000
1993	Flood Earthquake	128,000,000	 9748	7,000,000
1994	Flood		2001	
1995	Flood	32,704,000		
1996	Storm			1,5000,300
1998	Storm Extreme Temperature Flood		2871 2541 1811	
1999	Storm		9,843	2,500,000
2000	Drought	50,000,000		
2001	Earthquake		20,005	2,623,000
2002	Drought Flood	300,000,000 42,000,000		
2004	Flood Earthquake	33,000,000	 16,389	2,500,000
2005	Flood Flood			3,330,000 2,300,000
2006	Flood			3,390,000
2009	Flood			2,150,000

Source: EM-DAT: the OFDA/ CRED International Disaster Database (www.embat.be)

1.2 Problem field

Floods are the most common occurring natural disaster that affects human and its surrounding environment (Samuels, 2010, p.1; Huang et al., 2008, p.65; Drobot et al., 2007, p.1; Ahern et al., 2005, p.1; Reacher et al., 2004, p.8). According to the Red Cross estimates (for the time period 1971-1995), floods killed, in an average year, over 17200 humans, affected 60.0 million people and rendered 3.2 million homeless (Flood risk and vulnerability in the changing world, 2003, p.2). Flooding cause widespread damage to human lives, crops, plantation, property, infrastructure, and business (Gupta et al., 2003, p.201). It has direct effects on the endowment and the activities of the household, which affect household behavior, food security, individual health and nutritional status (Ninno et al., 2001, p.8). It has transient and non-transient consequences for social, economic, psychological, and physical health of the people.

Floods are also the most costly in terms of human hardship and economic loss (Samuels, 2010, p.1; Huang et al., 2008, p.66). Flood losses are related to both the flood potential at a site, and the nature of the land use (Simons et al., 1977). Flood-related economic loss is significantly associated with the severity and duration of floods as well as the economic levels of the affected residents. Severe and longer-lasting floods result in higher economic losses. The more severe the floods, the greater the total economic loss, as well as the greater the proportion of loss related to property (Huang et al., 2008, p.71). Also, a ranked correlation analysis showed a positive relationship between average economic loss per person and duration of floods i.e. the longer the duration of floods, the higher the economic loss (Huang et al., 2008, p.66).

Apart from financial implications, flooding has a major impact on the health of the individuals. Flooding gives rise to a range of health infirmities both physical and mental (Coulston & Deeny, 2010, p.290; Ministry of Health & Family Welfare Bangladesh, 2004, p.5). The physical health problems include, gastroenteritis issues, skin rashes, earache, and otitis media, depression, anxiety, and other forms of psychological distress (Coulston & Deeny, 2010, p.290; Reacher, et al., 2004, p.1). Also, flooding give rise to infectious diseases such as military fever, pneumonic plagues, dermatopathia, dysentery, common cold, dengue, break bone fever, etc. Chances of food poisoning also become more where electric supply interrupted in food-storage area due to flooding. Further, sanitary condition is compromised with

respect to cleanliness, food hygiene, toilet, safe water, and vector control which exacerbate the health crisis (Ministry of Health & Family Welfare Bangladesh, 2004, p.7). Floods also have a severe impact on the mental health of the survivors giving rise to depression, anxiety, and Post Traumatic Depression symptoms among the victims (Coulston & Deeny, 2010, p.290; Berg et al., 2006, p.1573; Elhai et al., 2006; Weihs et al., 2000; Kilijanek & Drabek, 1979). Mental health issues often are escalated by some of the social consequences of flooding, such as the loss of community and neighborhood (Coulston & Deeny, 2010, p.290; Kilijanek & Drabek, 1979, p.556).

1.3 Gap areas

The above leads to the following queries

1.3.1 Who is vulnerable to floods in a community and why?

1.3.2 The impact of flood on livelihood impoverishment and the public health facilities in the community.

13.3 Role of social support and community well being is not being dealt in post flood coping and resilience.

13.4 The role of the state in disaster mitigation and prevention.

1.4 Research questions of the study

The major research questions of the study are given as follows:

1.4.1 Who is vulnerable to floods in the community?

1.4.2 What is the impact of the flood on the livelihood and the public health services in the affected area?

1.4.3 How does the social support help in the post flood recovery?

1.4.4 What are the broader initiatives taken by the government to combat flood hazards in the given region?

1.5 The objectives of the present study are:

Disaster studies are still in their infancy in India. Most of the studies have been undertaken by the amateur social scientists who have tried to superimpose their disciplinary insights over the ground realities. Thus, there exists a lack of any standard scale to gauge the factors such as vulnerability, hazard, flood risk, coping,

etc. The current study is an earnest effort to define vulnerability, hazard, coping, etc. based on the insights from the field. The broader goal of the study is as given below:

1.5.1 To examine the impact of flood on the livelihood and the public health facilities and explore the role of social support in livelihood resettlement and reconstruction post flood.

1.5.2 Define 'vulnerability' vis-à-vis flood hazard, and examine the impact of flood on vulnerable groups like women, children and marginalized groups.

1.5.3 To examine the role of the state in flood management and control.

1.6 Organization of the thesis

The thesis has been divided into 6 chapters:

Chapter 1 Introduction

Chapter 1 is an introductory chapter. This chapter presents preliminary information on the research objectives and problem statement. Also, the comprehensive information on the methodology and the field area has been discussed. The details of the research design, methods and techniques of data collection used, problems, and limitations of the study have been presented. Further, the field profile, beginning from the state, to district to block, and finally to the village level has been described in a chronological sequence.

Chapter 2 Vulnerability, Livelihoods, Public Health implication and mitigation in Disasters**:** Review of literature.

This chapter is devoted to the review of literature. All the variables and constructs used in the thesis have been described here based on the existing literature.

Chapter 3 Impact of flood on livelihoods and public health facilities, and the role of social support in livelihood resettlement and reconstruction post flood.

This chapter is divided into three sub parts. The impact of flood on the livelihood has been described in the first part. The second part deals with the influence of the flood on the public health facilities in the village. And lastly, the role of social support in coping and resilience post flood has been described in the third part.

Chapter 4 Brief discussion on vulnerability and vulnerabilities of women, children, and marginalized groups in flood prone area.

The central concept in this chapter is vulnerability. It is notable that vulnerability is unequally divided across race, caste, gender, age, and so on. With reference to the floods in the village Shival, a thorough analysis of vulnerable and marginalized populations has been made.

Chapter 5 State response-Flood management and control.

In this chapter, the role of the state in the prevention and mitigation of disasters has been described. In the first part, the Indian disaster management structure has been conceptualized including the brief history of its evolution. The second part is based on the empirical findings from the field. The objective has been to highlight the gap between the theoretical/ proposed practices and the empirical observation.

Chapter 6 Summary and Conclusion

The central focus of this chapter is to bring to light the major findings of the study including the summary and the conclusions of this research.

1.7 Methodology

1.7.1 Design of the study

This section is devoted to the description of the broader methodology of the study. Before discussing the design of the study, it becomes mandatory to discuss the qualitative research method. Qualitative study is a systematic description of a phenomenon against its measurement of quantification. It takes an interpretative, naturalistic approach to the subject matter. Qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings that people bring to them. Qualitative research begins by accepting that there is a range of different ways of making sense of the world and is concerned with discovering the meanings seen by those who are being researched and with understanding their view of the world rather than that of the researchers (Introduction to Qualitative Research Methods, p.3). In align with the broader objectives of the study, it deemed feasible to resort to a qualitative study as "qualitative research provides 'richness and holism with strong potential for revealing complexity' (Chaulagai, 2009, p. 29)". As discussed earlier, disaster studies are new to India, and

there exists a lack of scale or instrument to measure factors such as hazard, vulnerability, coping, resilience, etc. Thus, it becomes imperative to resort to a qualitative study for only qualitative method can help encompass data from a wide range and boundaries, providing an eclectic view of an issue.

After method, we come to the description of the tools and techniques of data collection. Observation, interview schedule and group discussion were the primary tools of data collection.

1.7.2 **Data Collection Process**

1.7.2.1 **First phase**

The study has been undertaken in two phases. In the first phase, the principal task was rapport establishment. It is often said that proper rapport establishment is almost a half job done. It is to be noted that all the informants have been addressed by the pseudo names to maintain the privacy and confidentiality of my research subjects. Age of the informants has been given in the bracket followed by the names. I approached two lekhpals Arjun Pratap Gupta (53) and Shyam Shankar Yadav (45). They have been working in the village for more than two years. And both have led the disaster management teams in the recurrent flood in the village. I described the purpose of my visit to them and intimated them with all the required information. They readily agreed to help me and made necessary arrangements for my study as well as personal logistics. They provided substantial help in this regard. They introduced me to the inhabitants and explained the purpose of my visit and helped me in gaining access to the inhabitants. They also introduced me to the major key informants in the village such as the *sarpanch*, the Auxiliary Nursing and Midwife (ANM), the Primary Teacher, etc. In this phase, I conducted semi-formal household survey collecting information on the basic demographics.

Basic household survey and rapport establishment

In this phase, I tried to get in touch with the key informants and the respondents. Firstly, I gave a brief overview of my study to the key informants who willfully agreed to cooperate and help me in all possible ways. The next step was to harness the network of the key informants who introduced me to the respondents in the village. My key informants helped me to gain access to the respondents. They introduced me to the villagers and thus helped me to gain wider confidence of the community. They

helped me to reach the major stakeholders of the community such as the *sarpanch* of the village, the ANM as well as the personnel at the Primary Health Centre (PHC), the teacher at the primary school, etc.

After a brief overview of the village, I collected various household demographic variables (name, age, literacy level, occupation, etc.) from each informant. The sample was purposive and the subjects were chosen on the basis of convenience. In the first phase, all the important stakeholders such as the Sub Divisional Magistrate (SDM), the Lekhpal, the ANM, the Primary teachers were chosen who could provide necessary information about the village and the floods. In the second phase, interaction was held with the rural inhabitants. This served as a forum for rapport building. Data was also gathered on the demographic variables, type of family, assets of the family as well as the housing patterns, etc. This household survey helped me to gauge the vulnerable population in the village and the community. It provided wider information on the hazard from the flood, and the damages incurred due to floods during current as well as past years.

The social mapping of the area

The second task of my study was to capture the social map of the village. With the help of my key informants, I tried to collect maximum information about the area. Firstly, I collected demographic information like total number of inhabitants in the village (absolute number as well as sex wise distribution along with age set distribution). Migrants were also included in the study. Secondly, caste wise distribution along with specific geographic distribution was mapped. Four common parameters-General, Other Backward Castes (OBC), Scheduled Castes (SC), and Scheduled Tribes (ST) were used to classify the population. Most of the inhabitants were Hindu except the teacher of the primary school who was a Muslim who belonged to the neighboring village. He proved to be a potent key informant as he had a wider knowledge on the village topography and geography and flood experience as his village was also frequently flooded. Thirdly, occupational distribution of the village was mapped. For the occupational listing, an occupational list was prepared divided into primary and secondary occupations.

Information was also collected on the land distribution in the village as well as the major landmarks in the area. A map was prepared depicting the land use pattern in

the village displaying the location of the agricultural fields, residential areas, PHC, school, and other major markers in the village. This map provided wider insights into the hazard from the floods and the damages incurred. Further, information was gathered on the social structure of the village like the community of the major stakeholders in the village and the political patrons such as the village head or the *sarpanch* which gave an idea of the distribution of resources in the village.

First phase of the data collection

A pilot study is preliminary study conducted before the commencement of the main study. In the first phase of the data collection, I engaged in an open discussion with the informants. The major target was to gain a general idea of the surroundings including the informants. In accordance with the broader objective of the study, I undertook pilot study of the village. In this phase, my prior task was to get an idea of the study population. I chose 20 households for the purpose of my study. Secondly, I gathered information on the social structure such as caste, occupation, and other relevant material for my study. I also approached government officials to obtain flood statistics such as areas affected, losses incurred, government aids and grants and provisions for coping and disaster management.

Further, I also interacted with few respondents to test the validity and reliability of the interview schedule. I undertook interview with five respondents in this phase.

1.7.2.2 **Second phase**

The main study began in the second phase with the proper formal interview schedule. In this phase, all the invalid or irrelevant items were dropped from the interview guide.

Pre-testing of the tool

The primary task in this phase was to test the validity and reliability of the interview schedule. A pilot study was conducted among a small group of people. It helped to gauge the utility and authenticity of the measures. Based on the primary feedback of the respondents, certain questions were dropped, while few modifications were incorporated in the interview schedule.

In depth study

To obtain better insights into the phenomenon, I conducted group discussions with the respondents and the key informants. It helped me to test the validity of the response through cross interrogation. The facts on the vulnerability, hazards, flood losses, and coping, etc. were obtained through group discussions.

Interview schedule (format and section)

Interview schedule was prepared for the data collection. It has been divided into two parts: demographic information and qualitative information related to disaster issue. The former contained information regarding demographic variables such as age, occupation, literacy level, etc. The information on the major variables such as vulnerability, social support, hazards, damage, etc. was collected in the second part. This interview schedule was based on the broader review of the available literature. After the pilot study, certain questions were dropped and few others were incorporated for the further study.

Conducting the interview

For the purpose of this study semi-structured interview was used. Semi-structured interview may be defined as an "interview whose purpose is to obtain descriptions of the interviewee's life world with respect to interpreting the meaning of the described phenomenon" (Bohl, 2010, p. 22). In this, the researcher has the liberty to change the direction and flow of the interview depending upon the context. It is suitable for qualitative studies in the absence of standard scales and instruments.

The key informants

For the purpose of the study, the researcher approached following key informants who by the virtue of their position and stand in the community provided substantial information for the study. The district officials such as the SDM Ram Prasad Yadav, the Lekhpal Arjun Pratap Gupta and other government officials were my key informants who divulged information on floods and other relevant material. My primary key informant was the Lekhpal Arjun Pratap Gupta. He has been working in the village for more than two years, plus he has led the disaster management team in the recurrent floods in the village. Another key informant was the principal at the Primary School in the village. He is native and has been exposed to recurrent floods during the past and thus had thorough knowledge on the issue.

Further, the Aganwadi worker and the ANM also provided substantial information on the public health facilities in the village.

Observation

Observation may be defined as "the systematic noting and recording of events, behaviors and artifacts (objects) in the social setting chosen for study" (Marshall & Rossman 1995, p.79). In this tool, the researcher participates in individuals' or communities' daily lives/activities by listening, observing, questioning and understanding the lives of people. It is a tool to learn individuals' behavior and the meaning behind this behavior. This method assumes that human behavior is purposive and expressive of deeper values and beliefs. The data from observations gives detailed descriptions of human experiences which consist of activities, behaviors and actions and interpersonal interactions as well as an organizational process that can entrench the topic by looking and listening, watching and asking. Keeping in view the research objectives, observation deemed to be the best tool to grasp holistic insights into the phenomena.

1.7.3 **Problems encountered during the study**

1.7.3.1 Lack of data and material

Flood studies are new to India; hence, there exists a paucity of statistical data. There exists a wider discrepancy in the available data. Although some organizations are collecting state wise data but district wise data, and further, village level data are hard to find and often beyond the reach of the common man. During my fieldwork, I confronted lot of opposition from the Block officers in securing the required data. They are hesitant to share disaster data with the common people, to avoid counter questions from the masses.

1.7.3.2 The field setting

The study was undertaken in the month of October which also posed constraints to data collection. October is agriculturally viable and my respondents who were majorly agricultural farmers were busy with the sowing of the seeds. Secondly, the study population had incurred recurrent flood damages and thus, residents exaggerated their problems due to floods in hope of getting more benefits and grants.

1.7.3.3 Elections

Due to the upcoming Assembly elections, the government officials were busy with the up gradation of the electoral poll list, and other relevant tasks, and thus, it was very difficult to secure appointment from them.

1.8 The field profile

1.8.1 Uttar Pradesh

Uttar Pradesh (U.P.) is the one of the significant state in terms of area and population in the country. It is located in the northern part of India, and is the most populous state of the country. The total land area of the state is 240,928 sq. kms divided into 75 districts, 820 blocks and 1, 07,452 villages. According to the Census of India (2011), the total population of the state is 19, 95, 81,477. The gender wise segregation amounts to 104,596,415 males and 94,985,062 females with the sex ratio of 908 as against the national standard being 940 (Provisional Census Data 2011 , 2011). The total population density is 828 persons per sq km which is much higher than the national average (382 persons per sq km). The decadal population growth rate of the state is 20.09 per cent (against 17.64 per cent for the entire country) and the population of the state continues to grow at a much faster rate than the national average (Provisional Census Data 2011 , 2011). The aggregate literacy rate sums to 69.72 per cent which could be read as 79.24 per cent male and 59.26 per cent female.

Geography:

U.P. is located amidst the plains of the Ganga and the Yamuna and their tributaries. Situated between 23^{o} 52' N and 31^{o} 28 N latitudes and 77^{o} 3' and 84^{o} 39' E longitudes, it is the fourth largest state in the country. It is bounded by Nepal on the north, Himachal Pradesh on the north west, Haryana on the west, and Rajasthan on the south west, Madhya Pradesh on the south and Bihar on the east. It can be divided into three distinct geographical regions:

- The Himalayan region in the north
- The Gangetic plain in the centre
- The Vindhya hills and plateau in the south

Uttar Pradesh is abundantly endowed with natural wealth. This wealth lies hidden below a variety of rocks of different ages found in lofty mountain ranges of the Himalayas in the north and the Vindhyan ranges in the south. The diversity of flora

and fauna present, big and small rivers, varieties of climatic conditions, and different kinds of soil found in the state are exclusive and hard to find elsewhere.

Vegetation and Flora

The flora of a region includes all kinds of plant species endemic to it. The common varieties of trees found in the state are listed below:

- Tropical Moist Deciduous Forests are found in the moist region of Terai. Lower regions have several species interspersed with bamboo, climbers, and some evergreen shrubs. Common trees found are Sal, Date, Gular, Jhingal, Palas, Mahua, Semal, Dhak, Jamun, etc.
- Tropical Dry Deciduous Forests are found in all parts of the plains, and usually in the central eastern and western regions. Babool, Thorny legumes and Euphorbia are extensively found here. Important trees present are Phulai, Khair, Kokke, Dhaman, Danjha, Neem, etc. Various types of resins and gums are also obtained from these trees.

Fauna

The diversity of fauna living in water, land and air are found in the state. Some of the important species found in the state are listed below:

Fish-Mahaser, Hilsa, Saul, Tengan, Parthan, Rasela, Vittal, Rohu, Mirgal, Kata, Labi, Mangur, Cuchia, Eel, Einghi, Mirror Carp, Trout, etc.

Amphibian-Frog and Toad

Reptiles-Bamania, Pit-Viper, Lizard, Goh, Cobra, Tortoise, Krait, Dhaman, and Crocodile, etc.

Aves-Eagle, Vulture, Peacock, Nightingale, Pigeon, Parrot, Owl, Nilkanth, and Sparrow

Mammals-Shrew, Porcupine, Squirrel, Hare, Mongoose, Cow, Buffalo, and Mouse.

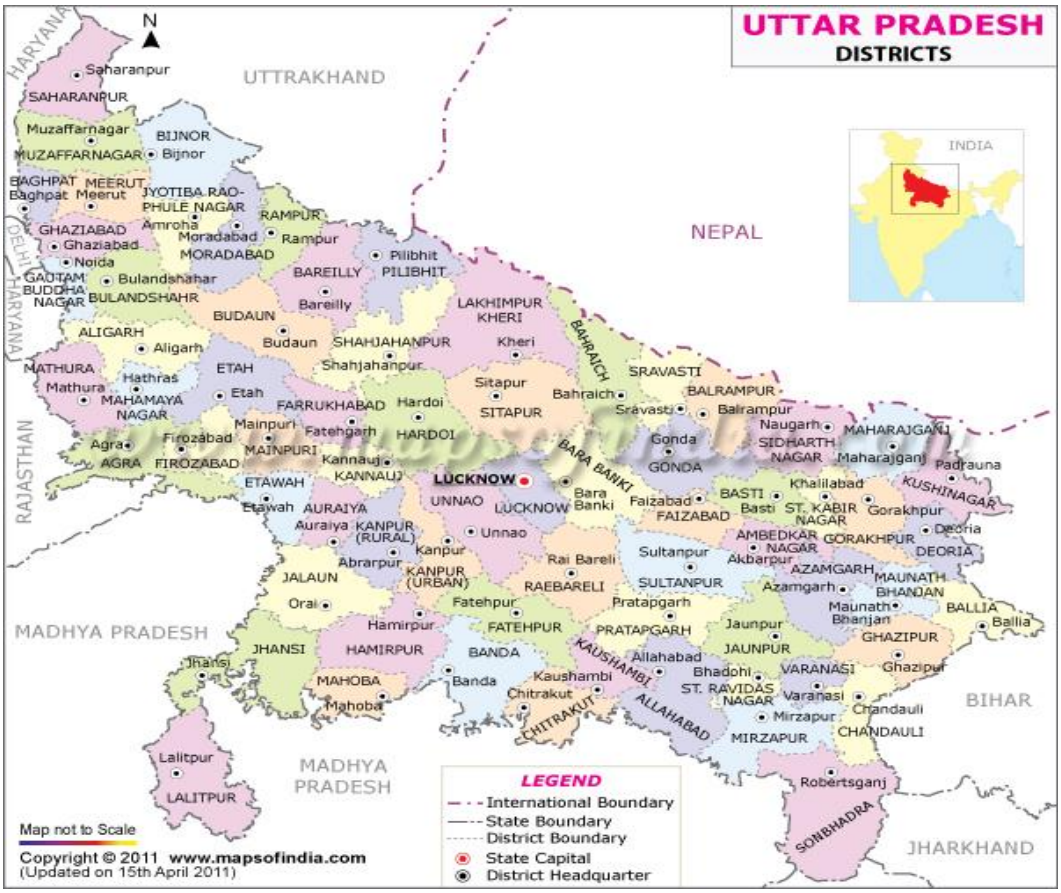
Other common species found are Tiger, Panther, Snow Leopard, Sambhar, Cheetal, Kastura, Chinkara, Black Deer, Nilgai, Back-Brown Bear, Mountain Goat, Hyena, Hill Dog, and Elephant, etc. Among the birds, Fowl, Pheasant, Partridge, Florican, Duck, Goose, and Wader are common.

Economy

Uttar Pradesh is the second largest economic contributor to the national economy. It accounts for 8.34 per cent of the India's total GDP. Recently, during the 11^{th} five year

plan (2007-12), U.P. has registered 7.28 per cent GDP growth rate against the target of 6.10 per cent and is one among the five states that surpassed their stipulated growth target. Agriculture is the major economic activity in the state. The per capita income is Rs 26,051 (Uttar Pradesh Development Report Vol-2, 2009, p.34). U.P. belongs to the one of the eight socioeconomically backward states, referred to as the Empowered Action Group (EAG). These states lagged behind in the demographic transition and had the lowest development indicators.

Figure 1.1 Administrative Map of Uttar Pradesh



Source: http://www.mapsofindia.com

Agriculture

Agriculture is the primary economic activity in the state. It is an important state in terms of agricultural productivity and was the leader of the Green Revolution in India. Its prime location, amidst the flood plains of the major rivers and the network of the rivers and the canals, makes it agriculturally viable. Majority of the population is dependent on agriculture for its livelihood. As high as 65 per cent of the total work force in the state depend on agriculture, most of whom are below poverty line. This state is very significant in terms of agricultural production and has a significant

bearing on the agricultural performance at the national level. It had 13 per cent share in the gross agricultural productivity of the country in the year 1999-00. The state has immense significance in the context of food security in the country. Rice, wheat, paddy, barley, millet, maize, black gram, green gram, arhar, etc. are the major crops (Uttar Pradesh Development Report Vol-2, 2009, p.2).

Minerals

Limestone, dolomite, soap stone, gypsum, bauxite, glass sand, manganese, non-plastic fire clay, etc. are the principal minerals found in the state. Mirzapur, Sonebhadra, Banda, Allahabad, Lalitpur are important for mineral production in the state.

Industries based on minerals

The region has a large reserve of minerals and has seen the growth of several industries based on minerals. The aluminum units in Banda and Sonebhadra, the copper plants in Pithora Garh, Almora Chamoli and Tehri Garhwal, the coal reserves in the Singrauli, and the limestone deposits in Mirzapur are significantly notable.

1.8.2 Selection of the District

The study was conducted in one of the important flood prone district Ballia of U.P. The selection of the district was purposive. Bairiya tehsil (Ballia) is the most affected flood region in U.P. and the district is frequently fraught with the heavy flood conditions in rainy seasons.

Ballia is the one of the eastern most district of the U.P. It is bounded on the west by Maunath Bhanjan district (U.P.) known as Mau (formerly part of Azamgarh district), on the north by Deoria district (U.P.), on the north east and south east by Bihar and on the south west by Ghazipur district (U.P.). It has an area of 2,981 sq km (Ballia at a Glance, 2011) with total population of 32, 23,642 (Provisional Census Data 2011 , 2011). Ballia is divided into 6 *tehsil* bifurcated into 17 community development blocks. Further, there are 163 judicial panchayats and 833 gram panchayats. There are aggregate 2360 villages which could be read as 1830 habituated villages and 530 inhabituated villages. The rural areas are inhabited by 29, 19,799 persons and the urban population is around 3, 03,843 persons. The sex ratio is 933 per 1000 males. The district fares well in literacy, total literacy being 73.82 per cent which comes out to be 73.15 per cent literacy in rural areas and 80.14 per cent in urban areas (Provisional Census Data 2011 , 2011).

Ballia is a land of great rivers of the *Ganga,* and the *Ghaghara*. There are some other minor river streams also like the *Haha* or *Ahar*, *Bahera*, and so on. There are no hills, the level surface is varied because of the high banks of the great rivers and the gentle slope from the central waster shed towards the *Ganga,* and the *Ghaghara*. The district can be divided into two natural divisions: the interior upland and the lowland tract. In area, the two divisions are approximately equal. The upland has an average altitude of 64 m above sea-level and comprises the western half of the district while the lowland tract comprises the rest of the district but is far from being of a uniform character. The main distinction is between the young and the ancient alluvium. The former is a piece of alluvium lying near the banks of the river and the latter including those lands which have remained untouched for a long time and are marked by great fertility. The surface of the lowland is usually very uneven (Ballia at a Glance, 2011).

The climate of the district is moist and relaxing except in the summer and the winter. The average annual rainfall in the district is 1,013.1 mm (39.89"). About 88 per cent of the annual rainfall is received during the south west monsoon months (June to September), August being the rainiest month. Except for the area around *Sikandarpur,* which gets less rainfall, the variation in the rainfall from place to place in the district is not much nor is the variation from year to year large.

The land is made up of doab of the Ganga and the Ghaghara, hence is very fertile and apt for agriculture. Agriculture is the main source of economy and paddy and wheat are the major staple crops. According to the 2006-07 data, the total cultivated land was 221 thousand hectares while the total irrigated land was 173 thousand hectares. Pulses, sugarcane, and jayad crops are the major cash crops grown in this region. Horticulture is another major source of income. Cabbage, tomato, pumpkin, garden pea, and onion are the important vegetables grown in the region. Cattle rearing are also carried on in some parts of the district.

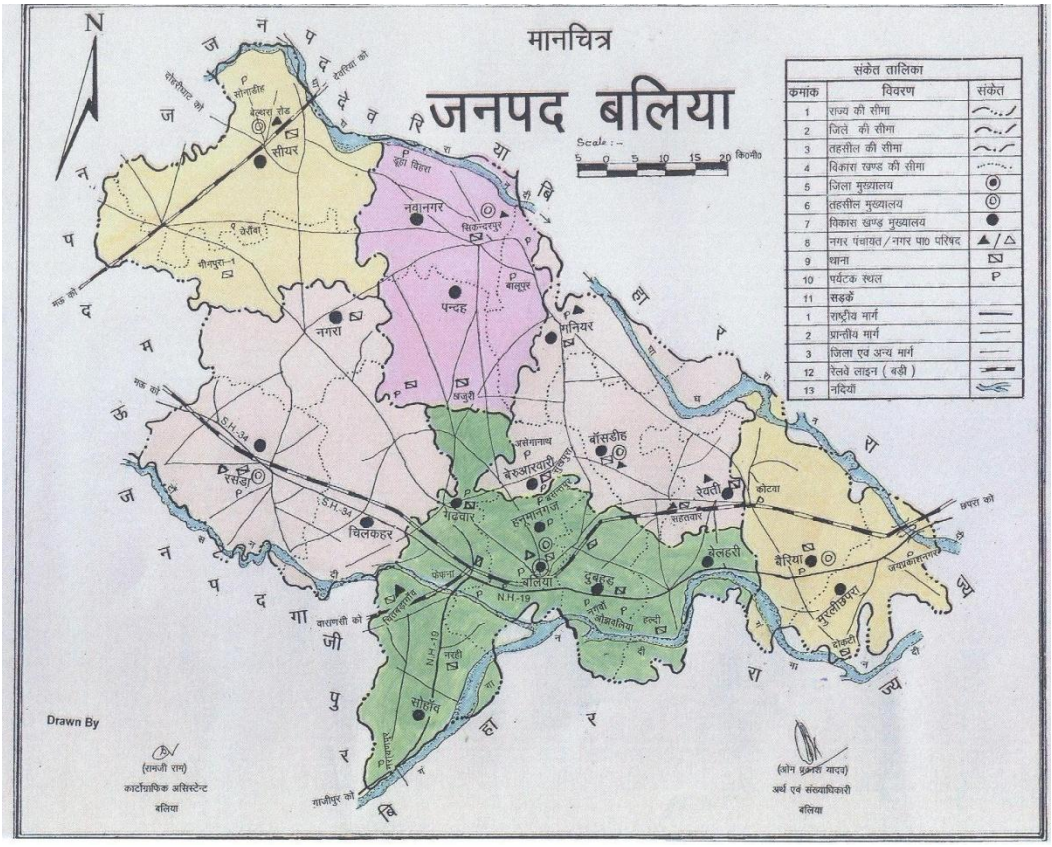
1.8.3 **Selection of the *Tehsil* and the Block**

Bairiya is situated amidst rivers the Ganga and the Ghaghara. It is bounded by the Chhappra district in the east, Bhojpur district in the south and Sivan district of Bihar in the south and the western limits is defined by the Bansdih tehsil. There are total 160 villages out of which only 109 are habituated. Bairiya tehsil is the most flood affected region in the district. Hence, based on the objectives of the study, one of the

villages named *Shival* was chosen as the area of study. As mentioned before, the selection of the Tehsil was purposive. Bairiya is the most affected flood tehsil in Ballia as well as U.P. and has been exposed to recurrent floods during the last decade. The intensity and frequency of floods is substantial, yet there have been no significant improvement in the flood prevention and mitigation. Lots of fund is pooled into disaster management by the government, but in vain. The village Shival is the major flood prone villages in the district and floods are a recurrent phenomenon in the village crippling its economy. Provisions of personal logistics and accommodation were also strong incentive in the selection of the district.

Every year there is an increment in the flow of the rivers which makes it a most flood prone region in the district as well as district the district. Unfortunately, major havoc is caused in the habituated villages. The study village *Shival* is also one of the flood prone regions drained by the waters of the Ghaghara. It is one of the most flood affected village in this block[1].

Figure 1.2 Official Map of Ballia District



Source: http://ballia.nic.in/default.asp

[1] (Personal communication with SDM Bairiya Sheetala Prasad Yadav, 7 Dec 2011).

1.8.4 **The village profile**

1.8.4.1 **Introduction**

Shival is a small village in Bairiya block of the Ballia district. It is seven kms away from the central secretariat of Bairiya and is listed as Shival Gram Sabha in the government records. In local parlance, it is known as Shival as well as Mathia. Village Shival is an important village in the '*Diryanchal*'. The term *'Diryanchal'* is commonly used for the border land between U.P. and Bihar. This land is contentious due to the simultaneous claims of the two states since independence. Locally '*diryanchal'* stands for underdevelopment and backwardness. And the zone is prone to criminal activities. In local parlance, it is known as Shival as well as Mathia.

Shival is situated on the banks of the river Ghaghara and the river defines the boundaries of the village on the three sides. There are recurrent floods in the village in the month of July and August. The northern limit of the village is conjoined with the other non habituated villages and there exists vast agricultural fields which are used for cultivation. Some part is flood prone and hence is fallow. While the village Gopalnagar lies in the north west, village Mangarh, and Sumerpur lies in the south west. It is one of the most populated villages in '*Diryanchal*'.

1.8.4.2 **History of the name (village Shival)**

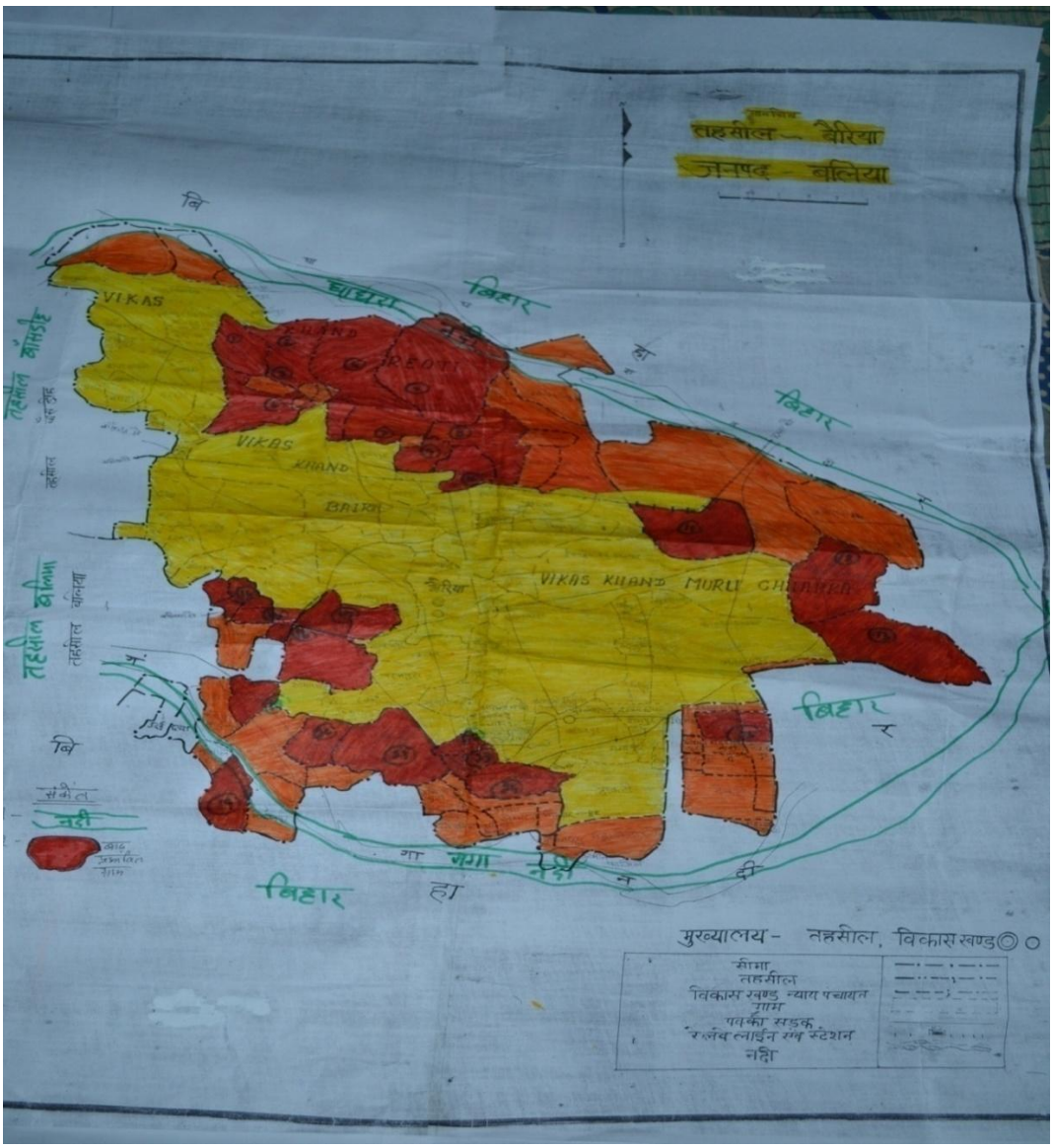
There exists a sad history behind the nomenclature of the village. Initially, there were two villages Shival and Mathia bordering each other. Sadly, the population of the two villages was lost due to frequent floods. The area and population left was merged together and named as Shival in the official records. Thus, it came to be popularly known as Shival but people still prefer calling the respective areas as Shival and Mathia.

1.8.4.3 **Religion, caste and place of worship**

The village is predominantly Hindu dominated. Most of the people are Hindu except the primary teacher who is a Muslim. There exists plethora of caste groups in the village. The village is preponderantly dominated by the Yadav (OBC) who forms the majority in the village. The head or the pradhan of the village is also one among the Yadav's. The Thakur (General), the Gond (ST), and the Dvishad (SC) are also substantial in number. While some scheduled caste (SC) groups such as Nai and Kurmi are also present.

There are several local structures worshipped by the people throughout the village. There exist quite a few local places of worship in the vicinity of the village. There is one hermitage belonging to Baba Ram Balak around four kms away from the village. Lots of devotees flock year round to pay homage to the shrine. Also, there is a hermitage of Baba Sudrishti in the north east of the village. He is very popular amongst the people and lots of devotees visit the hermitage. A fair is also held annually in the month of December at the hermitage. This fair is popularly known as '*Dhanushagya*' among the people. Lots of pilgrims from the neighboring villages also visit the shrine during the fair.

Figure 1.3 Official Map of the Tehsil



Source: Tehsil Office Bairiya (Ballia)

1.8.4.4 **Political Structure**

The village is politically significant due to its geopolitics. It is located on the borders of U.P. and Bihar. The land is quite contentious due to the rival claims of the duo neighbors popularly known as '*Diryanchal*'. Its geographic location (*Diryanchal)* makes it prone to conflict and criminal activities, and hence is politically significant. Inside the village, the Yadav are the 'dominant group' due to their numerical strength and has been holding the reigns of leadership since decades. They are economically established and have been dominating the local population. And this has often led to the conflict between the Yadav and the Thakur who has been the potential aspirants for political supremacy. But due to the numerical majority, the Yadav are successful in securing the political supremacy, as the Yadav outnumber the Thakur, in numbers. The political participation of females is negligible in the community. Currently, the local municipal seat is reserved for females and the sarpanch is a female from the Yadav community. But her contribution towards her roles is insignificant and most of the tasks are handled by her husband.

1.8.4.5 **Demographic Profile**

Shival occupies an important position in the Bairiya block. According to the Census of India (2001), the total population of the village stood at 1486 divided as 784 males against 702 females. Child sex ratio (0-5 yrs) is also somewhat even absolute number being 173 males against 150 females. In terms of literacy, only 414 people were literate against the total population of 1486. Literacy sensex is strongly biased towards the males in the village. Only 85 females were literate as against 319 males. Most of my informants were non literate or had secondary education. Majority of the family members possessed primary education or were non literate. Very few had higher education such as inter or graduation.

There were 192 households according to the Census of India (2001). Majority of the families were joint family where more than two generations were living together under one roof. Average family size in the village stood at 14.5. Similarly, aggregate number of married couples in the family stood at three. The demographic details of the subjects have been given in the table below:

Figure 1.4 the Social map of the Village

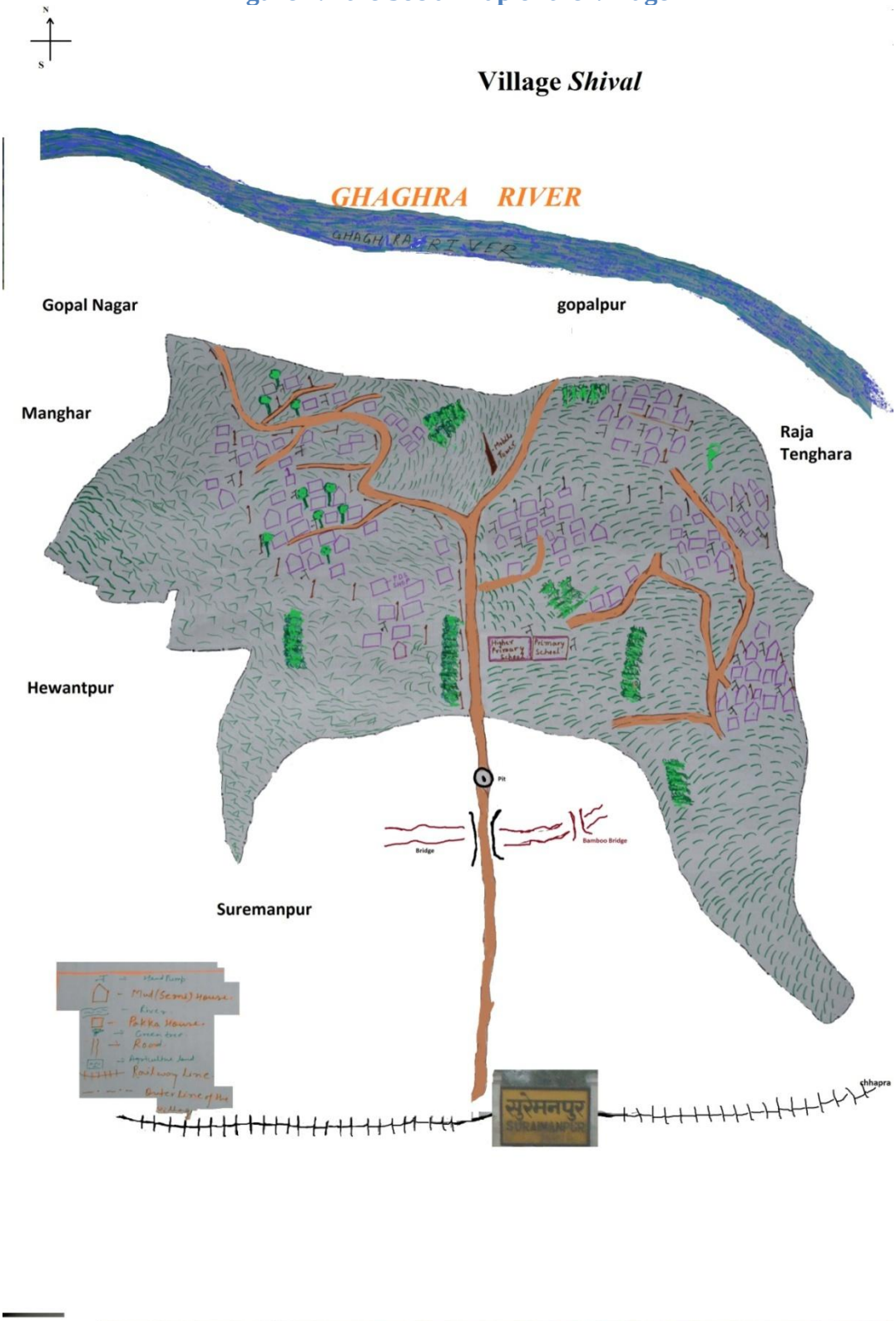


Table 1.2 Demographic details of the Informants

SN	Name	No of members in the Family	No of Males	No of Females	Total No of Juvenile Population (0-5 yrs)		Age Group Range (yrs)	Literacy Range	No of Married	Land Area Owned (Hectares)
					M	F				
1	Kallan Chaudhary	17	9	8	1	2	70- 4	7 to nil	10	0.506
2	Debindra Chaudhary	13	6	7	-	2	42- 2	9 to nil	6	0.253
3	Chamman Chaudhary	15	8	7	2	2	62-3	9 to nil	8	0.379
4	Harsh ram Chaudhary	17	10	7	1	1	60-1	BA to nil	10	0.506
5	Kalavati Gond	12	7	5	1	-	48-4	BA to nil	6	0.506
6	Avdesh Gond	11	7	4	-	-	68-8	12 to nil	4	0.253
7	Lori Gond	14	6	8	1	3	55-1	10 to nil	6	0.253
8	Hari Gond	11	5	6	1	-	58-2	BA to nil	6	0.253
9	Sadhinath Yadav	32	13	19	3	3	54-2	MA to nil	6	5.795
10	Dharilal Yadav	12	7	5	-	-	61-9	BA to nil	6	7.59
11	Gyan Prakash Yadav	16	8	8	2	2	65-3	BA to nil	6	.771
12	Kalpnath Yadav	18	8	10	1	2	66-1	BA to nil	8	2.53
13	Shivdhar Yadav	9	4	5	-	-	48-6	BA to nil	2	2.53
14	Shivpal Singh	18	11	7	2	-	68-2	MA to nil	10	2.783
15	Ramdev Singh	17	11	6	1	-	72-4	MA to nil	6	3.795
16	Dermanand Singh	14	8	6	-	1	70-3	BA to nil	6	2.53
17	Devanand Singh	15	8	7	2	-	64-2	BA to nil	6	2.277
18	Challan Kushwaha	7	4	3	-	-	44-12	BA to nil	2	0.506
19	Lalmam Kushwaha	7	3	4	-	-	40-10	8 to nil	2	0.632 5
20	Shaymdev Thakur	16	6	10	1	2	59-4	10 to nil	6	0.253

1.8.4.6 **Household and Settlement Pattern**

The village is populated by different caste groups. The Yadav are the dominant and economically affluent group in the village. They exercise possession over the major resources such as land in the village. They occupy the fertile lands and their fields are also on the altitude, less vulnerable to the floods. While the other marginalized groups such as the Nais, and the Kurmis, etc. are housed in the hinterlands of the village. Flood water is first to enter in their houses or fields.

From the primary field experience, it could be easily deduced that the most of the inhabitants are rich and affluent. Most of the houses are pakka houses and are located beside the main road. Few houses are semi pakka type whose walls are made up of concrete while the roof is made up of the husk. Due to the recurrent floods, some land is left fallow in front of the house for the inflow of the waters of the flood. All the houses are built on platform sort of structure to prevent inflow of flood water inside the house.

1.8.4.7 **Civic Amenities and Facilities in the Village**

The village is quite underdeveloped and there exists a lack of basic civic amenities in the village. The state of available infrastructure is very poor and dilapidated. There is acute shortage of basic civic amenities such as education, health care, means of communication, and so on.

Education

There is a serious lack of educational facility in the village. There is only one primary and one higher primary school in the village. The strength of the primary school is around 150. There are two teachers and two *shiksha mitra* in the school. *Shiksha Mitra* is personnel having certain educational requirements serving as a resource person for teaching and maintenance of the schools in rural areas. They are meant to supplement the teachers and ensure positive child teacher ratio in the rural areas. I has been found that staff is quite negligent towards its duties influencing the teaching in the school. Only one teacher and *shiksha mitra* were present during the visit to the school. This teacher, also, happens to be the principle of the school, and hence is preoccupied with the official tasks. The other teacher happens to be a pradhanpati[2], and is inattentive to his tasks. Only one *shiksha mitra* was found to be handling the

[2] Pradhanpati is a term used for the husband of the female pradhans.

majority of the tasks. The situation is even worst in higher primary education. There is only one Higher Primary School in the area. Two teachers are responsible for more than 100 students. For higher education, students are forced to migrate to the city or neighboring districts. Besides, there are some private schools catering to the educational needs of the residents. The nearest inter college is Baba Lakshman Das Inter College Bairiya located around five or six kms away from the village. There is only Degree College for higher education in the area. It is located in Raniganj seven kms away from the village. But the state of infrastructure is very poor. The children from the well do to families often migrate to the city or Varanasi for higher education.

Health facilities

There exists lack of health facilities in the village. There is no Primary Health Centre (PHC) in the village though there are more than 1500 residents in the village. The health needs of the people are met by the local health practitioners. These practitioners provide health care to the people but are not very skilled and often claim fake medical degrees from Patna, Varanasi, and other cities. Some of them possess degrees which have been derecognized in the recent times.

The nearest PHC is located in Kotva which is more than seven kms from the village. It caters to the health needs of the 15000-20000 people. This PHC is overburdened and under furnished for the residents. There exists lack of personnel. According to Indian Public Health Standards (IPHS) for Community Health Centre (March 2006), there must be two medical officers (one may be from AYUSH or lady Medical officer), one Pharmacist, three Nurse Midwives, one Health Worker, one Health Educator, two Health Assistants, two clerks, one Driver and four other IV class personnels at any PHC (Ministry of Health & Family Welfare India, 2006, p. 20) but less than half the personnel were currently available in the PHC. There are two MBBS Doctor and one pharmacist for the entire PHC. Besides, four *Auxiliary Nurse Midwives* (ANM), two dais, one health supervisor, one ward boy, one sweeper, one cook, one peon are also there which is less than half the number of stipulated norms.

Transportation and Communication

The village fares poor in transport and communication. In the year 2003, under the Pradhanmantri Sadak Yojna, the village was linked to the central secretariat via

Suremanpur and Gopalnagar road link. Shival is seven kms away from the central secretariat and most of the residents frequently visit the secretariat for their basic needs. The road between Suremanpur and Shival is dilapidated and unfit for movement. A part of the road was destroyed during the floods and has not been repaired. The road is full of numerous pits and is prone to accidents. During floods, the transportation though road is frequently disrupted, and people are forced to travel through boats.

The villagers have constructed a temporary bridge like structure with the help of bamboos but it is not safe and very risky. During floods, this also gets disrupted and people find it difficult to reach the central secretariat, and other far off places. The nearest railway station is Suremanpur which connects the residents to the other cities.

Electricity and Water Supply

The village has been lately electrified. The electricity has been supplied through cemented poles and used for the domestic consumption as well as agricultural purposes. Most of the houses have electric connection. But there is lot of irregularities in the electrical supply. It is reported that during the harvesting period, it is regularized for the agricultural consumption.

Water facilities are also not satisfactory in the village. The quantity of arsenic is very high in waters in and around Bairiya. Two types of hand pump are being used for water supply: the India Mark II hand[3] pumps and the old regular hand pumps. There exists preponderance of the latter over the former in the village. The government has installed special filters inside the hand pumps in the area to check the quantity of the arsenic but it is not widely available in the village. Only one hand pump containing special filter was present in the entire village.

The remote location of the hand pumps hinders the optimum availability of drinking water in the community. People often have to bring water from far off location due to the unavailability of pure and safe drinking water while the waters of the Ghaghara are utilized for irrigation and feeding the livestock. The river water is fetched through tube wells for irrigation.

[3] The India Mark II is a human powered hand pump designed to lift water from the depth. It is most widely used water hand pump in the world. The pump was designed in the 1970s through joint efforts of the Government of India, UNICEF, and WHO to address drought and water shortage problem in the country.

Grocery Shops

There are few small grocery shops in each neighborhood of the village. These functions more as a general merchant shop and all the utilities are easily available here. But this facility is disrupted during floods. There is no established market in the village and people need to go to Sumeranpur or Raniganj for marketing. There also exists one Public Distribution Service (PDS) shop for the distribution of subsidized items in the village. This service is also disturbed during floods or any hazard due to the disruption of means of transportation and communication.

Chapter 2

Vulnerability, Livelihoods, Public Health implication and mitigation in Disasters: Review of literature

2.1 Disasters

Disasters-natural or human-made are common throughout the world (Ministry of Home Affairs New Delhi, 2011, p.2). They have been the constant, though inconvenient, companions of the human beings since time immemorial. The word 'disaster' is derived from Middle French désastre1 and that from Old Italian disastro, which in turn comes from the Greek pejorative prefix δυσ-, (dus-) "bad"+ αστήρ (aster), "star". The root of the word disaster ("bad star" in Greek and Latin) comes from an astrological theme in which the ancients used to refer to the destruction or deconstruction of a star as a disaster. Disaster may be defined as a naturally occurring, largely environmental hazard which may occur relatively suddenly, e.g. cyclones, volcanic eruptions and earthquakes, or with some degree of regularity in terms of seasonality, such as periodic 'cycles' of drought and/or flood years as a result of climate change (Enarson 1998, cited in Ahmed, 2004, p.1). Although there is no standard definition, disaster is generally conceived as an exceptional event that cannot be controlled without outside assistance.

Disasters have increased considerably during the past 50 years. The number of disasters has increased by a factor of 15.0 and since the 1960s over 200.0 million people in 2009 were left without basic necessities (i.e. water, food, shelter, medical assistance) as a result of natural disaster, compared to 5.0 million in the 1960s. This increase is not due only to better disaster reporting or an increase in population; it is also caused-by the growing vulnerability of population to extreme physical events (O Keefe et al. 1976, cited in Reyes, 2010). The Red Cross estimates that disasters displace five million people from their homes each year, in addition to killing and injuring tens of thousands of people (Norris et al. 2004, cited in Pines, 2009, p.2).

According to Centre for Research on the Epidemiology of Disasters (1997), "natural disasters concern the interaction of natural hazards and socio-economic systems rather than natural hazards per se". Disasters cause immense loss to life, property and livelihoods every year. Damage caused by natural disaster is of two

types:tangible and intangible. The tangible damage is those which can be evaluated in quantitatively economic terms. Intangible damages arise from adverse social and environmental effects caused by flooding to which monetary value is not assigned. Direct damage refers to impact on assets and property and indirect damage includes a decline in production, reduced income, and increased expenditure over a period of time until the economy and assets are recovered. Property loss (PL) caused by the floods reflected direct tangible damages and income loss (IL) reflected indirect tangible damages (Huang et al., 2008, p.66).

The economic costs of natural disasters are on an alarming rise. Most affected are the poor and the socially disadvantaged in the developing countries (Arya, 2007, p.1). In the backdrop of the rising hazard due to disasters the United Nations Organization (UNO) declared the year 1990-2000 as the International Decade for Natural Disasters Reduction (IDNDR) (Ministry of Home Affairs New Delhi, 2011, p.3).

2.2 India and disasters

India's geo-climatic conditions as well as its high degree of socio-economic vulnerability, makes it one of the most disaster prone country in the world (Ministry of Home Affairs New Delhi, 2011, p.1). It has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions. Floods, droughts, cyclones, earthquakes and landslides have been recurrent phenomena. About 60 per cent of the landmass is prone to earthquakes of various intensities; over 40 million hectares is prone to floods; about 8 per cent of the total area is prone to cyclones and 68 per cent of the area is susceptible to droughts (Ministry of Home Affairs New Delhi, 2011, p.3). During the last thirty years' time span, the country has been hit by 431 major disasters resulting into enormous loss to life and property. According to an estimates, 43039 people were killed and about 150 crore rupees were affected by various disasters in the country during these three decades (Disaster & Relief). The disasters caused huge loss to property and other infrastructures costing more than US$ 4800 crore. The disasters during the last decade (1993-2012) in the country and their impact in term of people affected, lives lost and economic damage is given in the Table 2.1:

Table 2.1 Disaster Scenario in India in term of Economic losses and Human losses during 1993-2012

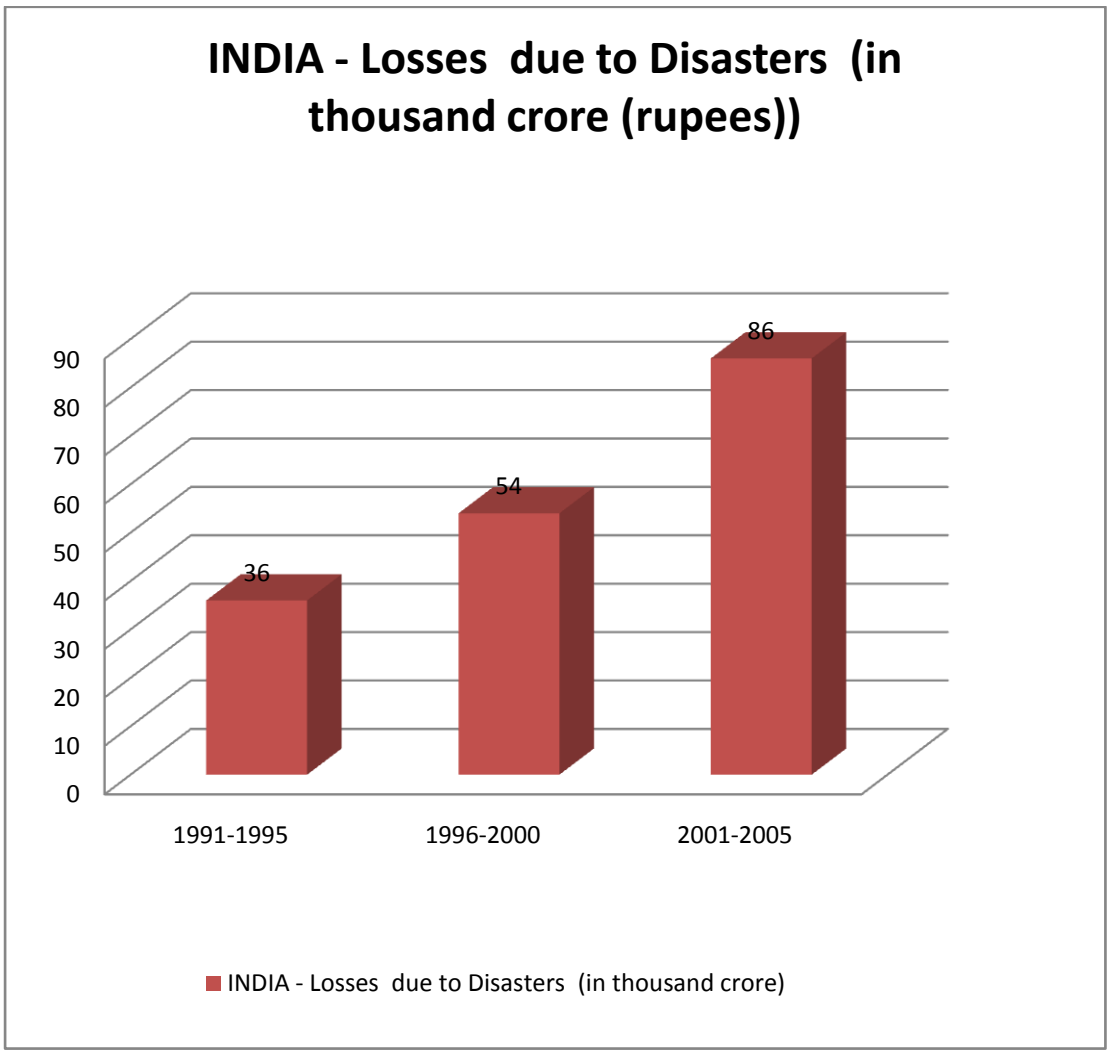
Disaster	Number of Event	Killed Number	Total Affected Number	Damage (000 US$)
Drought	5	20	351175000	2041122
Earthquake (Including Tsunami)	9	47679	8373265	4434750
Epidemic (Unspecified, Bacterial, Parasitic + Viral	36	3103	334617	-
Extreme temperature (Cold , Heat and Extreme Winter)	24	8856	-	-
Flood (Unspecified, Flash, General, Storm surge/ Coastal floods)	136	25592	517412587	27834379
Mass Movement (Avalanche, Land Slide)	25	1811	1333804	54500
Storm	45	17535	34660320	548116

Source: (EM-DAT: the OFDA/ CRED International Disaster Database-Université Catholique de Louvain Brussels (Belgium))

From the table given above, it could be easily deduced, India is one of the ten worst disaster prone countries of the world. The number of factors both natural and human induced, including adverse geo-climatic conditions, topographic features, environmental degradation, population growth, urbanization, industrialization; non scientific development practices, etc. increase its vulnerability to disasters. Variety of factors, either in original or by catalyzing the intensity and frequency of disasters, are responsible for the heavy toll of human lives and disrupting the life supporting system in the country. Further, various human induced activities like increasing demographic pressure, deteriorating environmental conditions, deforestation, unscientific development, faulty agricultural practices and grazing, unplanned urbanization, construction of large dams on river channels, etc. also influence the susceptibility to the disasters in the country.

Geographically, India could be divided into five distinct disasters zones (Fig 2.2). In the north, the Himalayan region is prone to disasters such as earthquakes and landslides. The northern plain is affected by floods almost every year. While the western part of the country, including Rajasthan, Gujarat and some parts of Maharashtra and the desert part of the country is affected by droughts and famine, while the coastal zone are susceptible to cyclones and storms.

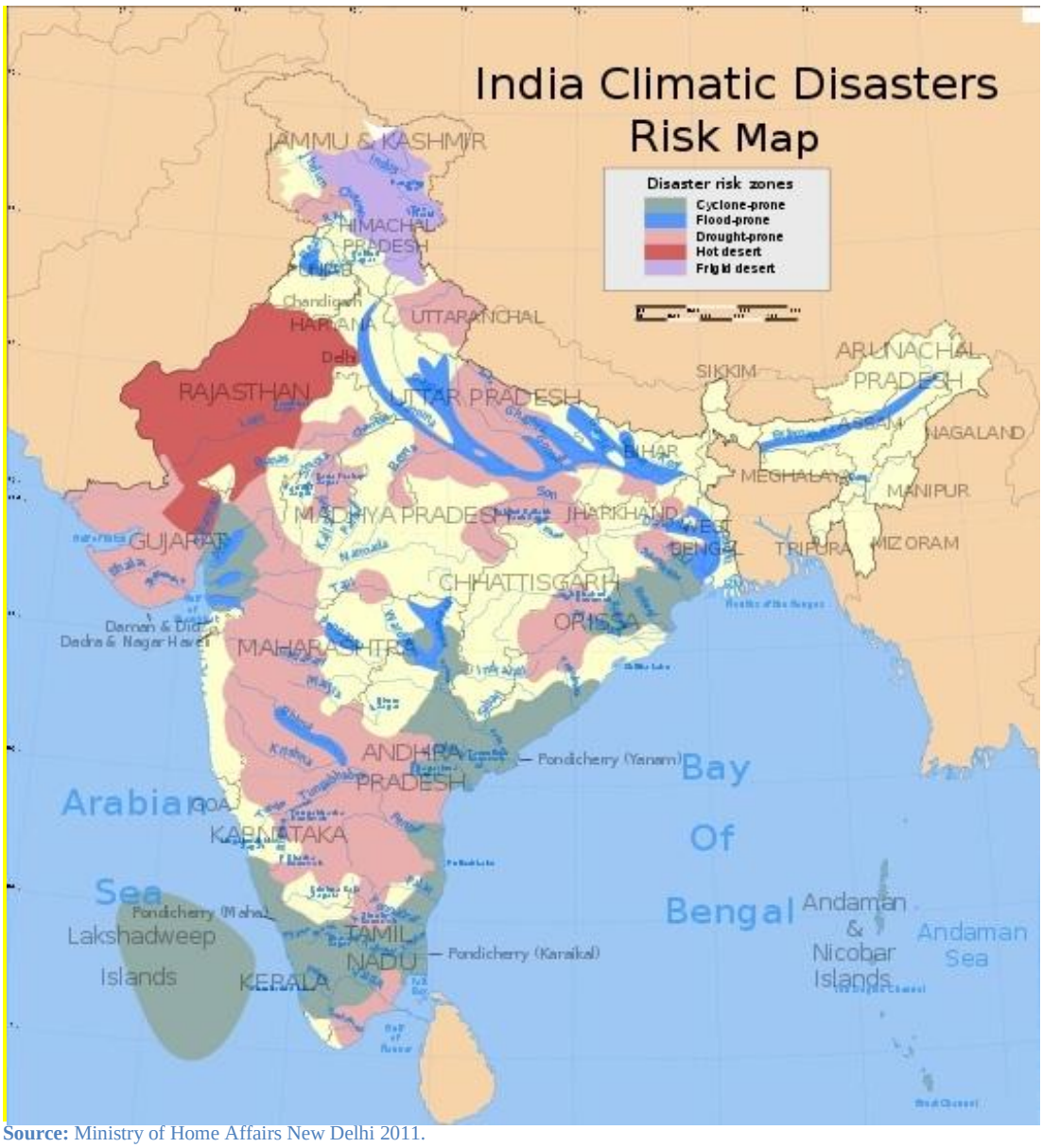
Figure 2.1 Losses due to disasters in India



Source: (Disaster Management in India, 2011)

In terms of monetary gains, the total losses due to disasters for the period 1991-95 was 36 thousand crore rupees which escalated to 54 thousand crore rupees during 1996-2000 and 86 thousand crore rupees during 2000-05 which is almost the treble the amount during 1991-95 The economic loss burden due to disasters has increased eight fold in the country (Gupta, et al., 2003, p.199). According to the World Bank estimates 2.25 percent of the GDP and 12.15 percent of the national revenues were lost because of natural disasters from 1996-2001 and the direct losses of public and private infrastructure have amounted to approximately US$30 billion over the past 35 years. On average, two per cent of India's GDP is lost in disasters every year (TOI, 2004).

Figure 2.2: India Climatic Disasters Risk Map



Source: Ministry of Home Affairs New Delhi 2011.

2.3 Vulnerability

The vulnerability of any physical, structural or socio-economic systems to a natural hazard is its probability of being damaged, destroyed or lost (Birkmann, 2008, p.1; Pistrika & Tsakiris, 2007, p.5; Alexander, 2006, p.6; Dixit, 2003, p.167). Vulnerability, in the disaster context, is a person's or group's "capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard" (Mohammed et al., 2011, p.16; Cançado et al., 2008, p.8; Neumayer & Plumper, 2007, p.3; McEntire, 2006; Simpson, 2006, p.4; Fothergill & Peek, 2004, p.90; World Health Organization,

2000, p.7). Vulnerability, as defined by inadequate capability, is linked to a specific group(s) of people or population. These people are perceived as vulnerable and thus it is difficult to protect them from a disaster.

The degree of vulnerability is defined by factors such as socio-economic status, differences in wealth, occupation, caste, ethnicity, gender, disability, health status, age, immigration status (legal or illegal), the nature and extent of social networks, and so on (Mohammed et al., 2011, p.36; Birkmann, 2008, p.3; Khunwishit, 2007, p.3; Fothergill & Peek, 2004, p.90). Vulnerable populations are more affected by the same disaster when compared to non-vulnerable populations. Moreover, among vulnerable population, the impacts of disasters vary depending on how vulnerable a person is. For example, a person who is old, disabled, a single-mother, being an immigrant, and living in hazard prone areas will be more affected by a disaster than one who is only poor, or disabled, or being an immigrant, or old, or being a single-mother, or a non-vulnerable person who lives in hazard prone areas. Thus, a person who possesses more than one or all characteristics of vulnerability would be more susceptible to and affected by a disaster than one who possesses only one or fewer characteristics of vulnerability (Khunwishit, 2007, p. 4). Moreover, among vulnerable populations, the impacts of disasters vary depending on how vulnerable a person is.

Vulnerability is not static but a dynamic process that depends upon the social, economic and political contexts that change over time, which will consequently affect the probability of loss. If societal vulnerability is exacerbated, the loss due to flooding will increase. On the other hand, strengthening social resilience capacity would reduce vulnerability. The magnitude of a natural hazard and of the vulnerability of all the exposed elements in a determined moment implies the risk of the hazard (Dixit, 2003, p. 13). The dynamic nature of vulnerability makes it difficult to quantify. Vulnerability has a time-space dimension that fluctuates according to the type of hazard (Pistrika & Tsakiris, 2007, p. 5; Simpson, 2006, p. 7). More specifically, the vulnerability of populations varies according to the time of day, day of the week, and season of the year (Simpson, 2006, p. 7). Further, vulnerability is group specific depending on the socio-economic configurations of society. For example, for an industrial society flood hazard may not be as severe as compared to the agrarian country where flood havoc cripples the back bone (agriculture) of the economy.

Similarly, within a country's vulnerability varies across the people employed in the primary, secondary or tertiary sectors.

The vulnerability could be better discussed under the following heads:

2.4 Social Vulnerability

The structural paradigm perspective in disaster research asserts disasters are a "products of a nature/society interface which intensify daily economic and social living problems" (Myers, 2007, p.3). This perspective is analogous to the Environmental Possibilism. There are no really generalized opportunities, and risks in nature, but instead there are sets of unequal access to opportunities unequal exposure to risks which are consequence of the socio-economic system (Neumayer & Plumper, 2007, p. 3; Ahmed, 2004, p. 1). Also, Tierney (2006) states, "Groups are differentially vulnerable … in the face of disasters, depending upon their position in the stratification system" (Myers, 2007, p.3). According to this paradigm, pre-disaster social cultural configuration is an important predictor of post-disaster hazards. An important approach encompassed by the structural paradigm is the vulnerability approach, which focuses on the spatial dimensions of social and economic stratification in relation to disasters known as the social vulnerability approach (Myers, 2007, p.9).

Social vulnerability means complex set of characteristics that include initial well-being, livelihood resilience, social protection, and self protection, social and political network and institutions (Cannon, et al., 2003, p.5). It relates to differences in gender, age, social position, incomes and many other potential factors that determine the ability to cope with adverse impact (Cutter et al., 2003, p.243). It has been found that poor and impoverished and marginalized social groups and individuals are more "at risk" in the wake of natural disasters (Myers, 2007, p.9). Socio-economically disadvantaged or marginalized groups, including the women, the elderly, racial/ethnic minorities, the poor, and those with lower levels of educational attainment, are often disproportionately affected by disasters. Also, the social aspects of vulnerability consist of the nature of people, social structures, and culture which inherently makes it geared towards a qualitative assessment (Simpson, 2006, p. 8). Complex interactions can take place between physical and social attributes along with living arrangements. One example of a complex interaction that takes place is that of

race and gender and the combination and interaction of the two variables creating marginality associated with high risk (Morrow 1999, cited in Simpson, 2006, p.8).

Also, socio-economic status is a significant predictor in the pre-and post-disaster stages, as well as for the physical and psychological impacts (Fothergill & Peek, 2004, p. 90). Low income victims have less insurance and savings, and their insurance is from riskier sources which are more likely to default on repayment in the event of a mass disaster. In lieu of publicly provided social safety nets, household coping strategies may include selling productive assets that have long term effects on their ability to recover from the disaster or remove themselves from poverty. Sadly, there is increased likelihood that the productive assets will be sold at price far below their pre-disaster value (Hubner, 2008, p. 7).

2.5 Geographic Vulnerability

Cutter's (1996) hazards-of-place model incorporates both biophysical and social indicators to provide all-hazards assessment of vulnerability at the local level. This model focuses on how risk to natural hazards is influenced by biophysical/technological vulnerability and social vulnerability to produce an overall vulnerability of place (Myers, 2007, p.4). According to this perspective, vulnerability to flooding is thus, perceived as both a biophysical risk (e.g. living next to a river) as well as a social response (social acts). It is, therefore, the interaction between nature and society that produces the vulnerability of places to events such as floods. Here 'Place' signify location where the social and the natural meet (Massey 2005, cited in Tapsell & Tunstall, 2008, p.135).

Place can be an important predictor of flood hazard. It can determine the local topographical and hydrological conditions and catchment characteristics, as well as local climate. For example, place can affect the speed of onset of flooding as well as the magnitude, frequency and impacts. Floods in areas with steep hillsides are difficult to warn against and prepare for and can be particularly dangerous due to mudslides and debris in the floodwaters (Tapsell S. , 2007, p. 6). Further, places also determine levels of socio-economic development in communities (e.g. levels of deprivation and wealth, access to services and resources, types of housing and tenure arrangements) and whether local service providers are prepared for flooding and can provide adequate support and response for those affected (Tapsell & Tunstall, 2008,

p. 136). For example in a study in North India in 1976 and 1979, Cannon observed that the homes of the lower castes and untouchables were typically located in the flood prone low lying areas around the settlements (Ray Bennett, 2009, p.15).

2.6 Age

Throughout the world, women, children and elderly are disproportionately affected by disasters (Armah et al., 2010, p.135; Fakhruddin, 2008, p.4; Weist et al., 1994, p.2). Children are considered a high risk population in disasters, and stress as because they are especially vulnerable to disruptions in their routines and settings, due to their dependency on adults access to social institutions and the resources that sustain daily life. In an analysis of impacts of the flood, Del Ninno and colleagues (2001) identified higher rates of stunting and wasting among flood exposed preschool children and higher rates of chronic energy deficiency among flood exposed women in November 1998, two months after the flood waters receded (Ninno et al., 2001, p.57). The affected children that are unable to receive proper nutrition or return to school may become less productive as adults, creating intergenerational effects from the initial disaster (Hubner, 2008, p. 7). Among children, boys are treated for illness more often than girls, and immunization rates are higher for boys, indicating a relative neglect of girls' health needs (Smith & Bryon, 2005, p. 1). Also, males are favored in the allocation of food within households, especially when it comes to diet quality (Neumayer & Plumper, 2007, p.11; Smith & Bryon, 2005, p.1; Minsitry of Health & Family Welfare Bangladesh, 2004, p.3). The increased household workload post disaster has a direct toll on the girl's education, forcing many girls to drop out of school to help with chores (Brody et al., 2008, p.3; Dankelman et al., 2008, p.9). Also, adolescent girls have been found to report especially high levels of sexual harassment and abuse in the aftermath of disasters and complain of the lack of privacy they encounter in emergency shelters (Barlett 2008, cited in Brody et al., 2008, p.7).

The vulnerability of the elders varies significantly with age, health, family, and economic circumstances. The groups located at the end of the age pyramid tend to present smaller mobility (displacement capacity), larger dependence, and smaller resistance to diseases, and frequently they do have fewer resources (Wisner et al. 2004, cited in Cançado et al., 2008, p.4). Also, older residents are apt to lack the physical and economic resources necessary for effective response, are more likely to suffer health related consequences and be slower to recover (Morrow, 1991, p. 4;

Huerta & Horton, 1978, p. 541). Elders may experience more stress and relatively greater personal loss than younger persons as a result of hazard events (Ollenburger & Tobin, 1998, p.95; Huerta & Horton, 1978, p.541). In addition, elderly individuals may also have heightened risk factors due to health difficulties and limitations in mobility (Ollenburger & Tobin, 1998, p.100). Also, older men are particularly disadvantaged by their tendency to be less tied into social networks than women and therefore, unable to seek assistance from within the community when they need it (World Health Organization, 2000, p.16).

In traditional rural communities, the elderly often provide their wisdom, cultural orientation and life experience to the younger generation. Given the enormous degree of social dislocation that accompanies emergencies, some elderly experience great difficulty in adjusting to alien social environments. They may experience lowered social status in the community due to the fact that they can no longer perform their social responsibilities. Traditional extended family support may disintegrate. This has negative impacts on the physical and mental health of the elderly, especially in impoverished environments and emergencies (Weist et al., 1994, p.32).

2.7 Gender

Gender refers to "socially constructed roles and relationships, personality traits, attitudes, behaviors, values, relative power and influence that society ascribes to the two sexes on a differential basis" (Glossary of Gender Related Terms and Concept). Women experience heightened risk exposures during disasters as a result of various societal and cultural norms including gender inequity and overall social roles (Ollenburger & Tobin, 1998, p.100). According to the Social Vulnerability Approach, disaster does not create specific vulnerability for women but exacerbate the pre-existing gender inequality. The "vulnerability of women" should be understood to be primarily cultural, and organizational rather than biological or physiological (Weist et al., 1994, p.3). Gender inequalities with respect to human rights, political and economic status, land ownership, housing conditions, exposure to violence, education and health, make women more vulnerable before, during, and after disasters. Women's vulnerability to the impact of disasters is also increased by socially determined differences in roles and responsibilities of women and men, and inequalities between them in access to resources and decision-making power (Gender and Health in Disaster, 2002, p.2). With the disruption of established male-dominated

social control mechanisms, women and their children are the first to be neglected, and/or abused.

The degrees of vulnerability among women in emergencies also differ considerably. All women are not universally or identically impacted by disasters (Enarson, 2000, p.4). Even amongst the females, adolescents, pregnant women, single mothers, lactating mothers, the disabled, and the aged make up particularly vulnerable groups in emergencies (Weist et al., 1994, p.29). The vulnerability of women stems from cultural, political, and economic conditions. The vulnerability of the women could be better discussed under the following heads:

2.7.1 Age

The life expectancy of women is usually longer than for men (Neumayer & Plumper, 2007; Ollenburger & Tobin, 1998, p.100), which has an additive impact on the gendered vulnerability. Economics of aging place many women in extremely vulnerable positions that influences their abilities to cope with the unexpected consequences of a natural disaster. Elderly women are likely to be particularly vulnerable, especially in developing countries where resources are scant and social safety nets limited or non-existent (Brody et al., 2008, p.3). Also, an older woman is more likely to suffer from health and mobility limitations, increasing their vulnerability (Ollenburger & Tobin, 1998, p.100). Access is further restricted for older women living in rural areas, who are often unable to travel the long distances to the nearest health facility (Brody et al., 2008, p.4).

2.7.2 Gender and Economic Dependency

Women in developing counties have been called the ‘invisible earners’ (Weist et al., 1994, p.15). Women's productive work, particularly in child-rearing and other domestic work, as well as their enormous contribution to national food production requirements, is hidden in statistics (Chiu 1982, cited in Weist et al., 1994, p.15). Women are not only responsible for attending to the basic needs of their children and families, but also account significantly for productive and income-generating activities in their respective communities (Weist et al., 1994, p.54). This pre-disaster condition in many societies, deny to women recognition for the work they actually carry out rendering them and their dependent children relatively more vulnerable than men (Weist et al., 1994, p.15). Women are likely to be adversely affected by damage

to economic livelihoods because basic survival strategies such as securing water, food, and wood for heating purposes, often fall on women, representing an extra burden on top of caring for and nurturing the family (Neumayer & Plumper, 2007, p. 15).

Females, generally have lower socio-economic status than males, and therefore, females are more sensitive to the possibility of resource loss (e.g. monetary loss) (Ho et al., 2005, p.15). Further, women in comparison to men have restricted access to the formal and regulated labor market (Monzini, 2001, p. 1). In India, a women's work in the household are not acknowledged as a form of work and not given credit as such. Only the work fetching cash outside the home is counted as a females' contribution to the household and given due credit. Further, socio-cultural beliefs and practices often preclude women's ownership of land and other production technologies such as tractors or grinding mills (Weist et al., 1994, p.16). Statutory and/or customary laws often restrict women's property and land rights and make it difficult for them to access credit and agricultural extension services (Brody et al., 2008, p.4). Low literacy coupled with very low levels of ownership of land and other productive assets makes women prone to destitution. Further, patrilocal residence, patrilineal descent, and the prohibition against women inheriting property tend to enforce the social norms that women are dependent on men from birth until death (Samarasinghe 2008, cited in Locke, 2010, p.51).

2.7.3 Gender and Women-headed Households

Women-headed households are now an increasing phenomenon worldwide. The women-headed household refers a unit of residence or domestic consumption where the lead responsible individual is a 'woman' (Weist et al., 1994, p.4). In these households, a woman is deemed responsible by members of the unit and by the community, and usually this person is the main income generator for the household. It consists of women with severely handicapped husband(s) and young children, handicapped women, widows, and young single women with no relatives.

Woman-headed households are particularly vulnerable to disasters. Left as widows from disasters, abandoned by men in search of an alternative life, or forcefully separated in conflict-from a spouse induced disasters, women are more likely to remain behind in the disaster zones to attempt a reconstruction (Weist et al.,

1994, p.33). Women-headed households may suffer from increased workloads and lack of access to resources where male household members out-migrate (Nelson, 2011, p. 24), as women have to take on traditional male roles in disaster risk reduction (Neefjes et al. 2009, cited in Nelson, 2011, p.24). The post disaster outmigration of males has an enormous impact in workloads; both for those that migrate and crucially for those that remain behind, and who have to take on responsibilities vacated by those that have migrated. In most families, these vacated responsibilities largely fall on the shoulders of mothers/wives and adolescent daughters (CARE International, 2002, p.11). Further, women who become the primary breadwinners also have to play the socializing roles of both mother and father in providing material and emotional support to the children (Weist et al., 1994, p.41). Woman-headed households often have little control over resources (Weist et al., 1994, p.25), have fewer resources to cope with and adapt to stresses of all kinds, and rely on more climate sensitive resources and livelihoods (Nelson, 2011), and the young dependent children of these households suffer disproportionately from malnutrition and from the added stress of prematurely having to contend with adult responsibilities (Weist et al., 1994, p.25). A study from Bangladesh reports instances of women in Bangladesh becoming destitute following a disaster as male relatives confiscated family land from a woman in the event of her husband's and son's deaths, leaving women and daughters poverty stricken and destitute. Sadly, there were no legal provisions to protect women and their families against such problems (Gender and Health in Disaster, 2002, p.3).

2.7.4 Gender and Decision Making

One most striking common element between women in developing countries and those in disaster prone areas is that of marginalization due to lack of adequate decision-making power and control over resources (Taft, 1987, cited in Weist et al., 1994, p.15). The social structure of most societies formally relegates women to inferiority and dependency, increasing their vulnerability through their disempowerment (Weist et al., 1994, p.6) in the household. Women are more likely than men to be absent from decision-making, whether in the household or at community, national or international levels-either because their contribution is not valued or because they do not have the time, confidence or resources to contribute (Brody et al., 2008, p.2). Major household decisions are the male prerogative and women generally have low decision making power within the family. This

dependency is further aggravated during the emergency period, and the wife (or the females of the household) is expected to take a supportive and submissive role. A 1991 cyclone study in Bangladesh noted that many women perished with their children at home as they had to wait for their husbands to return and make an evacuation decision (Gender and Health in Disaster, 2002, p.2). Women who are dependent on men in the household may also be kept in more passive 'victim' roles, with less of a voice in the recovery process in its male-gendered management structure. Also, low participation of women in planning and decision-making at the local, district and state levels is a considerable barrier to gender-sensitive disaster response, and results in insufficient attention to disaster-related violence in the communities.

2.7.5 Gender and Health

Post disaster mortality, morbidity, injury, and illness rates are often higher for girls and women (Brody et al., 2008, p.3; Enarson, 2000, p.1). According to a recent report from the World Conservation Union/ Women's Environment and Development Organization (IUCN/WEDO), women and children are 14 times more likely to die than men during disasters (IUCN/WEDO 2007). Gender and age differentials in mortality rates were strikingly apparent in the aftermath of the Asian Tsunami, where the largest numbers of fatalities were women and children under the age of 15 (Brody et al., 2008, p.6). Also, in an analysis of impacts of the flood, Del Niño and colleagues (2001) identified higher rates of stunting and wasting among flood exposed preschool children in and higher rates of chronic energy deficiency among flood exposed women in November 1998, two months after the flood waters receded (Buttenheim, 2006, p. 2). Women are more generally responsible for water acquisition, and more often work with water in cooking and doing laundry. Consequently, they are at once more vulnerable to water-borne diseases, but are also transmitters of these diseases (Ministry of Health & Family Welfare Bangladesh, 2004, p.6; Weist et al., 1994, p.39). Also, being faced with the burden of caring for dependents while being obliged to travel further for water or firewood makes women and girls prone to stress-related illnesses and exhaustion (Brody et al., 2008, p.3).

Women and girls also face barriers to accessing health care services due to a lack of economic assets to pay for healthcare, as well as cultural restrictions on their mobility which may prohibit them from travelling to seek healthcare (Brody et al.,

2008, p.3). Social taboos around menstruation and norms about appropriate behavior for women and girls are reported to contribute to health problems in young women in disaster situations (Gender and Health in Disaster, 2002, p.2). For example, during the 1998 floods in Bangladesh, adolescent girls reported perineal rashes and urinary tract infections because they were not able to wash out menstrual rags properly in private, often had no place to hang the rags to dry, or access to clean water. They reported wearing the still damp cloths, as they did not have a place to dry them (Gender and Health in Disaster, 2002, p.2). Further, women and girls are also more negatively affected by the often appalling health and hygienic conditions in refugee camps (Neumayer & Plumper, 2007, p. 13). In addition, studies have also reported adverse reproductive out-comes following disasters, including early pregnancy, premature delivery, still births, delivery-related complications, and infertility (Gender and Health in Disaster, 2002, p.2). Twenty six per cent of pregnant women exposed to isocyanides during the 1984 Bhopal explosion had spontaneous abortions, as against six per cent in a comparison group (Gender and Health in Disaster, 2002, p.2).

2.7.6 Gender and Sexual abuse and Violence

There is increasing risk of emotional abuses and violence[4] against women in the aftermath of disasters (Enarson et al., 2006, p.134; Gender and Health in Disaster, 2002, p.3; Enarson, 2000, p.1), especially in low income countries. A UNDP study (1994) reported girls are more vulnerable to sexual abuse and exploitation following disasters, especially displaced girls (Enarson et al., 2006, p.135). Following the 2004 Indian Ocean Tsunami, there were numerous media accounts of violence against women and sexual exploitation of girls (Enarson et al., 2006, p.135). Increasing instances of rape, abuse, and social stigma have been reported in the intermediate spaces like war camps and shelter camps formed during times of natural disasters (Ray Bennett, 2009, p.10). The vulnerability to abuse and violence is aggravated in the aftermath of disasters, particularly when families have been displaced and are living in overcrowded emergency or transitional housing where they lack privacy. Disasters also increase the vulnerability of females to sex trafficking. Incidents have been reported of sale and purchase of females in the disaster affected areas where

[4] Violence against women means as 'any act of gender-based violence that results in, or is likely to result in, physical, sexual or mental harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life' (Violence against women: Intimate partner and sexual violence against women, 2011).

people sell their girls in exchange of cash and kinds (Nelson, 2011; Hameeda et al., 2010; Sahara Group, 2004).

2.8 Household

The household is a domestic group often assumed to be the basic unit of production and consumption in the society (Weist et al., 1994, p.24). The households are the basic unit of production and reproduction, and the one at which critical decisions are made. The household is conceived as a social group which resides together, shares the same meals, and makes joint or coordinated decisions over resource allocation and income pooling (Ellis, 1993). Households have the capabilities and access to a range of assets which they use to carry out different livelihood activities. Households are differentiated by relative well-being and their access to resources and power. Households use their assets and capabilities to engage in many different strategies to secure their livelihoods. The household is usually based on kinship, and in India, it normally consists of joint or extended family members.

The characteristics of a household are:

2.8.1 Household members have basic needs like food, water, shelter, education, etc.

2.8.2 To meet these needs, household member's had equal access to resources or services, e.g. water, food, shelter, healthcare, electricity, etc. This is gained through payment, which, in turn is secured by undertaking productive activities.

2.8.3 There are barriers to accessing resources or services resulting in reducing the quality and quantity of resources accessibility to the poor.

These barriers are:

a. Position in society, e.g. culture, gender, religion, status, poverty;
b. Control of resources by structures, e.g. government, private sector employers, and by processes, e.g. laws, regulations, which latter may discriminate in particular against the poor.

Vulnerability of the household to hazard is defined as the degree of direct exposure to the flood at the household level. It is measured in terms of a perceived threat to life, injury to oneself or another household member, loss of household property and crop loss, narrowly escaped from being washed away, seen the nearby village being washed away, death of relatives in flood, witnessing being injured or dead, heard of someone in the town or village who was injured or dead in flood, and house damaged

fully or partially, overall damage, damage to property, financial loss, and relocation experience. Floods come with multiple shocks to household economic resources and their daily living environment. Micro-level research suggests that lower incomes are most likely to be impacted, and feel the impact most keenly (Lindell and Prater 2003, cited in Hubner, 2008, p.3). Property loss was the leading economic loss among low-income families (77 per cent), while income loss was the primary economic loss among high-income families (51.98 per cent) (Huang et al., 2008, p.69). Fothergill (2004) discovered that poorer residents could not afford floods insurance, even though they were aware of its availability and benefits (Fothergill & Peek, 2004, p.93). Labor demand declined, and households reported reduced food consumption and increased rice prices (Birkmann, 2008).

Some aspects of household vulnerability vary with the seasons. While occupational diversification may allow households to maintain a level of income throughout the year, there may be periods of high income (as when crops are harvested or fishing is good) and low income (as when fishing is poor or not possible due to storms). A household's ability to weather these slack periods depends so on the availability of other sources of income, including remittances from family members living outside the area, informal loans from money lenders or traders, and systems of mutual support at the community level (Pomeroy et al., 2006, p.788). In addition, local factors have also been shown to affect vulnerability at the household level. Eriksen et al. (2005) described how Kenyan and Tanzanian households where each member specializes in a limited number of intensive, cash-yielding coping strategies were generally less vulnerable than those whose members spread their time among several marginal livelihood activities. They also noted that many rural households lack the skills and access to capital, required to engage in the most desired, cash-yielding coping activities, and found that time availability, especially among women, was an important determinant of the ability to engage in favored coping strategies (Hahn, 2009, p. 2).

The ability of households to maintain livelihood necessity diminishes after successive and frequent floods (Ninno & Lundberg, 2005, p. 68). Mukherjee & Nayyar (2011) reported households in Pakistan had more difficulty in smoothing consumption after successive frequent disasters. Similarly, Deaton (1992) finds that the ability of households to maintain consumption diminishes after recurrent floods (Ninno & Lundberg, 2005, p. 68).

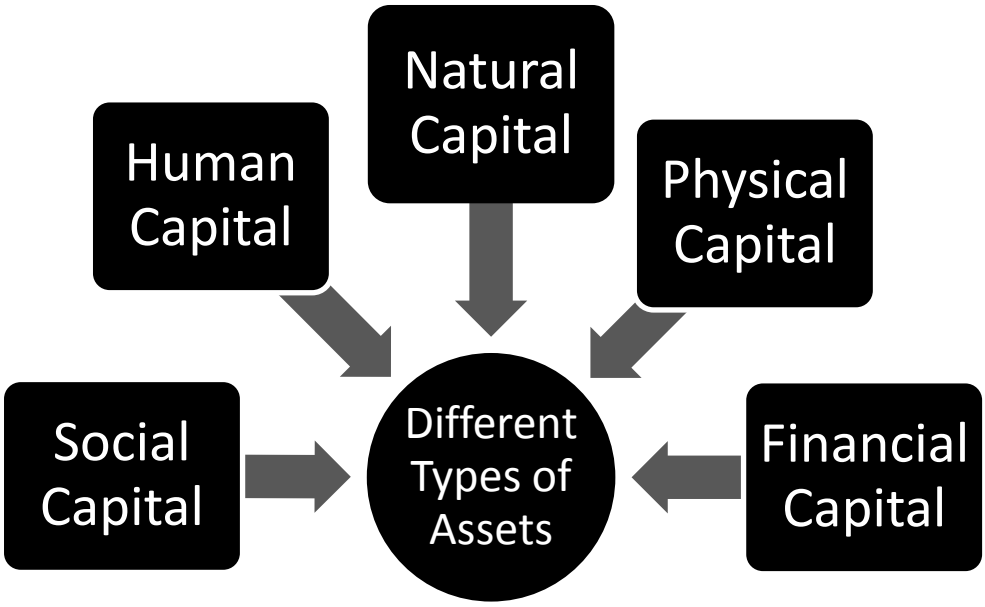
2.9 Livelihood

Livelihood is may be defined as a means of gaining a living (Chambers 1995, cited in Antony, 2009, p.1), or a combination of the resources used and the activities undertaken by individuals, households and communities in order to live (Antony, 2009, p. 1). Ellis (2000) defines livelihood as the resources (natural, physical, human, financial, social, and political), the activities and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household). A livelihood is a means of support, something that provides income to live on, especially paid work to secure the necessities of life. Livelihood activities are economic activities that people know, own and undertake to earn income today and into the future. Livelihood activities undertaken by people are shaped by their knowledge, inherent capabilities, and assets. These activities are enhanced by five basic assets with linkages to each other: natural, social, human, physical and financial capital (Antony, 2009, p.1; Nagarajan, 2006, p.1; Twigg, 2001). These assets change over time and differ among households and communities. Access to them is vital for livelihood sustainability and resilience/restoration after a shock (Nagarajan, 2006, p.1). Thus, a livelihood not only means the activities that people carry out to earn a living but it also includes all the different elements that contributes to, affect, their ability to ensure for themselves and their household a living. This includes:

- The assets that a household owns or is able to gain access to-human, natural, social, financial, physical, political, and others;
- The activities that allow a household to use those assets to satisfy its basic needs;
- The different factors that a household itself may not be able to control directly, like the seasons, natural disasters or economic trends, that affects its vulnerability, policies, institutions, and processes that may help households, or make it more difficult for them, to achieve an adequate livelihood.

Livelihood assets are the means of production available to a given community that can be used to generate material resources sufficient for the community's survival. The five forms of livelihood assets are human, social, natural, physical, and financial capital.

Figure 2.3 Different kinds of Livelihood Assets



Source: (Antony, 2009)

- Human: skills, knowledge, ability to labor, good health.
- Social: the social resources upon which people draw in the pursuit of livelihood objectives (e.g. networks and connections, membership of groups, relationship of trusts, reciprocity, and exchanges). Social capital also includes a household's range of contacts/access to formal government structures, access to information and agricultural technical support, degree of gender equity, as well as the number of social groups to which a household belongs (Hahn, 2009, p. 2).
- Natural: the natural resource stocks from which resource flows and services are derived (e.g. land, forests, marine/wild resources, water, protection from storms and erosion).
- Physical: the basic infrastructure and producer goods needed to support livelihoods. Infrastructure components include affordable transport, secure shelter, adequate water supplies and sanitation, access to information, etc. Producer goods are the tools and equipment that people use to function more productively.
- Financial: includes saving and debts, and inflows of money other than earned income (e.g. Pensions and remittances).

Livelihood security is the ability of a household to meet its basic needs (or realize its basic rights). These needs include adequate food, health, and shelter,

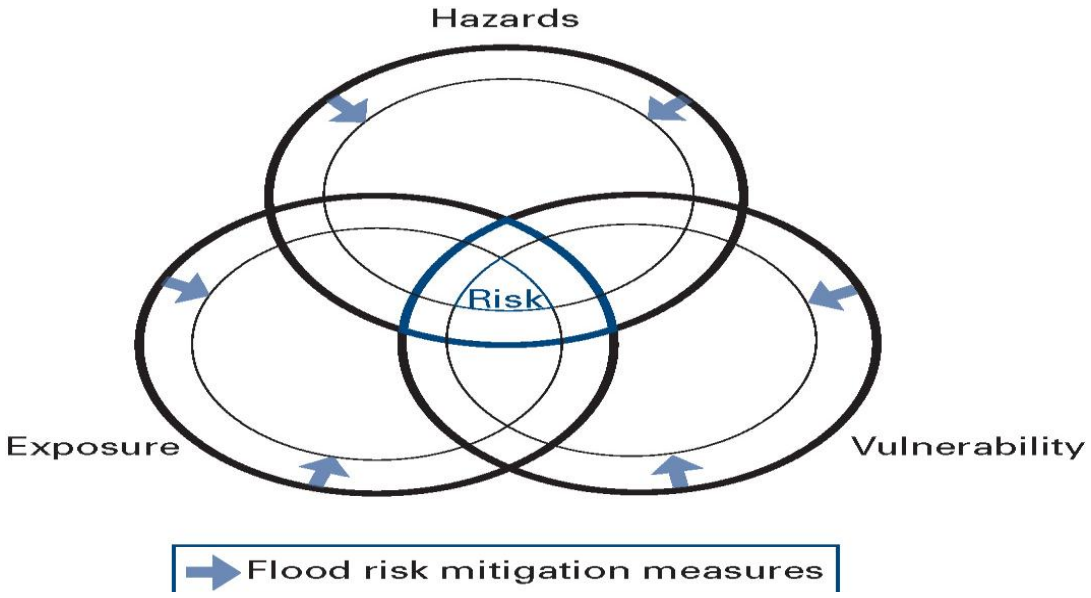
minimal levels of income, basic education and community participation. Livelihoods are secure when households have secure ownership of, or access to, resources (both tangible and intangible) and income earning activities, including reserves and assets, to off-set risks, ease shocks, and meet contingencies (Chambers,1988) popularly known as 'Sustainable Livelihood Model'. A livelihood is said to be sustainable, when it has potential to cope with, and recover from, stresses and shocks and maintain or enhance its assets and capabilities while not undermining the existing resource base (Antony, 2009; Nagarajan, 2006; Twigg, 2001).

2.10 Vulnerability and Livelihood

The extent of damage caused by specific flood event depends on the vulnerability of the affected socio-economic and ecological systems (Cutter, 1996; Mitchell, 1989). Vulnerability means being prone to or susceptible to damage or injury i.e., the degree to which someone's life and livelihood is put at risk by a discrete and identifiable event in nature and society (Blaikie et al., 1994). The livelihood sensitivity tool is grounded in the approach that essentially melds a hazard x vulnerability/readiness = risk framework with the common Pressures−State−Impacts−Responses (PSIR) approach (Wisner et al., 2004).

Risk = Hazards x Vulnerability/Readiness

Figure 2.4 Flood Risk Mitigation Measures



Vulnerability of rural families to livelihood is due to the impact of external environment such as flood (Blakie et al., 1994). About 80 per cent of the tsunami-affected households lost their main source of income, and 90 per cent of those households had productive assets destroyed or damaged (Nagarajan, 2006, p.1). Also, over 100,000 micro entrepreneurs lost their livelihoods in Aceh (Nagarajan, 2006, p.1).

2.11 Resilience

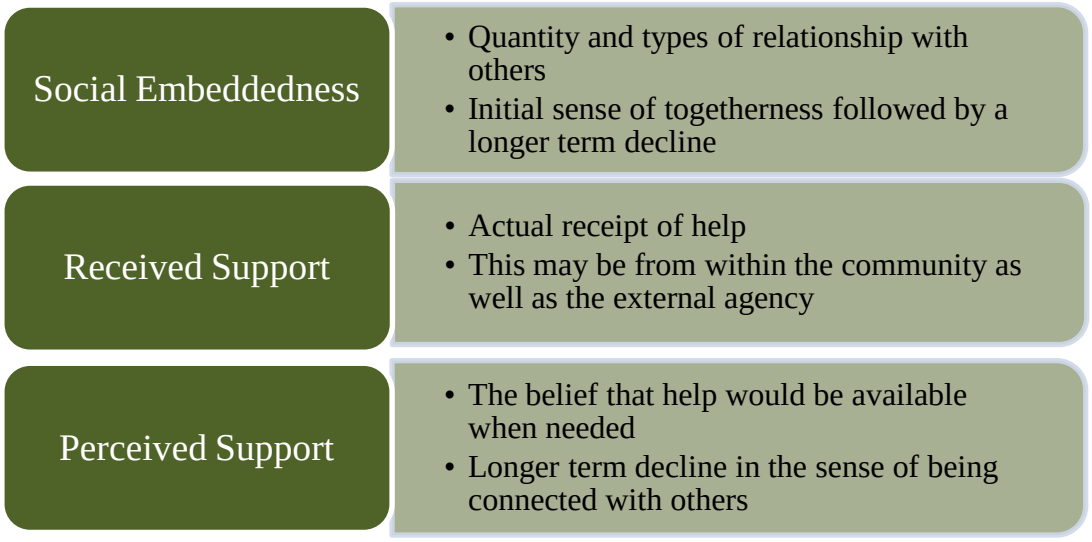
Resilience refers to the ability to absorb and recover from hazard impacts. For many analysts, it is the converse of vulnerability (and thus much the same as capacity), though others make the useful distinction between capacities as attributes of individuals and households, and resilience which also includes a favorable institutional environment. From this latter perspective, resilience is the coming together of such capacities with the social, institutional and informational resources that enable their effective use (Tan, 2008, p.206). Also, resilience may be defined as "the capacity of a system, community or society potentially exposed to hazard to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure". This is determined by the degree to which the social system is capable of organizing itself to increase this capacity for learning from past disasters for better future protection and improve the risk reduction measures (Tan, 2008, p. 206).

Preparedness behavior is an important predictor of resilience. Preparedness behavior includes a variety of actions taken by families, households, and communities to get ready for a disaster. Preparedness (pre-floods) is both the capability of coping with a floods throughout the inundation period, and post-floods recovery capability and strategies (Raaijmakers et al., 2008, p.302). Preparedness activities may include devising disaster plans, gathering emergency supplies, training response teams, and educating residents about a potential disaster. It has been found that there is a positive association between socio-economic status (SES) and preparedness behavior (Fothergill & Peek, 2004, p.92). Also, a strong correlation exists between awareness and protective behavior and property ownership and protective behaviors (Coulston & Deeny, 2010, p.294). However, Burningham et al. concluded that there was no association between experience of flooding and preparedness for flooding

2.12 Social support

Social support refers to social interactions that provide individuals with actual assistance and embed them into a web of social relationships perceived to be loving, caring, and readily available in times of need. This definition imbibes within itself three major facets of social support: social embeddedness (quantity and types of relationships with others), received support (actual receipt of help), and perceived support (the belief that help would be available if needed) (Kaniasty & Norris, 2004; Kaniasty & Norris, 1995). The three types of received support are emotional support (expression of interest, assurance affection and closeness), informational support (to understand a situation and information and how to do something), tangible support (receiving money, transportation help, shelter, receiving tools and equipments, getting help of meals or groceries and having someone to watch children, pet or other belongings (Kaniasty & Norris, 1995).The perceived support refers to helping behavior that might happen, received support refers to helping behavior that does happen, and social embeddedness represents the most basic structural component from which these functional components emerge. In short, perceived support refers to helping behavior that might happen, received support refers to helping behavior that does happen, and social embeddedness represents the most basic structural component from which these functional components emerge.

Fig 2.5 Social Support and Post Disaster Dynamics



Socio-economic factors play a significant role in all areas of social life, including in disasters, as they, too, are social phenomenon (Fothergill & Peek, 2004). Some researchers have suggested that disasters may intensify existing social disadvantages (Ginexi et al., 2000). In their study of social support after Hurricane Hugo, Kaniasty and Norris (1995) found that ethnic minority and less educated persons received less help than did their comparably affected counterparts. Socially and economically disadvantaged groups are frequently too overburdened to provide ample help to other members in time of additional need (Norris et al., 2005). Also, one's location in the social strata often determines one's life experiences, relationships, opportunities, and overall life chances.

Disaster victims tend to rely primarily on their indigenous support networks although there is also a lot of formalized aid offered by governmental and relief agencies especially in the affluent regions of the world. The pattern of help receipt post natural disasters could be better represented as a pyramid with its broad foundation being help from family, followed by support from other primary support groups such as friends, neighbors, and local religious congregations, and its narrow top being the aid provided by formal agencies and professional services (Kaniasty & Norris, 2004). Being a social animal, man builds a society for his living and survival. The members of this society or a social group are bound to each other by some cohesive force called social networks. This network is a buffer against hazards and protects an individual. Social support is directly proportional to the strength of the social networks. Social networks are key social units that respond to disasters and that are definable and interpretable on their own terms (Kreps, 1984). Social network and social units play an important role in the recovery and resilience post disaster in the villages as social cohesion is stronger in the rural community against urban areas.

Social support is an important predictor of coping and resilience post disaster. Social support influences the rumination and the coping behaviors of the individuals. Gonzalez de la Rocha (1991), Lomnitz (1977), Reyes Morales (1994), and Velez-Iba˜nez (1983) have all described how the Mexican poor use family and other close relationships to mobilize resources in their struggles to overcome some of the vicissitudes inherent in poverty and political disenfranchisement (Cannon, 2000). Further, supportive social networks are often cited as a buffer against stress (Karanci & Acarturk, 2005; Brewin et al., 2000; Pittman & Lloyd, 1997; Realmuto et al., 1991). In their study with the survivors of the Yugoslavia war, Rosner et al. (2003)

found that being a member of a group was a predictor of growth. The authors explained this finding by the opportunity membership may provide for sharing trauma history, world view and collective coping strategies with each other. Therefore, social support seems to be an important facilitator of growth (Tedeschi et al., 1998). The greater the levels of social support, the greater the likelihood of developing successful coping skills. a) The greater the individuals' integration into kinship networks, the greater the likelihood of developing successful coping skills. b) The greater the individuals' integration into friendship networks, the greater the likelihood of developing successful coping skills. c) The higher the level of community participation, the greater the likelihood of developing successful coping skills (Perry, 1983).

Gender had both main and interactive effects on post disaster social support, with women perceiving less social support and embeddedness than men especially with regard to friend support. Women network has been found to be localized within the neighborhood as they have limited contacts to the wider sphere. Conventionally, women are more oriented to the interior, domestic space, whereas men are more oriented to the exterior, outside the family environment. Thus, it is possible that men are better situated to retain sources of support associated with employment outside the immediate colonia. Bolin and Stanford (1999) suggested that women are particularly vulnerable to the effects of disaster because of their care giving roles and relative lack of power and status. Hoffman (1999) argued that women tend to lose conflict over scarce resources in crisis. These factors may have also contributed to women's lower levels of perceived social support (Fothergill & Peek, 2004).

Social support is very complex and follows a cyclic pattern. Initially, there is a strong mobilization of helping behavior (in the domain of received social support) but later, there is often a deterioration of perceived social support and social embeddedness better known as 'Social Support Deterioration' model. Many things can lead to post disaster declines in social support and social functioning (Kaniasty & Norris, 2004). Firstly, disasters affect entire indigenous networks; the need for support may simply exceed its availability, causing expectations of support to be violated. Further, relocation and job loss and even death following the most severe events remove important others from victims' supportive environments. Disaster victims often abandon routine social activities, leaving fewer opportunities for companionship and leisure. Social networks become saturated with stories of and feelings about the

event and may escape interacting. Whereas victims want and need to be listened to, they and others in their social environments may not necessarily wish to be the listeners. Physical fatigue, emotional irritability, and scarcity of resources increase the potential for interpersonal conflict and social withdrawal. Thus, fairly soon, mutual helping and cohesion yield to conflict and disharmony; the mobilization of support yields to deterioration of support. Eventually, however, it is assumed that perceptions of social support "bounce back" to pre-event levels as the community and individuals recover. The deterioration of social support appears to occur at multiple levels ranging from intimate dyads to family and friendship networks to entire communities (Cannon, 2000).

Thus, social support post disaster provides opportunities to examine aspects of social structures and processes that are hidden in everyday affairs as disasters do not affect all members of society equally (Fothergill & Peek, 2004). As Durkheim's analysis of deviance and crime, two seemingly "abnormal" phenomena, provided the means for identifying certain "normal" features of the structure and functioning of societies. Also, many of Garfinkel's field studies of ethno methods involved the intentional creation of exceptions in order to learn about the routine (Stallings, 2002, p.283). Similarly, disaster studies provide rich data for addressing basic questions about social organization-its origins, adaptive capacities, and survival (Kreps, 1984, p. 310). These questions were considered fundamental by the classic figures of sociology, as a disaster is a "natural laboratory" providing a unique opportunity for challenging and advancing existing theories (Stallings, 2002, p.283). This opportunity comes about through the analytical strategy of studying the "exception" in order to better understand the "rule" (Stallings, 2002, p.283).

2.13 Public Health

Public health is "the science and art of preventing disease, prolonging life and promoting physical health and efficiency through organized community efforts for the sanitation of the environment, the control of community infection, the education of the individuals in principles of personal hygiene, the organization of medical and nursing service for the early diagnosis and preventive treatment of disease, and the development of social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health" (Baggott, 2000; Winslow, 1920). It is a concept and science of promotion and improvement in

the health of a population or community through education, endorsement of healthy life style and research for disease prevention. It integrates a holistic approach towards health, i.e. it is not only concerned with curative perspective, but also includes personnel and other facilities to provide all health services required for the promotion of health, prevention of disease, diagnosis, treatment of illness and physical, social, and vocational rehabilitation. Gostin believed that the public health can be achieved only through collective action, not through individual endeavor (Gostin 2000, cited in Oliver, 2006, p.196).

The organized efforts by societies towards public health are not new phenomena for the India as well as for world. Many historians have reflected that, the level of sanitation pattern in Indus Valley period was far better than that is found in some parts of the contemporary India. Bathrooms, latrines, water closets, and the underground drainage systems represented an advanced stage of urbanization in Mohenjo-Daro & Harappa. It gives an idea of the organization of public health facilities in ancient India (Banerji, 1985). The improvement in the health status and decline in the mortality in England and Wales in the late 17th century was due to nutrition and environment. Medicine was not responsible for the improved health, since the decline in mortality became significant in the late 17th century, much before the discovery of antibiotics in 1930s. Science, technology and medicine have little contribution in the decline in the mortality (Mckeown & Lowe, 1974).

The concept of public health is multidisciplinary in nature. It denotes major governmental and social activities which are extended to cover almost all aspects of a society. The methods are borrowed from several disciplines like epidemiology and biostatistics; health economics, sociology, political science, and other social science; the biological and physical sciences; public health engineering, nursing, dentistry, and nutrition; community/social/preventive medicine; health education; and health administration i.e. the organization of personnel and facilities to provide all health services required for the promotion of health, prevention of disease, diagnosis and treatment of illness, and physical, social and vocational rehabilitation (Editorial, 1985). In a narrow sense, public health refers to the health of a population, the longevity of its individual members and the extent to which they are free from disease. Alternatively, public health can be seen as a philosophy of intervention aimed at protecting and promoting the health of the population (Baggott, 2000). So in short, public health has a collective perspective in addressing health as a feature of society

rather than individual. This is particularly important as an individual and his attributes are a reflection of interplay of various influences from the society and his environment. We can understand public health as collective, organized efforts by society towards promotive, preventive and curative health with the understanding of social, economic, political and environmental factors.

The health system and health service system are the two integral component of public health at large. The health system is the subset which includes resources, services and organization while the health service system is made up of health service system as well as nutrition, environment and other elements having a bearing on health. The health services system is an umbrella term which influences the health of an individual. It includes within itself health care services as well as a vast array of institutions /sectors / processes that have wider implications for the individual health and well being. In addition to health services, agriculture, food availability, water supply, environment, sanitation, housing, education, transport, and the like also determine the public health scenario. All these factors play an important role upon the public health facility in the community.

Chapter 3

Impact of flood on livelihoods and public health facilities and the role of social support in livelihood resettlement and reconstruction post flood

3.1 Impact of flood on livelihood

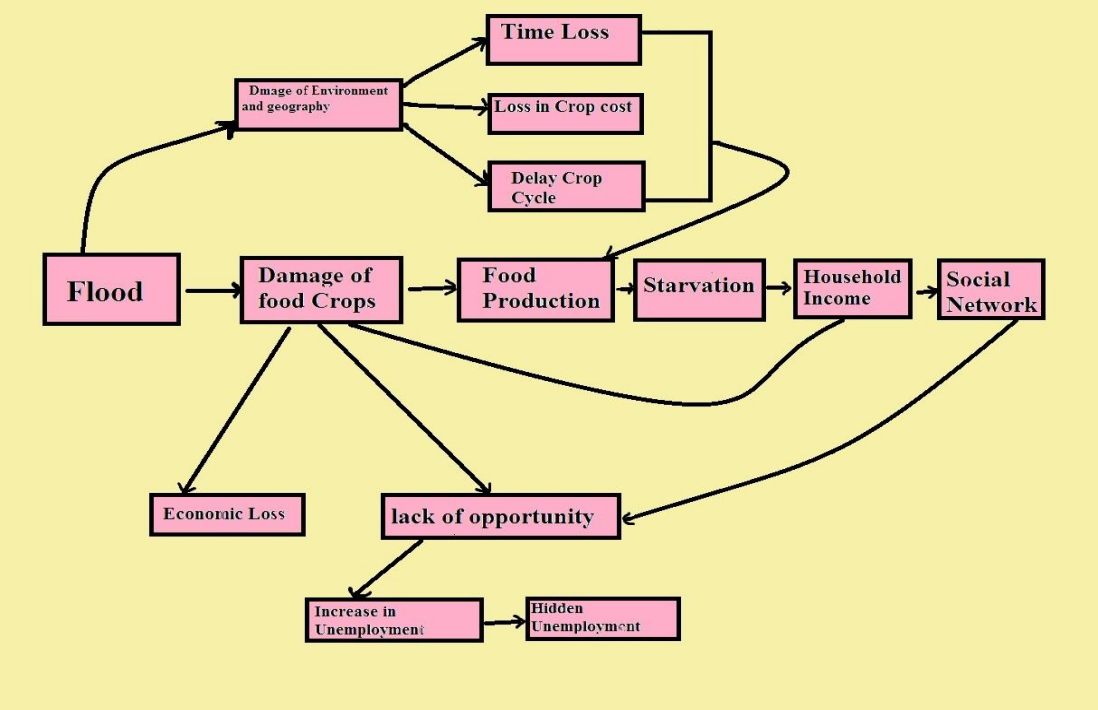
The floods had a direct impact on the endowment and the activities of the household, which affect household behavior, food security, and individual health and nutritional status in several ways. According to UNICEF (1990), there are multiple pathways of flood impact on household resources and well being, the production of food and cash crop, nonfarm employment and wage employment, household domestic assets (e.g. house, utensil, and food stock), productive assets and store value, household income, insecurity (Ninno et al., 2001, p.8). Ellis found that the floods damaged or destroyed infrastructure, workplaces, and household assets, and disrupted the normal functioning of labor, credit, and commodity markets (Ellis, 1998, p. 8). Study by Ninno et al. (2001) showed that the landowning farming households were particularly affected because the floods waters damaged standing crops and receded only in late September, thus, reducing the time available for planting another crop and reducing the level of own food production. Non farming households were also affected, as the floods water destroyed the productive assets of self-employed households, such as weaving looms and rickshaws (Ninno et al., 2001, p.8). While economic damages and loss of life are pronounced in urban and coastal areas, due to the concentration of infrastructure and people, floods in rural areas are both closely linked to agricultural production and livelihoods of rural populations (Manuamorn, 2009).

The flood is also accompanied by reduced availability of food and other commodities which led to increase in the price of essential commodities and a reduction in the amount that could be purchased by households. Food security was compromised by reduced expenditure on food resulting from additional constraint on household budget and rising food prices. Flood led to direct damage and destruction of household domestic assets. The assets at risk from flooding can be enormous and include private housing, transport and public service infrastructure, commercial and industrial enterprises, and agricultural lands (Pistrika & Tsakiris, 2007). Other assets include water pumps necessary for accessing clean water, cooking and cleaning

utensils, and food stock (Ninno et al., 2001, p.8). In addition, the floods had a significant impact on markets, primarily through the destruction of transport infrastructure, market infrastructure, including warehouses, and loss of stored food or agricultural input commodities. These, in turn, reduced the capacity of operators along the value chain (transporters, processors, wholesalers and retailers), raised transaction costs, lowered the functioning of markets, and the availability of food commodities (World Food Programme, 2010, p. 8).

The relationship between the floods and consequent impact on livelihood in a rural centre could be better represented by the figure given below. Flood destroys the food crops which lead to the economic loss as well as the loss of employment opportunities. Further, loss of food crop leads to the low yield which means less grain for domestic consumption. In poor households, with low resources, less grain implies shortage of food which may often lead to starvation. Loss of food crops leads to the decline in agricultural income which is a major resource base in rural places. Thus, there is a decline in income of the household. Floods leads to the destruction of the environment, primarily, agricultural fields. Water logging and inundation leaves the fields unfit for farming, thus farmers have to wait for the retreat of the flood waters which causes time loss and delay in cultivation. Delayed cultivation does not yield optimum output as by the time, the crop reaches the market, the prices decline and the farmers have to incur losses on the input. Also, delayed farming disturbs the crop cycle. Further, floods give rise to lack of employment options giving rise to the problem of unemployment as well as hidden employment in the village.

Figure 3.1 Impact of flood on Livelihood Activities



Adapted from Armah el al.2010.

3.1.1 Floods and agriculture

Floods are an important source of risk for the agricultural sector (Manuamorn, 2009, p. 3). According to FAO Agricultural Assessment Report, the monsoon floods caused damage of unprecedented scale to agricultural crops, livestock, fisheries and forestry and destroyed primary infrastructure such as tube wells, water channel, household storage, house, animal sheds, personal seed stock, fertilizers and agricultural machinery (World Food Programme, 2010, p.6). Low agricultural yield lead to the decline in the household income. Also, standing waters post flood led to inundation of the mature crops which disrupted the production cycle.

Agriculture is the primary economic activity in the village. The land is very productive and fertile. Almost all the households derive their basic subsistence from the crop farming. The big landlords have large fields which they lend to the marginal farmers for cultivation. The flood exercise manifold influence on the agriculture. Firstly, the floods destroy the standing crops, destroying the resource base of the poor farmers depriving them of their principle means of livelihood. Secondly, the loss of the crops deprives them of future cash as well as food grains. It has been found that the farmers utilize their yields as a major resource base. Some part is saved for domestic consumption, some part is held as a seed grain for the next harvest while the

surplus or excess yield is sold in the markets. This surplus is a significant predictor of the household income. Big farmers have larger landholdings, and have greater surplus to sell in the market while the poor or marginal farmers have small landholdings yielding low surplus. The annual floods have detrimental effect on the crop and crop cycle, specifically for the kharif crop such as rice. Table 3.1 shows the annual flood affected areas during the last three years in Bairiya Tehsil.

Table 3.1 Annual Flood Performa (Bairiya Tehsil)

	2008-09	**2009-10**	**2010-11**
Estimated affected area (hectares)	18,832	14666	300
Estimated agricultural area affected due to flood (hectares)	11287	7585	119.7
Annual distributed Relief Fund (Rupees)	1,90,45530	69,38,860.	2438413
Deaths in a year		8	10

Source: Official Record at Tehsil on disasters

Rice is the staple food crop in Shival. Rice is usually sown after the rains of south west monsoon in July and harvested in October. Rice is manually transplanted from the nursery to the fields. The onset of flood coincides with the transplantation of seedlings from the nursery to the fields. The water logging due to floods has a harmful impact on the crop and the floods destroy the crops in its initial phase. Thus, destroying the principle means of subsistence. Due to inundation of flood waters, the farming activity is interrupted and comes to a halt. People then have to wait for the flood waters to recede. And usually this remains for a month or two. The next crop is sown only after the complete retreat of the flood waters. This delay gives rise to numerous problems. Firstly, the entire crop cycle is disturbed i.e. ideally the rice is sown in late June and harvested in September but due to floods, rice is sown in late July or August and harvested in late September or October which in turn interrupts Rabi crops also. Rabi is generally sown in September and harvested in December. The delay in the floods interrupts the entire crop cycle. The delayed crop matures later and reaches the market late. By the time, the crop reaches the market; the prices come down yielding low returns.

Dhari Lal Yadav described that everywhere farmers have 12 months in a year but we have only 8 months. He stressed that there is much difference in the condition of the farmers in the plain against the flood prone region. Nothing has been done to bring them at par through government interventions and schemes; if there are any, are

run only on the ground. The farmers of the flood prone areas are geographically vulnerable and owe their livelihood to the benevolence of the nature. The farmers in the plains have 10-12 months for agriculture against only 7-8 months amongst the farmers in the flood prone areas. It takes almost two months to bring back field to the cultivable stage after floods which bring the major setback to the crop cycle. Thus, farming has not remained a viable livelihood option for the poor and marginal farmers.

Another informant Shivpal Singh described that the poor and downtrodden are the worst sufferers but it is not that only they suffer. The rich and affluent are also influenced by it. In his own words:

> *"Lekin iska matlab yah bilkul nahi hota hai ki jiske pas jameen hai vo pareshan nahi hai. Ham bhi is bhad me kya kar sakte hai jo kheti hai bhi vo kisi kam ki nahi rahti hai, baki samay job hi hota hai us se sirf khaya ja sakta hai koi fayada nahi kamaya ja sakta"* meaning that the poor are definitely more vulnerable but it doesn't mean that the rich and affluent are happy. Big landholder's also encounter similar problems. In this situation, one can survive here but cannot make money.

Infrastructure facilities such as poor roads and storage facilities disrupt the transportation and marketing of crops and the farmer is unable to reap optimum output on his yields. Secondly, delayed crop influences the food security of the house. The recurrent floods have destroyed the resource base of the major farmers. Farmers are bound to sell a major portion of their crops to repay their loans or in the recovery post disasters. Miserably loss of a single crop brings leads them to the verge of starvation. Thus, floods have a direct influence on the food consumption pattern in the household. Manual wage cultivators who work on others' farm also run out of employment due to water logging. Usually, they out migrate to nearby urban centers to earn their livings. Since most of them are unskilled and lack any technical skills, they have to work as casual or unskilled labor.

In the words of Dharmanand Nand:

> *"Every year flood interrupts the agricultural cycle crippling the backbone of the economy. Due to water logging from mid June to mid August, kharif crop is badly influenced*

depriving people of the basic food grains; in case of severe flood almost a crop is lost. Besides agriculture other economic activities also come to a halt such as MNREGA and other programmes depriving people of livelihood. Almost every year Kharif crop is destroyed by the flood and it is a rare year when there is optimum yield. Further, it also influences the upcoming Rabi due to the prevalent scarcity of flood grains and indebtedness. Thus, farming has almost become a gamble for the inhabitants".

Similarly another informant Ram Pujan described:

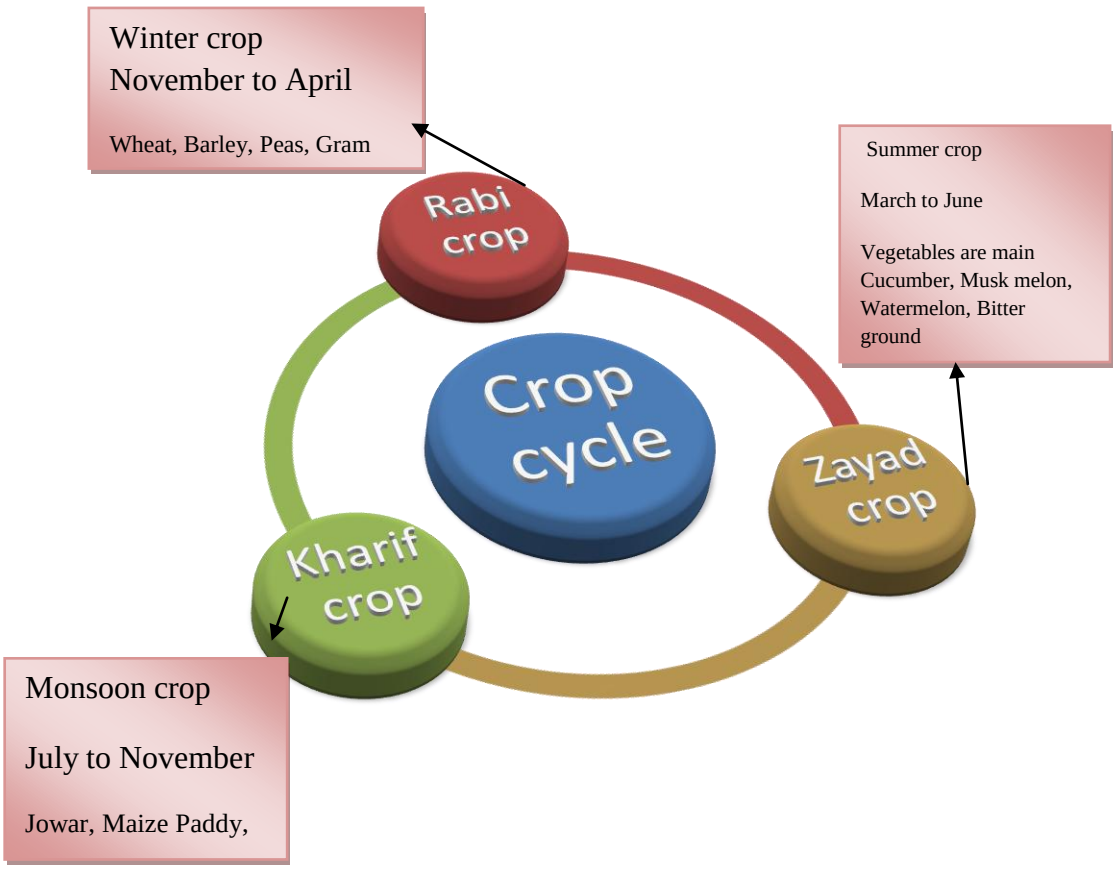
"Flood not only influences the yield but it also influences the marketing of the yield. Due to poor road and water logging, harvest fails to reach the market at the proper time. And by the time, it reaches the market; the costs come down, downgrading the profits. Although people have sufficient landholdings, yet we have not prospered compared to the other villages".

He admitted that that he is a retired deewan and his son is in police service yet he is unable to save much from agriculture.

3.1.2 Floods and the Crop cycle

In northern India, tri-crop system is practiced i.e. three crops are grown in a year viz, Rabi, zayed and kharif crops. These three are seasonal crops and grown in a specific period of the year. Rabi refers to agricultural crops sown in autumn and harvested in winters (October last to March Last). Wheat, barley, peas, gram, mustard are the major Rabi crops. While Kharif crop refers to the planting, cultivation and harvesting of any domesticated plant sown in the rainy (monsoon) season. Kharif crops are usually sown with the beginning of the first rains in July, during the south west monsoons. Millet (bajra), sorghum (jowar), paddy (rice), maize, mungbean (green gram), arhar or tur (pigeon pea), urad (black gram), peanut (groundnut), sunflower, soybean are the major kharif crops. In between the Rabi and the kharif seasons, there is a short season during the summer months in which seasonal fruits are grown known as the Zayed crops. For e.g. watermelon, muskmelon, cucumber, vegetables and fodder crops.

Figure 3.2 the Crop Cycle in the North India



Time is very important determinant of this crop cycle. Floods coincide with the kharif crop. Usually, kharif is interrupted due to the onset of the rains and the crop is delayed. This delay has a detrimental influence on this crop cycle. Often, this delay is carried on for a year or so leaving the farmers at a great loss. This in turn disrupts the livelihood of the farmers. The poor and marginal farmers are the worst sufferers since they have little resources living hand to mouth. In case of unavailability of the other employment options, they are left to starve without any alternative source of income.

Another informant Chamman Chaudhary eht no regna otni stsrub ylneddus fo eussi work during the flood. In his own words:

> *"Do you think we have any option? We do not have morsel to feed".* He described that *"landless people like him find it difficult to carry out a living. During floods, we do not have work for living and are helpless. Though we want to work, but have no options and just have to sit idle in search of employment".*

3.1.3 Livestock

Livestock refers to one or more domesticated animals raised in an agricultural setting to produce human commodities such as food, fiber and labor (Glossary of terms). Rearing of animals is yet another important source of livelihood in the village. Rearing livestock is usually low cost investment as the grass, husks, hays, etc. to feed them is easily available in the village. People generally keep cows for milk while ox is tamed for cultivation. There are some castes that have been traditionally living on the sale and purchase of the milk and milk products such as the Yadav and the Gond. It is their traditional means of livelihood. This is only meant for local sale and purchase due to the lack of market and proper connectivity. Livestock is also used as a buffer asset and people resort to their sale in case of severe crisis.

Maintaining livestock during floods becomes a major issue as there arise shortage of fodder due to water logging in the fields. Often the cattle have to go hungry for days as grass becomes scarce while the stored hay gets wet. Relocation of the residents to the shelter camps also creates added issues. Animals become nuisance at the shelter camps creating problems for the inhabitants. Also, cattle are vulnerable to insect and snakes bites, and other diseases.

3.1.4 Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA)

Apart from agriculture, there are a few government programs to provide livelihood to the inhabitants in the village specifically MNREGA. Mahatma Gandhi Rural Employment Guarantee Act was launched in the year 2005 with the aim of providing guaranteed employment to the rural poor in the country. According to the Act, each family is entitled a minimum 100 days of manual work at a wages exceeding a minimum amount. The primary aim of the Act is to ensure minimum employment to rural households and to increase wage employment along with a secondary focus to improve natural resource management. These include works like drought proofing, rainwater harvesting, and soil conservation, afforestation, and pond and tank construction. Apart from encouraging sustainable use of resources, these works also help in mitigation of an adaptation to climate change and in turn, improved productivity and quality of life. MNREGA is one of the largest poverty alleviation

programmes, which acts as a strong safety net for the poor in the absence of alternative sources of employment.

MNREGA was launched in the year 2006 in the village. There are currently 460 registered job card holders in the village, and out of 460, 68 are females and 392 males. The beneficiaries are mostly the Yadav and the Gond. According to the official estimates, in the fiscal year 2010-2011, Rs 5.0 lakh was spent on the scheme. MNREGA has proved to be beneficial for the poor and marginalized farmers. Although complaints of malpractices in the scheme are reported such as preference in wage roll to the near and dear ones of the Pradhan or delayed payment or payment less than the stipulated wages, yet the villagers are happy as it is the only option for the poor and marginalized farmers.

Kalavati described:

> *Manregva na aail hoth th kuchhau na laukat, iha th theek se jai bari rastau na laukat" i.e. all the growth and development in the village owe to MNREGA.* The MNREGA has been landmark in this regard and all the progress has come henceforth due to it or else even the road was not visible in the village. Before MNREGA, there was lack of roads and other infrastructure. The road was muddy and poorly maintained. MNREGA led to the development of the village. She is quite hopeful that it will further lead to the growth and progress of the village in the times to come.

MNREGA has proved to be a viable livelihood option for the poor and marginal farmers. However, there are several constraints. Firstly, MNREGA is only meant for the 100 days in a year. So for the other part of the year, people are left idle. Secondly, the employment sources are dependent upon the work carried out by the local panchayat which further is influenced by the budget of the panchayat. Further, registered residents always outnumber the required number. Most of the residents are not able to get stipulated work benefit. Floods also have a detrimental impact on the employment options under MNREGA as all construction work comes to a standstill during floods.

3.1.5 Migration

Disasters act as a "push" factor in the decision to migrate, forcing people to move from one area to another. Migration as a coping strategy in the wake of a disaster is fundamentally influenced by the social context in which people are embedded (Myers, 2007, p.4). It has been found that there are very little employment options in the village. To let their both ends meet, potentials job aspirants move to the local markets and nearby urban centers like Ballia and Varanasi. Due to the lack of vocational training in the village, most of them work as unskilled manual labor. Some of the migrants visit their families regularly and send remittances back home, where it complements the income from the agriculture. Many of the families have members who live in urban centers and work as unskilled laborers sending remittances back home. But their income is not very high as most of them are unskilled and non literate and work as manual unskilled labor in the urban centers.

3.1.6 Lack of opportunities

Floods have a detrimental impact on the livelihood opportunities in the village. Rural areas are marked by limited livelihood options which further worsen during floods. Due to water logging, all agricultural activities come to a standstill and thus, villagers are left to sit idle without any work. The poor and marginal farmers are the worst sufferers as they live hand to mouth living on the daily wages. Most of the inhabitants work as manual wage laborers and have little to save without any alternative source of employment. The interior location of the village as well as lack of proper means of communication inhibits commutation for livelihood. People are driven into the vicious cycle of unemployment.

Lori Gond described:

> *"The unemployment becomes the major issue during and post disaster. It exercises twofold influence on the poor flood victims. Firstly, it cripples the usual livelihood options depriving people from their chief means of sustenance. Due to water logging, cultivation come to halt and manual laborers find it difficult to let their both ends meet. Lots of people are left jobless. The government induced employment schemes such as MNREGA which has proved to be boon for the poor and landless people is also interrupted due to water*

logging and crunch on the resources. In fact, poor connectivity further becomes an issue as poor transportation prevents movement to nearby urban areas for work. Lots of people are left idle without any work and are forced to survive with bare minimum resources.

Another informant Dhari Lal also reiterated the same thing. He replied:

The situation gets worst for the manual wage earners who run out of employment during floods and lose all livelihood options. The villagers have little opportunities for the subsidiary occupation, left at the vagaries of the nature. In local markets, the surplus of manual laborers is created which leads to the downfall of the wages adding to the agony and miseries.

Further, lack of skill or technical training is another constraint. There are no vocational schools in the village and, most of them are unskilled which limits their opportunities. This further undermines their employment options in the market, and they are forced to work as manual or unskilled labor. This has deeper implications for their future as there is little scope for growth and progress, and thus, they are driven into a vicious cycle of poverty. Sometimes the issue of hidden employment crops up. Hidden unemployment may be understood from the example given below. The one who is actively looking for a job but have no works is called unemployed. While those who have given up looking, those who are working less than they would like, and those who work at jobs in which their skills are underutilized are not officially counted among the unemployed, though in a sense they are. This is known as hidden unemployment. Hidden employment is a common problem in the villages. It has been found that often an entire family works in the small farm.

Another informant Mahesh replied:

In his own words *"badh humni ke jaldi budh bana dela".* According to him, the floods influence the growth and well being of the youth and make them mature at very tender age. Combating floods, year after year, makes the inhabitants become quite mature and they start making their living very soon. "*The loss of crops and livelihood adds to the burden of*

making the both ends meet, thus more and more people are diverted towards work in the family. Often poor children become the prime victims and they start learning some vocation to support their families as early as possible. Most of the youth find themselves stranded with the responsibility of seeking work for wages and feeding their family. He further added that *"this is not confined to males in the village but to females as well. Females are also expected to contribute towards household duties and specifically in the reconstruction of household post flood. They start working in fields' apart from the kitchen and household activities".*

3.2 Flood and the Public Health Facility

The health impact of floods has been widely documented but there exists a lack of literature on the impact on the public health. In this section, I am going to discuss the impact of floods on public health. As mentioned before public health is a broad concept and includes wider elements which influence the health and well being of the community. Public health is "the science and art of preventing disease, prolonging life and promoting physical health and efficiency through organized community efforts for the sanitation of the environment, the control of community infection, the education of the individual in principles of personal hygiene, the organization of medical and nursing service for the early diagnosis and preventive treatment of disease, and the development of social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health" (Baggott, 2000; Winslow, 1920). It incorporates health care system, health care services and infrastructural factors as an elementary ingredient of the health of the community. The health system is the subset which includes resources, services and organization while the health service system is made up of health service system as well as nutrition, environment and other essentials having a bearing on health. The health services systems is an umbrella term which influence health of an individual. It includes within itself, health care services as well as a vast array of institutions /sectors /processes that have wider implications for the individual health and well being. In addition to health services, agriculture, food availability, water supply,

environment, sanitation, housing, education, transport, etc. also determine the public health scenario as all these have a bearing upon the community health.

In this section, we will first discuss the civic amenities and infrastructure in the village which has a direct bearing on the public health in the community. The details of the water supply in the village, toilet facilities, education facilities, electricity, means of communication, and road in the village has been mentioned in this section. The next section deals with the public health facilities in the village and how they were disrupted after flooding. Immediately after the floods, there is rise in various kinds of water borne diseases and a host of health related issues. In addition, floods destroy the basic infrastructure giving rise to the problem of hygiene and sanitation, and so on. The basic health care facilities in the village, perception about the health amongst the community members, and the problems in the delivery of the health care services in the village have been dealt in the last section.

3.2.1 Civic amenities and infrastructure

3.2.1.1 **Water supply in the village**

The village is quite underdeveloped and suffers from the lack of basic amenities. The biggest problem in the region is the availability of the pure drinking water. In the village and the nearby areas, water is contaminated with arsenic and is not fit for consumption. The water contains arsenic which makes it unfit for drinking and household chores. A report by the Water and Sanitation Support Organization (WSSO) to estimate the arsenic affected areas of district Ballia, reported that arsenic is frequently found in those hand pumps which are located at the depth of 75 feet below ground. It has been reported that the melanosis was common in the region with manifestation of white spots on legs and abdominal region in a numbers of persons belonging to different age groups (Department of Rural Development, Uttar Pradesh, 2011, p.3). The other health issues due to arsenic are given in the table below:

Table 3.2 Health problems in environmentally exposed populations due to Arsenic

Organs affected	Effects
Skin	Hyper pigmentation Hyperkeratosis Skin tumors
Lungs	Lung cancer*
Liver	Liver dysfunction Haemangioendothelioma
Cardiovascular system	Peripheral vascular disturbances leading to gangrene
Nervous system	Peripheral neuropathy Hearing defects
Hematopoietic system	Disturbed erythropoiesis with anemia
Reproductive system	Increased frequency of spontaneous abortions*

* The Role of arsenic in these effects is equivocal

Source: (Human Health Concerns of Lead, Mercury, Cadmium and Arsenic, 1987)

Hand pipe is the major source of water supply in the region. In the village, most of the hand pumps are located at 50-75 feet below ground level, and are invariably contaminated with arsenic. The government installed few India Marka hand pumps to combat this issue. These hand pumps are installed at 120 feet below ground level, thus are less prone to arsenic. But they are much cost intensive and very few hand pumps could be installed which is not sufficient for the entire village. Using their political mileage, higher castes were able to get it installed in their locality and the poor and marginalized do not have access to it. The Yadav and the Thakur settlements are equipped with these hand pumps while the poor and lower castes people are compelled to drink contaminated water.

Illiteracy and low awareness amongst the members makes them quite casual about the issue. People do not have an exact idea of the problem concerned. Some of them know that they are drinking contaminated water but still have no idea about its ill impact. Some of them do not acknowledge it as a serious problem, although are concerned about arsenic. Arsenic has a detrimental impact on the human body and health. But since the impact are not immediately visible so there is not much uproar in the community. Speaking on the issue, the doctor at the PHC Dr Mahendra Nath commented:

> "*Drinking water is a major problem in the village. Most of the villages are suffering from the problem of safe and pure drinking water. The drinking water supplied is contaminated with arsenic and people are vulnerable to several water borne diseases".*

One of the informants Lori Gond described:

> *"Dar tho haiye hai par abahi tay kuchu na bahail batai"* it mean that we are afraid, but there has been no problem as of now. Thus, the issue has not been given due concern.

During floods the situation gets critical. Hand pump water gets muddy and unsafe for consumption. This water is unsafe for consumption and gives rise to several infectious and water borne diseases.

3.2.1.2 **Toilet Facility**

Open defecation is a common practice in the villages. Very few informants had toilets in their homes. Most of the people use open fields for excretion and urination. Very few houses are equipped with latrines in their homes. Only rich and affluent people have latrines in their houses. Even then males still prefer to go in open for defecation. Economically weak and marginalized find it economic liability, and regard it as unnecessary asset. They regard it as a burden on income, space as well as infrastructure. Most of the poor and downtrodden have small house where it is impossible to accommodate toilets. In rural setup, people prefer housing toilets away from the living rooms preferably in the house as it is not regarded as a healthy practice to house living room adjacent to the bathrooms (or toilets). Further, latrines demand space which is not feasible in small houses. So they prefer open defecation to cemented latrines. One of the informants Kallan Chaudhary replied:

> *"Haman janat hai ki jaroori bati, par iha Kuriya me kaha banai bathroom", it* means that we know the importance of the toilets but where can we put the toilet in this mud house?

There are government sponsored schemes for the promotion of toilet facility in the village. Under this scheme, grants are disbursed for the construction of latrines in the house. For Below Poverty Line (BPL) persons, the governments provide Rs 1500 as the promotional money for building toilets in the homes and an individual has to bear only 400 Rupees. The share of the Central government in this grant is 900; Rs 300 is drawn from the state government, while 300 is disbursed from the Local Panchayat funds. Some grant is available for the Above Poverty Line (APL) families also.

3.2.1.3 **Education Facility in village**

There is an acute scarcity of education facility in this region. There is one primary school and one higher primary school is in the village. There are no options for secondary or higher secondary educations, leave aside the higher education options. In the year 2011-2012, registered number of students in the primary schools was 233 out of which 118 were girls. But the student turnout is very low which further decline during floods. The student teacher ratio is highly skewed. One teacher is responsible for the entire curriculum plus often has to look after the other classes at the same time due to the unavailability of the staff and personnel.

It is to be noted that the gender ratio is quite even which is quite interesting to probe. At the first instance, this number gave a positive picture of education in the village. These statistics point towards gender equality in education which proved to be contrary in the study. The researchers tried to know the reason behind the high enrollment of girl child in the village. Does it in anyway indicate gender equality. To which the principle of the primary school Sri Sadhinath Yadav replied:

> "*No, it is an example of gender discrimination. The parents preferably send their male child to some convent schools while the girl child is sent to the primary school. People do not like to invest in the education of the girl as they believe girl' education is not worth it. Most of the people believe that a girl is supposed to work at home and carry on household chores. What's the point in educating her more? Further, money spent on her education is a loss as she has to be married and leave her natal home. Thus, they do not prefer to educate them. People enroll their girl child in lure of the mid day meal schemes and other facilities such as scholarships and government grants for educating a girl child".*

The literacy rate is quite low and most of the villagers are non literate. Even the ones who claim themselves as literate are hardly able to read and write. Most of my informants claimed themselves to be literate and one of the informants was graduate (Bachelor of Arts) from Sudish Baba Degree College. This region is quite underdeveloped and there is huge scarcity of education options in the village. Poverty and backwardness has impeded the growth and development and has thus, prevented education to reach the masses. Sadhinath Yadav further added:

> *"This region is quite backwards. There has been no development in the village. Local leaders have done nothing substantial to develop this region. The biggest problem is the provision of education in the village. Rich and affluent send their wards to the nearby urban centers such as Varanasi, etc. The poor and the marginalized are the worst sufferers as they have meager resources and awareness to educate their children".*

It has been found that education is not a priority amongst the villagers. Most of the villagers have been traditionally engaged in farming and agriculture and find education to be less valuable for their livelihood, and regard it unnecessary for their survival. It has been found that lack of employment prospects compels them to concentrate on the vocational training. They do not find education a viable investment and find no reason to spend money and time on it. Frequents floods has demolished their resources, and thus, their prime concern is to teach livelihood skills to their wards then mere words and numbers. They are less inclined to educate their children. Although, they may enroll them but the student turn out is very low for both the genders for different reasons. Male children are supposed to help their father in agriculture while a girl child is expected to help her mother in the domestic chores such as cooking or fetching waters or looking after the younger siblings. Thus, student turn out is very low which often worsens during agricultural periods or floods.

Speaking on the issue, one of the informants Mahesh Kushwaha replied:

> *"Padiya se naikhe na chali bhai sahib, kuchu padhi leyel jai ta ka hoi? Naukari mili? Ase badhiya ta kaam kaaj sikh le el ta kamai khai ta lei na".* Meaning thereby education cannot secure livelihood. What is the viability of this education? It is better to learn some vocation than learning words and numbers.

Further, illiteracy and poverty also aggravates this problem. There is a common perception that education is only for the rich and poor and who want to seek white collar jobs in the market. They believe education makes people lazy and unfit for manual work. They believe education will make their progenies become averse towards agriculture or manual job which is their prime source of livelihood. Thus,

education will reduce their employment opportunities in the local market. One of the informants replied:

> "*Babua collector nakhe na ban jai…. Phir to rajva kamao na kari. ..Khetva ke dekhi'* meaning thereby he is not going to become a collector. If he will study, he will stop working on my fields, then who is going to look after them.

3.2.1.4 **Electricity**

The village has been lately electrified. The electricity has been supplied through cemented poles and used for the domestic consumption as well as agricultural purposes. But there is lot of irregularity in the electric supply. It is reported that during the sowing period, it is regularized for the agricultural consumption while the rest of the year the supply is quite uneven. The villagers are not much concerned about it as they believe electricity is a luxury and can be done without. In an interview, one of the informants replied,

> *"Baki cheej jaroori hai light vaight tho bad me aa bhi jayegi, jitni hai utni kafi hai"* meaning thereby electricity is not a priority. We need some other things for our living. We can manage without it.

3.2.1.5 **Communication**

The village is quite underdeveloped, yet popular means of communication are easily available. Mobiles have made their way into the villages. People have personal mobiles. Almost all the informants had mobiles in their family. In some families more than two mobiles were found. People are no more interested in sending traditional mails and rarely visit post offices. People prefer mobile to writing letters. As government post is very slow and time consuming and may take months to reach the destination. Secondly, most of the villagers are illiterate or only primary educated and are not able to write letters. They have to rely on some other persons to write their messages which caused them great inconvenience. Further, the nearest post office is very far away from the village and difficult to reach. Thus, people find mobiles to be a convenient source of communication.

3.2.1.6 **Road facilities in the village**

The village is severely underdeveloped suffering from the lack of basic amenities. The road is demolished and filled with numerous potholes. The road is full of numerous pits and potholes which makes it vulnerable to accidents. Earlier, there was muddy road in the village which created serious constraints in the movement. It used to get waterlogged during rainy season or floods, making the movement difficult. Often the villagers were forced to move through marshy path during the rainy season. Pedestrians could still make it out but the bicycle riders or motorcyclists found it difficult to move. The concrete road was built in the year 2003 under the centrally sponsored scheme the Pradhan Mantri Gram Sadak Yojana (PMGSY) to provide all weather road connectivity in rural areas of the country. The programme envisages connecting all habitations with a population of 500 persons and above in the plain areas and 250 persons and above in hill states, the tribal and the desert areas (Pradhan Mantri Gram Sadak Yojana, 2000, p.2). However, due to the lack of maintenance issues, the road again got damaged.

This road is the only link to the outside world besides village. This road connects the village to the railway station, local market, and other important centers like health centers, banks, tehsil, etc. The road is linked via bridge on the stream of the water which is associated to the main river. Frequent floods has destroyed the bridge and has made it unfit for movement but the administration is quite negligent about the issue. After the continuous heedlessness of the administrative officials, the villagers themselves created a temporary structure for movement. This bridge is made up of woods and bamboo. Although, it has eased the movement but it has low durability and is not safe and very risky. During floods, this also gets disrupted and people find it difficult to reach the central secretariat and other far off places. This makes the movement very tough and impedes the access to the outside world. The alternative way to travel to the markets is through four-wheelers via agricultural lands, which is quite lengthy and one has to cover 12 to 14 km instead of 5 to 8 km to reach the local market. This is a costly affair and consumes more money and time. During normal times, this does not appear too taxing but during emergencies it becomes a serious problem.

Speaking on the road structure in the village during an interview, one of the informants Shivdhar Yadav described:

> *The biggest problem in this village is of connectivity to the outer world. The road is dilapidated and unfit to move. The*

government tried to build bridge to develop this region but unfortunately it could not be completed due to the red tapism. Later, this incomplete structure became problem for the inhabitants, as it destroyed the earlier local structure built by the residents to navigate from the village. He emphasized that people don't need a vast bridge but a link to move. He ridiculed the government action plan in a sarcastic manner, "*D**as baetyo ke bad ladka hua tho vo bhi napunsak ho gya***" meaning thereby a son born after 10 daughters and that too an impotent one. He concluded his agony in the following words, ***"Duniya chand par pahunch gai aur ham bansh par hi rah gaye",*** i.e. the world has reached the moon and we are still lingering on bamboos (bridge).

Similarly, another informant Kalavati replied:

"***E tha marai ke rasta na huye babu".*** This road is the way to death. She further added said that "*the things have changed a lot due to MNREGA otherwise earlier there was nothing. The state of infrastructure was poor and totally demolished. But still lot remains to be done. The road is the major constraints in the growth and development of the village".*

Further, Kalpnath Yadav also added:

"*The floods have a major impact on the road in the village and disrupt the connectivity. But the administration turns a blind eye to the issue"*. He added that "*although such problems are common to other villages too but ours is a perennial problem. In other villages, generally the problem is confined to floods but here there is no change. This has a major issue in the accessibility to the world beyond the village".*

Poor road has a direct impact on the connectivity problem. This has a major constraint for economic activities as it prevents the navigation to the outside area, preventing the inhabitants from seeking livelihood in the nearby place adding to their woes during as well as post flood. People find it difficult to commute to the nearby

places for livelihood and work. To and fro journey is very difficult and time consuming, and it is difficult to return home in a working day. Thus, those who are ambitious enough to work in the nearby places are forced to move permanently as a migrant which in itself has several added constraints.

One of the informants Dharmanand Singh replied:

> *"Floods not only influence the yield but it also influences the marketing of the yield. Due to poor road and water logging, harvest fails to reach the market at the proper time. And by the time it reaches the market, the costs come down, thus downgrading the profits. Although people have sufficient lands, yet we have not prospered compared to the other villages"*. He admitted that that he is a retired deewan and his son is in police service but he is unable to save much from agriculture. Almost every year a part of the profits are drained by the flood waters. He further added that "*ownership of land is not very profitable in this 'Diryanchal'. Most of the resources are lost in the coping and maintaining the status quo. Thus, at the end of the year one does not have much to boast about. The condition of the poor and marginalized is even worst in the village*".

Poor road is a major roadblock in the accessibility to the health centers too. The nearest PHC is seven kms away from the village. And one had to go via bridge to the PHC which is dilapidated and unfit to move. The distance inhibits the health care seeking behavior of the individuals. The poor and marginalized find it difficult to afford four wheelers or motor bikes to carry them to the PHC. They avoid visiting health centers for minor illness and health care services are sought only when the problem gets severe. This has a dual impact on the health care services. Firstly, it impedes the health care seeking behavior of the community as a whole. Secondly, it further aggregates the gender biased health care practices. It has been found that there is gender discrimination in the health care services. In popular practices and specifically in the rural setup, the health issues of the females are not given priority. Females do not have adequate access to the health care services due to the secondary status in the family.

It has been found that females rarely visit the PHC for their personal problems. The accessibility is a major issue in this regard. Women frequently reported that distance is the major roadblock to the accessibility. The PHC is very far away from the village thus they cannot travel alone and have to be accompanied by male members which limit their health care seeking behavior. Often they are hesitant to disclose their illness to the males due to the cultural setup. Further, PHC is very far away and one needs a conveyance thus minor illness are not paid heed as the patriarchal setup pays little heed to the women's problem. Thus, the road is a major barrier to the accessibility to the public health in the village. Also, poor road blocks the connectivity to the outside world and makes the movement difficult in case of crisis as well as normal period.

3.2.2 Health care services in the village

3.2.2.1 Health care facility in the village

There is an acute lack of health care facilities in the village. There is not a single Primary Health Centre (PHC) in the village. The nearest PHC, PHC Kotva is seven kms away from the village while the nearest Community Health Centre (CHC) is 14 to 16 kms away from the village. A PHC is basic structural and functional unit of the public health services in the community. An ideal PHC is expected to cover a population of 20,000 in hilly, tribal, or difficult areas and 30,000 populations in plain areas with 4-6 indoor/observation beds. It acts as a referral unit for six sub-centers and refer out cases to CHC (30 bedded hospital) and higher order public hospitals located at sub-district and district level (Indian Public Health Standards (IPHS) For Primary Health Centres, 2006, p.3). Its primary function is the provision of Out Patient Department (OPD) services for two hours in the morning and two hours in the afternoon plus 24 hours emergency services in the community. It is concerned with the dispersal of the medical care, Maternal and Child Health Care including family planning, Management of Reproductive Tract Infections (RTIs)/ Sexually Transmitted Infections (STIs), National Health Programmes including Reproductive and Child Health Programme (RCH), HIV/AIDS control programme, nutrition services (in coordination with ICDS), School Health, Adolescent Health Care, Promotion of Safe Drinking Water and provision of basic amenities such as sanitation, prevention and control of locally endemic diseases like malaria, Kala-Azar, Japanese Encephalitis, collection and reporting of vital events, spreading education and awareness about

health and non communicable diseases, monitoring and supervision of AYUSH, maintenance of record of vital events in the village (Ministry of Health and Family Welfare New Delhi, 2006, p.3).

Ideally, the PHC should have two medical officers out of which one may be from AYUSH or lady medical officer, one pharmacist, three nurse-midwife staff suitably for 24-hour, two nurses which may be also contractual, one female health workers, one health educator, one male and one female health assistant, two clerks, one laboratory technician, one driver (for ambulances and the vehicles may be out-sourced) and four class IV staff. Comparing to the ideal PHC manual, there are only two medical doctors, one pharmacist, one health worker female, two health assistant (one female and one male), one laboratory attendant, one sweeper at the PHC which is half the number of the standard norms.

Geographical distance limits the accessibility to the PHC. In case of crisis, people resort to the PHC for health care service but preferably avoid CHC, as it is very far away from the village. In case of emergencies, people prefer district hospitals due to its outreach and easy connectivity via trains than CHC. Distance adds to the medical costs, preventing people from seeking professional health care. In case of minor diseases and illnesses people resort to home remedies or local quacks. There are few local clinics in the village owned by the practitioners who hold fraudulent degrees such as DMS Patna, DMS.FPT, and MBMS (BHU), etc. Although people are quite skeptical about their skills, yet are bound to use them due to poverty. There are some private clinics but are very costly, thus out of the reach of the poor and marginalized.

One of the informants Hari Gond described:

> *"The accessibility to the health care services is a major problem in case of disease and illness. Firstly, the distance and secondly, the accessibility pose a major constraint in seeking PHCs. For minor illnesses, we resort to home remedies or quacks".*

Another informant Kalpnath Yadav also reported the similar problems. He replied:

"There is acute shortage of public health facilities in the village. There is no PHC in the village. Nearest PHC is seven kms away from the village. It is also under furnished lacking the personnel as well as the resources. The situation further deteriorates during and post floods. Immediately after flood, there is rise in the disease and water borne infections. Floods have a highest toll on the health facilities in the village. But there are no special provisions to deal with the health needs of the peoples. Usually the PHC is overburdened with load increasing multifold after floods. Further, lack of proper roads and means of transport hinders the access to health facilities. In the case of severe illness one has to hire private transport which adds to the medical costs".

The situation is further worse for the vulnerable groups like the women, children. Women are marginalized in the access to the health care services in the community. Their health concerns are given lowest priority. Lack of economic assets to pay for healthcare, as well as cultural restrictions on their mobility may impede them from travelling to seek healthcare which is a major roadblock in the accessibility and availability of the health care to the females. Further, rate of institutional deliveries is very low. Most of the deliveries are being carried out in the homes under the supervision of local dais. A woman informant Kalavati replied:

"*Health is a luxury in the village and people do not have sufficient resources to seek medical aid in case of illness and disease. The condition is further worse for the fairer sex due to the prevalence of systematic gender discrimination and marginalization. Women are prone to several diseases due to the lack of proper food and nutrition and accessibility to the health care services. Often their health issues are not acknowledged as such. Women are last to seek medical aid in case of disease and illness and only consult PHCs when the condition becomes critical. The situation is similar in case of reproductive and maternal issues. Most of the*

women prefer home delivery during pregnancy. The rate of the institutional deliveries is very low in the village."

In an interview on the health care services in the village, the duty officer Dr. Mahendra Kumar Jha described the lack of personal as the major constraint in the delivery of the health care services in the community. He described:

"*In rural areas, there is deficiency of medical facilities. The government body is often overburdened with several commitments in diverse areas. Although our PHC is handling the NRHM programme, yet there exists an acute shortage of resource and personnel. Further, there is no specialist although the programme envisages it so. The one' who are appointed here do not stay here for long and leave quickly. It becomes difficult to deliver required health care services to the inhabitants. The things would be worst but for the ASHA and ANM who are major resources personnel at the ground level. In such circumstances, one is not concerned with quality but quantity i.e. reaching to majority numbers and providing minimal health services to maximum number of people".*

The ANM also had a similar opinion on the issue. She gave a very grim response on the health care service provisions in the community. She replied:

"***Babu kuch bhi tho khas nahi hai bas kam chalaya ja raha hai"*** meaning that the things are practically not sufficient but anyhow we try to manage the situation. She enumerated several constraints in the provisions of health care facilities in the area. Firstly, the village is highly populated. Each village is inhabitated by around 1000-2000 population and each ANM is responsible for more than two villages. She described she herself is handling three villages covering around 5000 people. One can imagine the work load on each personnel. Further, post flood communication system is destroyed and connectivity becomes another constraint. It becomes difficult to reach people due to water logging and

> poor roads. Due to the shortage of resource and personnel often they are interested in the provisions of health programmes but do not enough time for the surveillance and evaluation of the outcome and impact of the programme.

The ASHA also reported:

> *"We are the one who are working in the fields. The doctor only gives instructions while the implementation part is our domain".* She enumerated certain difficulties in the discharge of her duties. She added the ANM is very negligent and quite irregular in her duties. She does not also perform her duty well due to which major work load falls on her (the ASHA). She is responsible for the whole village. *'I am the only person, who is responsible for all, and I am not too much professional. People expect that I should know everything, but it is practically not feasible".*

Floods have a major impact on the health care services in the village. It has been found flooding has a severe consequence for the delivery of the health care services. To explore the problems in the dispersion of the health care services in the village, the researchers carried out interview with the personnel. The probing question was 'How do you manage the health care services during floods with such limited resources'? To which Dr. Mahendra Kumar Jha replied:

> "*During floods, the health care services are delivered through several temporary agencies such as temporary medical posts at relief centers and mobile ambulances. Often help is sought from other PHCs also. Personnel are hired from other districts in case of emergencies. The target is on providing health care services to the maximum number of people with minimal loss of lives and resources".*

He further added:

> "*We try our level best, but we have our own limitations; we just try to reach to the maximum numbers. But sometimes,*

we are helpless in front of nature, and also due to institutional limitations."

The villagers are quite unhappy with the current health care service system and regard it as an inadequate. They are also disappointed with the performance of both health personnel and regard them as negligent of their duties.

Chamman Chaudhary commented:

"The *ASHA and ANM are just statutory bodies quite negligent of their duties. The personal rivalry between them has further aggravated the problem. The ASHA is from higher community and thus, is quite biased and does not help the lower castes people. The lower caste people are discriminated in the delivery of the services and do not have access to basic information"*.

Thus, we find there is acute shortage of health care facilities in the village. The constraints are numerous including geographical barriers, social barriers, and institutional barrier, and so on. The situation further deteriorates during floods and has major implications for the health of the community.

3.2.2.2 **Understanding and perception of the health care personnel**

There is acute shortage of health facilities in the village. The nearest PHC is seven kms away from the village. The PHC is highly under furnished and suffers from the lack of infrastructure and personnel. Under the National Rural Health Mission (NHRM), the Accredited Social Health Activist (ASHA) and the Auxiliary and Nursing Midwife (ANM) have been stipulated for the provision of the health care services in the village. The National Rural Health Mission (2005-12) seeks to provide effective health care to a rural population throughout the country with special focus on states, which have weak public health indicators and/or weak infrastructure.

Speaking on the health care services in the village, the ANM replied that she is overburdened with responsibilities and has to look after four villages which is quite tedious. She replied:

"There are several problems in the provisions of health care facilities in the village. Firstly, there are institutional problems such as lack of resource and personnel. Secondly, there exists apathy towards health among the villagers.

Health is not given due prominence and is not on peoples agenda. Health issues are not given due attention and medical care is sought only when the condition becomes severe and out of control. Further, there exists gender discrimination in the provision of health care services. Females are more vulnerable due to wider social norms and practices. Illiteracy and poverty are major barriers to the health care services in the village. People are not so considerate about health and wellbeing and do not pay much attention to the health related issues. Whenever any health personnel try to counsel them they just actively refuse to acknowledge it and say ***"Hum to gaon mein rahte hai khuli hava me tho hame kya samasya?****" We are the inhabitants of village and live in open and fresh air so we can never have any health problems. There exists denial of health needs among the villagers and a disease is only given due attention when it gets out of control creating serious problems. The health needs of the woman and girl child are further downplayed due to the social cultural configurations".*

The ASHA also reported the similar problems:

Health care services are a major issue in the village. Most of the villagers are poor and have little to spare on medicines. They do not find it easy to invest in health care services for minor issues. They try to avoid seeking professional help due to poverty. Money is a major roadblock in the accessibility to the health care services. People usually resort to health care as a last recourse. Women are further marginalized in the access to the health care services. The major problems amongst them are they do not have enough money and thus are never interested in long course for medicine. They seek immediate relief which is an unhealthy practice and has a larger impact on their health and well being. They are not much concerned about the health issues. Sometimes they are often hesitant to discuss their issues and just say "U-hai vali

davai dai de joun falanva ke dehel rahlu" meaning give me the same medicine which you gave to Y (any lady's name).

Similarly, the doctor at the PHC reported:

> *"This is a village and people are quite casual about health. Health is never on their priority agenda and health care services are utilized only when there is an outbreak of some diseases such as malaria, diarrhea, or other critical issues. They have quite false perception of health and health care services. They believe that living in village and fresh air makes them immune from all kinds of health problems, and thus they do not require any special care and attention. He quoted lines from one of his patient, "**Humni to guava mein na rahli humni ke ka hoe sakala?** Usually people resort to homely remedies for treatment of any minor diseases such as stomach ache, cough, and cold, and so on. Lack of education and awareness they do not pay much heed to the minor illnesses. Professional help is only sought when the issue becomes out of control. Due to recurrent floods, the villagers is prone to several water borne diseases and immediately after flood there is rise in the cases of diarrhea and other diseases. Diseases are ignored in the primary stage and often by the time it gets severe attention, the condition gets critical and out of control".*

To conclude, we find that the personnels regard lack of infrastructure and people's perception as the major roadblock in the provision of health care services in the village. They believe villagers are themselves at fault for their health problems. The solution is education and awareness. The villagers must be educated about the importance of health and health care services. They must be made aware of basic provisions at PHC to widen their accessibility.

3.2.2.3 **Perception about the health amongst the villagers**

Self-perceived health is a powerful predictor of health outcomes (Goodwin & Engstrom, 2002). The villagers were quite satisfied and had a high perception of their health. Most of them believed that they were healthy and free from all kinds of

diseases. They believe rural areas have fresh air free from pollutants and are healthy for habitation. Most of the villagers had a positive approach and believed they were healthy and free from disease. They regard their surrounding environment is the best which had a positive impact on their health and well being. Although some of them reported minor illnesses, yet health was not a priority issue and perceived themselves to be healthy and fit. 16 out of 20 informants did not report any major health problem in the first instance. They believe that hard working makes them physically strong and immune to minor diseases. And they all were quite satisfied with their physical health status.

The content analysis of the interviews revealed that the respondents had a high perception of their health and reported themselves to be physically immune and healthy. None of the informants reported any severe illness. Some of the respondents mentioned minor illnesses such as viral fever, cough and cold as common diseases in the village. The children were frequently reported to be falling sick than young and adults. Similarly, females' problems was also not given due consideration. Some of them also reported minor injuries and problems but did not give it a serious consideration.

Speaking on the perception of the health one of the informants Kalavati replied:

> *"iha marai ke fursat nahi ba, thuh dagdari bejat hua"* meaning people do not have enough time to die and you (the researcher) expects us to seek health care and hospital. When the researcher asked to enumerate health problems in the village due to floods, she replied ***"****A baba pani se dar nakikhe na ba, paniyai me kam na kari la hamn, rog aog nahikhe na hola".* They are not afraid of waters as they have lived in it over the years and work in it. They have been living in same environment and thus, have adapted easily but are unhappy with the government approach.

Villagers believe hard work has a positive impact on the health and well being of an individual. They described that hard work is very good for human body and keeps the body fit.

In an interview, Avdhesh Gond replied

> *"Haman Gaon me rhail jayela iha kaha beemari rakhal ba"* it mean that we are the inhabitants of the village, and are less vulnerable to diseases. He further added "*hard work makes us physically immune from all kind of illness thus, the residents fall ill less frequently"*. He further added ***"****Haman majooran ke rog vog kam se hi bhag jala"* it means that we are laborer and have to work very hard. Our all illness disappears due to work.

3.3 Social Support: Evidences from the field

Flood is a recurrent phenomenon in the village Shival, crippling the livelihood options and destroying the resource base. The periodic nature of flood leaves little time for coping and resilience, as no sooner the former wounds begin to heal a new scar arises. Lack of adequate government intervention and mitigation leaves little scope for external aid post disaster and people have to rely on their informal network for assistance and recovery. Social support thus becomes very critical in post disaster recovery and resilience in the village. Social support is directly derived from the one's social network. A social network is a social structure made of nodes (which are generally individuals or organizations) that are tied by one or more specific types of interdependency such as values, visions, ideas, financial exchange, friendship, sexual relationships, kinship, dislike, conflict or trade. Nodes are the individual actors within the networks, and ties are the relationships between the actors (Armah et al., 2010, p.22). Rural communities are characterized by stronger social solidarity marked by informal social cohesion and informal ties. Caste and class are the two major nodes of the social network in the villages. The caste nexus is the major unit of orientation and mobilization. The caste acts as a major interest group and mobilizer of support and assistance post disaster. It has been predominantly evident that the caste solidarity is very strong in the village. The members of the same caste are preeminently closer and have stronger network ties. The social cohesion is stronger within a caste group which is often used as a buffer during crisis.

3.3.1 Caste and Economic Network and Social Support

The village Shival is a multicaste village inhabitated by numerous caste groups such as the Yadav, Thakurs, Gond, Dvishads, Nais and Kurmis. The Yadav are the 'dominant group' due to their numerical strength and has been holding the reigns of leadership since decades. They are economically established and have been dominating the local population. And this has often led to the conflict between the Yadav and the Thakurs who has been the potential aspirants for politically supremacy but has been unsuccessful due to the numerical majority of the formers. The Yadav and the Thakurs control the major resource base of the village possessing major landholdings in the village. They employ other lower castes as the manual laborers on their fields for the cultivation thus providing livelihood to the landless and marginal farmers in the village. This perpetuates the traditional jajmani system where the landowning castes provided food grains to the servicing and labor classes. Notably the Yadav preferably give their land to the Gond while the Thakur to the Dvishad. This network is very useful during crisis, as the destitute bank upon these for their livelihood and survival.

Elucidating the nexus between the social support and the caste system, one of the informants Shivdhar Yadav described:

> *"The notion of social support has almost sublimed in the village. Now a day's people have got quite self-interested and nobody wants to help others. Monetary help is available only to the near and dear ones of the Pradhan. People are divided in the name of caste and creed. And nobody wants to help members from the other community. The members of the caste group are particularly averse to helping the other castes and thus, little help available is, particularly mobilized by caste ties".*

Another informant also reiterated the same thing:

> *"The caste affiliation is very strong in the village and people are more mobilized by caste nexus. During crisis availability of help is determined by the caste not the need. Since they (Nais) are very poor they do not have much to offer to each other. Only help is available in the form of food grains or other minor support during and after floods".*

It has been found that in an ideal village structure, economy follows the caste structure. Usually the dominant caste owns the major resources such as land, livestock, and so on. In Shival, major landholdings are under the ownership of the Yadav and the Thakurs. While the rest of the castes have marginal landholdings or work as manual labor in the big landholding of the duo, the Yadav and the Thakurs. Villagers have to resort to these two duos for any mileage. It has been found that people have become individualistic and the motive of altruism has almost vanished. They only help whom they consider is of some benefit in the long run. In the aftermath of floods, the poor and landless find it difficult to meet their both ends, as they do not have enough resources to bank upon. They often have to borrow money from the rich and affluent class on exorbitant interests. Often they end up, paying many times the principle or has do repay by manual wage labor at the moneylenders farm. Thus, monetary help is distant phenomenon. Poor residents try to mobilize resources amongst themselves and may extend aid in the form of food grains, shelter or child care.

Hari Gond described:

> "*Society has drastically changed over these years. Now people have become individualistic and are concerned more with personal well being and affluence. Nobody wants to help others. People may sympathize but do not want to lend a penny as they are afraid of losing it. Altruism has almost vanished in the village. Only help available is from the community members but is more of informal kind such as providing food, childcare and manual help. Monetary help is a distant phenomenon. The sense of social responsibility has almost vanished. The social support is also biased by caste and creed. The rich and affluent lend only to those who have sufficient resource to mortgage in case of nonpayment of loans. The poor and the marginalized have no recourse but to die in poverty and misery".*

He further emphasized that rich people have become too selfish to help the poor and the needy. They look down upon flood as an opportunity and try to harness maximum revenues on the loans. Profit maximization is their utmost priority. They charge exorbitant interest on the money lent. Often one lands up paying twice or thrice the

actual amount. In case of forfeiture of loan, one also has to dispense manual labor in the moneylenders' fields. Rich and affluent lend money to only those who have something to mortgage in case of forfeiture of loans. Further, villagers are divided on communal lines and communal solidarity is very potent. People preferentially extend aid and support to their community member. Since most of his community members (Gond) are poor and marginalized, they have little to offer in case of crisis. Social support is more dependent on the personal networks within and outside the community.

In the words of Lori Gond:

> *"The floods have an unequal impact on the poor victims. The poor and impoverished are particularly vulnerable due to their poor fiscal strength and coping capabilities. The poor are the worst sufferers due to floods. No sooner the Ghaggra raises, we the poor, the hapless are left on the vagaries of nature. The floods divest us with our resources as well as the employment opportunities".*

He further added that almost all the householders have registered decline in their fiscal state due to recurrent floods. Often a buffer period is too short for the proper recovery of the losses incurred before the next flood. Thus, the concept of the social support or the help from the community members becomes out of question. Little help is available from the kins and acquaintances often in the form of food grains or mutual help and assistance post flood. Sometimes people have been found to take minor loans from the relatives or neighbors but that is not enough and sufficient. People are forced to borrow money from the local moneylenders who charge exorbitant interests on the borrowed money. In case of forfeiture of the debts, they often have to compensate it through manual work. Many have worked in the fields of the moneylenders as manual laborers during farming. And the value of their labor is always surplus to the money borrowed.

3.3.2 Political Network and Social Support

The dominant pattern of rural hegemony is derived from the caste system. A caste system is a hereditary, endogamous group, having a traditional association with an occupation, and a particular position in the local hierarchy of castes. Relations between castes are governed by the concepts of pollution and purity, and generally,

maximum commensality occurs within the caste (Ray Bennett, 2009, p.8). Caste is based on a ritualized purity, with the Brahmans on top and the (former) 'untouchables' or the lower castes at the bottom of the hierarchy. The different caste groups were linked by the division of labor and thus, there exists interdependence on each other establishing a social nexus within caste members. Gradually this ritualistic base of hegemony gave way to the numerical preponderance/economic affluence better known as in his essay '*The Dominant Castes in Rampura'* by M N Srinivas. A caste may be said to be 'dominant' when it preponderates numerically over the other castes, and when it wields preponderant economic and political power. A large and powerful caste group can be more easily dominant, if its position in the local caste hierarchy is not too low. The members of a dominant caste are in a privileged position vis-a-vis the other local castes, and its leaders wield considerable power. These leaders have the greatest stake in the village, have command over resources and, generally, it is they who organize local activity, whether it be a festival, general protest, or fight. They dominate the traditional village council or panchayat (Srinivas, 1998, p. 24).

The Yadav and the Thakurs are the numerically dominant caste in the village. They have hold over major village resources and have a major say in the local politics. Both groups try to grab the local leadership which is a major bone of contention between them. However, due to numerically majority the Yadav usually secure political reigns in the village. This has led to the creation of two factions in the village. Both castes try to outdo each other in local elections. As mentioned before, the Yadav usually lend their land to the Gond while the Thakhur to the Dvishad for cultivation, thus have created their own following. The duo, the Gond and the Dvishad acts as a vote bank for the Yadav and the Thakurs respectively. This reciprocity is also viable during crisis when each subordinate population, banks on their superiors for help and support. It could be easily deduced that local leadership, economy and caste affiliation are an important interface to social support. In Shival, the nature of social support is more caste based and the caste affiliation is an important predictor of social support and assistance post disaster.

In the words of Shyamdev Thakur, a barber by profession:

> *"The concept of 'social support' is nonexistent in the village. The Yadav and the Thakurs are the dominant and*

affluent group and control major resource in the village. They maintain their monopoly over these resources and extend help only within their networks. Nothing is available to the poor and the impoverished. The poor and the needy are only remembered during the elections when each tries to establish their predominance and supremacy to secure votes. The rivalry between the duos never leaves any scope for growth and development. They are more concerned with securing power and position with the support of the poor and the needy".

3.3.3 Gender and Social Support

It has been found that women are the community's 'first line of defense' or QRTs since traditional social norms compel them to be home-bound, in the care of children (Tan, 2008, p.212). With the disruption of established male-dominated social control mechanisms, women and their children are the first to be neglected and/or abused. Women encounter strong institutional barriers to organizational efforts. Women are less likely to organize, either out of seclusion, lack of education, or outright threat. Gender had both main and interactive effects on post disaster social support. Bolin and Stanford (1999) suggested that women are particularly vulnerable to the effects of disaster because of their care giving roles and relative lack of power and status. Hoffman (1999) argued that women tend to lose conflict over scarce resources. These factors may have also contributed to women's lower levels of perceived social support.

Kalavati described:

> *"**A babua humni ke, ke dehi…..ab hamar admi rahat ta kauno baat rahit… U rahen to sab udhari det rahen par hum mehraru ke koi na dela".*** Meaning thereby who is going to help us. When my husband was alive things were different. When he was alive even I used to get loan but now nobody lends to a single women.

Thus, it could be concluded that social support is the primary determinant of the coping and resilience post floods. The higher the social support, the greater is the

coping. People usually derive support from their informal networks. It has been found that in Shival, caste and economic networks are the primary networks which acts as a mobilizer of the community support and assistance. People are more interested in helping their caste brethrens. It is notable that gender discrimination is also prevalent in the social support with women receiving low social support and assistance post disaster.

Chapter 4

Vulnerabilities of women, children and marginalized groups in flood prone area

This chapter is divided into three sections. Although mentioned in the chapter two, we again begin by defining vulnerability to hazards in the first part. The second part deals with factors which make one vulnerable to the hazards. Under this, we discuss the economic vulnerability, geographic vulnerability as well as social vulnerability to disasters. Lastly, we describe the vulnerability of the children, women, and elderly to the natural disasters.

4.1 Vulnerability

The vulnerability of any physical, structural or socio-economic systems to a natural hazard is its probability of being damaged, destroyed or lost (Birkmann, 2008, p.1; Pistrika & Tsakiris, 2007, p.5; Alexander, 2006, p.6; Dixit, 2003, p.167). Vulnerability, in the disaster context, is a person's or group's "capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard" (Mohammed et al., 2011, p.16; Cançado et al., 2008, p.8; Neumayer & Plumper, 2007, p.3; Fothergill & Peek, 2004, p.90). Vulnerability, as defined by inadequate capability, is linked to a specific group(s) of people or population. These people are perceived as vulnerable and thus it is difficult to protect them from a disaster.

Degree of vulnerability is defined by factors such as socio-economic status, differences in wealth, occupation, caste, ethnicity, gender, disability, health status, age, immigration status (legal or illegal), the nature and extent of social networks, and so on (Mohammed et al., 2011, p.36; Birkmann, 2008, p.3; Khunwishit, 2007; Fothergill & Peek, 2004, p.90; Wisner et al., 1994). Vulnerable populations are more affected by the same disaster when compared to non-vulnerable populations. Moreover, among vulnerable population, the impacts of disasters vary depending on how vulnerable a person is. For example, a person who is old, disabled, a single-mother, being an immigrant, and living in hazard prone areas will be more affected by a disaster than one who is only poor, or disabled, or being an immigrant, or old, or being a single-mother, or a non-vulnerable person who lives in hazard prone areas.

Smith (1992) describes two key paradigms used in the social scientific study to frame disasters: the behavioral and the structural paradigms. The behavioral

paradigm focuses on the geophysical cause of disasters and the use of technology to alleviate damage as the result of such an occurrence. The structural paradigm emphasizes the influence of the social structure in which individuals and groups are embedded (Myers, 2007, p.9). According to this paradigm, pre-disaster social cultural configuration is an important predictor of post-disaster hazards. An important approach encompassed by the structural paradigm is the vulnerability approach, which focuses on the spatial dimensions of social and economic stratification in relation to disasters (Hewitt 1998) known as the social vulnerability approach by Weist et al. (1994). Social vulnerability means a complex set of characteristics that include initial well-being, livelihood resilience, social protection, and self protection, social and political network and institutions (Cannon et al., 2003). It relates to differences in gender, age, social position, incomes, and other potential factors that determine the ability to cope with adverse impact (Cutter et al., 2003). It has been found that poor and impoverished and marginalized social groups and individuals are more "at risk" in the wake of natural disasters (Wisner et al., 2004). Socio-economically disadvantaged or marginalized groups, including women, the elderly, the racial/ethnic minorities, the poor, and those with lower levels of educational attainment, are often disproportionately affected by disasters. The vulnerability could be better discussed under the following heads:

4.1.1 Economic vulnerability

Socioeconomic status is a significant predictor in the pre-and post-disaster stages, as well as for the physical and psychological impacts (Fothergill & Peek, 2004, p.90). Low income victims have less insurance and savings, and their insurance is from riskier sources which are more likely to default on repayment in the event of a mass disaster. In lieu of publicly provided social safety nets, household coping strategies may include selling productive assets that have long term effects on their ability to recover from the disaster or remove themselves from poverty. Even more damaging is the likelihood that the productive assets will be sold at price far below their pre-disaster value (Hubner, 2008, p. 7).

The flood exercises major influence on the economic resources of the villagers. Firstly, it ruins the agriculture which is the backbone of the village economy. Secondly, it destroys subsidiary livelihood options such as manual labor or wage labor opportunities. Floods exercises twofold influence on the agricultural activities in

the village. Floods destroy the agricultural crops demolishing the income base of the farmers, thus leaving them impoverished. Water logging and inundation due to floods disturbs the crop cycle leading to the delay in the cultivation of the kharif crop. Further, water logging and inundation due to floods leaves them out of employment in other ventures such as manual or wage labor. People run out of livelihood options during and post floods, finding it difficult to meet their both ends.

Speaking on the issue of economic losses due to floods, one of the informants Shivdhar Yadav replied:

> ***"E the pooji par tay hoi na ki ke kitna pareshan hoi"***. The losses due to floods are inversely proportional to the economy. The poor and miserable are the worst sufferers, against the rich and the affluent due to the reasons obvious.

Lori Gond also reiterated the same thing. In his own words:

> *"We just have bare minimum to survive. How can we pool for the future when the earnings are not enough for daily subsistence? The poor and landless people do not have much option".*

4.1.2 Geographic vulnerability

According to the Cutter's hazards-of-place model (1996), vulnerability at the local level is determined by the biophysical and social indicators which provide all-hazards assessment of hazard to disasters. This model focuses on how risk to natural hazards is influenced by biophysical/technological vulnerability and social vulnerability which interact to produce an overall vulnerability of place (Buttenheim, 2006, p. 4). Vulnerability to flooding is thus perceived as both a biophysical risk (e.g. living next to a river) as well as a social response (social acts).

Place can be an important predictor of flood hazard. It can determine the local topographical and hydrological conditions and catchment characteristics, as well as the local climate. For example, place can affect the speed of onset of flooding as well as the magnitude, frequency and impacts. Floods in areas with steep hillsides are difficult to warn against and prepare for and can be particularly dangerous due to mudslides and debris in the floodwaters (Tapsell & Tunstall, 2008, p. 134). Further, places also determine levels of socio-economic development in communities (e.g.

levels of deprivation and wealth, access to services and resources, types of housing and tenure arrangements) and whether local service providers are prepared for flooding and provide adequate support and response for those affected (Tapsell & Tunstall, 2008, p. 136).

In a village system, caste and creed exercise a major influence on the availability and accessibility to the resources. It has been found that due to systematic marginalization and discrimination members of the lower castes and untouchables were generally housed on the outskirts of the village. The houses of the lower castes are located at the periphery which makes them prone to floods.

Kalavati described:

> "*The poor and the low castes are prone to severe flood hazards due to the geographical location of their house. Being located on the margins, the flood water percolates easily in their houses during floods. In addition, their agricultural fields are also on the margin of the village facing a similar hazard from the floods. Reaching first, the flood waters leaves at last, flood exposure is greater in their vicinity. This is not an individual problem but of the community as a whole. It is a common problem among the Gond in the village. Most of the Gond are marginal farmers and thus, are quite vulnerable to floods*".

Chamman Chaudhary (46) also added:

> "*Frequent floods have gradually wiped out the resources increasing the vulnerability to the floods*". He added that "*now people are not concerned with the recovery of the losses as they have become more tolerant towards the hazard. The primary concern is to minimize the losses. The attention is on the mitigation of the losses"*. He further adds *government is more functional towards damage control mode than the prevention and promotion of flood control. There have been no special efforts to prevent floods such as building embankments and other structure. Relief provisions are also inadequate. The government has been very casual*

in its approach. Not a single provision has been made to provide sustainable livelihood to the inhabitants".

Other informants also reiterated the similar issues. They stressed that one's location is a primary determinant of the losses incurred. The peripheral areas are more influenced by the floods then the centre so the ones who occupy lands in the border areas are more vulnerable to floods as the water easily percolates in their lands and leaves at last. The houses of the poor and marginalized communities such as the Scheduled Tribes and Scheduled Castes are located in the hinterlands and are the major victims of the floods.

4.1.3 Vulnerability of the children to disasters

Throughout the world, women, children and elderly are disproportionately affected by disasters (Nelson, 2011, p.6; Weist et al., 1994, p.20). Children are considered a high risk population in disasters and stress as because they are especially susceptible to disruptions in their routines and settings as they are dependent on adults' access to social institutions and the resources that sustain daily life. Children face inequities in access to nutrition and healthcare, resulting in mortality from malnutrition, diarrhea and other preventable and treatable ills. Gender discrimination is prominent in the risk exposure. It has been found that the girl child faces inequity and differential access to nutrition and education in family (Chatterjee 1997, cited in Mohammed et al., 2011, p.9). Gender discrimination in the allocation of resources, including those relating to nutrition and medicines, may put girls at greater risk than boys (Brody et al., 2008, p. 3). Also, males are favored in the allocation of food within households, especially when it comes to diet quality (Neumayer & Plumper, 2007, p. 11; Smith & Bryon, 2005, p. 1).

Bairagi (1986) reported in rural Bangladesh the female children were more adversely affected by famine than were the boys (Neumayer & Plumper, 2007, p. 11). Among children, boys are treated for illness more often than girls, and immunization rates are higher for boys, indicating a relative neglect of girls' health needs (Smith & Bryon, 2005, p. 1). During or after disaster, more girls drop out of school to reduce household expense by saving on school fees or to assist in the household with task such as fetching water, or as a result of pregnancy and early marriage (Eldridge 2002, cited in Dankelman et al., 2008, p.11; Brody et al., 2008, p.9). The increased household workload post disaster has a direct toll on the girl's education, forcing

many girls to drop out of school to help with chores (Brody et al., 2008, p.7). Due to increased burdens and lack of income generating measure, girls have to take on more tasks in the household and do not have time to attend school. The girls are drop out of school to help their mother and or looking after their siblings. Many adolescent girls take on new responsibilities or share responsibilities with mothers and adolescent brothers (Care International, 2002, p.11). A study in Cambodia (2002) reported older daughters often have to take on significantly increased responsibilities-usually from the mother or related to collection activities around the non-flooded or shallower parts of the village such as fodder or firewood collection or small-scale fishing, and so on (Care International, 2002, p.11).

Gender discrimination is a common phenomenon in the rural India. The patriarchal setup favors male child over a female child due to numerous socio-cultural beliefs and practices. The son is believed to be a placard for an old age as it is believed that boy will provide for his old parents as the parents get older while the girl child will be married and has to leave her natal family. Also, a son is supposed to be the bearer of traditions and symbolizes a ritual aspect, e.g. the son lights the funeral pyre when the parents die. A family without a son is incomplete and a social embarrassment. As an Indian mother puts it: 'In India every mother must have a son' (Sharma, 2010, p. 3). The patrilocal residence has led to the decline in the status of the girl child in the family. Parents regard investment in girl child as sheer wastage of resources and time as a girl child has to leave her natal family after marriage and is thus, economically not viable for her family. The girl child is frequently discriminated in the allocation of major resources such as food, education, health care, etc. in the family. Sons are given priority in case of crisis as well as the normal period. In case of an emergency, a girl child is expected to take care of her male siblings over her own life.

In the village Shival, things are no different from the other villagers. Gender discrimination is a common event. Most of the families regard investments on girl child as a sheer waste of popular resources. Girls are discriminated in access to education, health care, food and nutrition, and other assets. Analyzing the enrollment statistics, we find that more girls are sent to primary school compared to boys while most of the boys are sent to private schools as parents are more inclined towards the better education of their male child in the family. Dropout rates are also higher for

girls then for boys. Further, the daily turnover rate is also higher for boys as girls are expected to help with the household chores in the family.

One of the girls (13) described:

> "*Humni iskool jajib to roti ke poi. Mein jab bolu mere ko iskool jana to amma bole tu ka karegi iskool jake. Kaun sa tere ko collector banna hai" meaning* thereby if I go to school who will cook chapattis. Whenever I ask my mother to go to school she says what I will do there. You are not going to become a collector.

Another girl (10) described:

> "*Bhadva ke samy hamni dugna kam karil ja ek tha ghere ke kam, dusar baharu kul kamavai na hauye bkhat na mile hai iskool jane ko*" meaning during floods the workload at home escalates thus I do not find to attend school. I assist in several household chores including cooking as well bring logs of woods for the hearth.

4.1.4 Vulnerability of the women in the community

Universally, women are the most vulnerable in disaster situation. "Vulnerability of women" should be understood to be primarily cultural and organizational rather than biological or physiological (Wiest et al., 1994, p.3). Women are systematically marginalized from the access to major resources in the community and are discriminated in the private and public sphere. Even in the family, the females are discriminated in the access to the food, health care and education. Males are favored in the access to the scarce resources during crisis such as food and nutrition, health care and so on. All women are not universally or identically impacted by disasters. Even amongst the females, adolescents, pregnant women, single mothers, lactating mothers, the disabled, and the aged make up particularly vulnerable groups in emergencies. The vulnerability of the women could be better discussed under the following heads:

4.1.4.1 The low status of the women in the community

Women are accorded lower status in rural India. It has been found that women are generally treated as inferior not capable of independent existence apart from the

males. From birth to death, they are held as male's possession which has to be a held under subordination. They are held to be meek and docile and unable of individual existence. Thus, they are not given due recognition in the household decision making or matters of important concern in the family. Women's subordination and vulnerability in India is grounded in Hindu caste[5] practices and patriarchal kinship practices which put women at a highly disadvantaged position in their everyday lives (Dube 1996, 1997 and Chakravarti 2003, cited in Ray Bennett, 2009, p.8). In times of disaster, this subordinate position increases the likelihood of women's vulnerability to environmental hazards.

In Shival, women are generally held in low esteem and not given due prominence. They have no inheritance rights and have no recourse to economic resources in the family. There exists widespread gender discrimination in the family and the community. A girl child is discriminated in the access to the major resources in the family such as food and nutrition, education and access to the health care facilities in the family. Traditional patriarchal structure perpetuates gender inequality in the village. In case of the crisis, the needs of the girl child or women in the family are first to be compromised. Females have the dual responsibility of working in homes as well as the fields while have the last recourse to the facilities in the family. Similarly, a girl child is supposed to help her mother with the household chores while her brother may loiter and roam around. It is deemed derogatory for the males including the male child to contribute towards the household chores, even if the mother or the lady may be sick. Further, a woman is not entitled to any kind of material possessions. All property passes down in the male line in the family. The daughter does not have any inheritance rights. In case of the absence of the male heirs in the family, the property is diverted towards the progeny of the other males of the family. Female child may have no access to the family resources except for the dowry which she receives in her marriage.

Elucidating the position of the women in the community, one of the women informants Sheela Devi (46) described:

> "*Rahua mehraru jat ke, ke puchelela. Humni to do go aksharo na padh sakni. 13 lagat bhare biyaah gayni. To*

[5] Caste may a defined as the hereditary, endogamous, usually localized group, having a traditional association with an occupation, and a particular position in the local hierarchy of castes. Relations between castes are governed [...] by the concepts of pollution and purity, and generally, maximum commensality occurs within the caste (Srinivas, 1998).

> *humni ka jani desh or duniya*", Meaning thereby nobody cares for the females in the community. I do not know how to read and write. I was married at no sooner I entered into my teens, thus have no idea of the society and the country.

Kallan Chaudhary also shared a similar view. He replied:

> *Mehararu ka janihai desh or duniya, kul to hamni ke dekheke ba*. Meaning that these women have no idea about the society and the country. All the matters whether be it family, property, economic or crisis is upon their shoulders.

Earlier women were not allowed to make an appearance in the public sphere but the things have changed for some time now. The growth of literacy and government initiatives has led to the positive change in the status of the women in the community. Now few females have started working out in the community and stepped outside in the public arena. The current *pradhan* is also a woman. This may seem positive yet much needs to be done to raise the position of the women in the community. The position of the women could be improved through education and awareness and make woman cautious of their rights. Education can be the best anecdote to deal with this issue as only education can bring positive results through education and awareness.

4.1.4.2 Gender and economic dependency

Women in developing counties have been called the 'invisible earners' (Wiest et al., 1994, p.15). Women's productive work, particularly in child-rearing and other domestic work, as well as their enormous contribution to national food production requirements, is hidden in statistics (Chiu 1982, cited in Wiest et al., 1994, p.15). Women in comparison to men have restricted access to the formal and regulated labor market (Monzini, 2001, p. 1). Women are not only responsible for attending to the basic needs of their children and families, but also account significantly for productive and income-generating activities in their respective communities. This pre-disaster condition in many societies deny to women recognition for the work they actually carry out rendering them and their dependent children relatively more vulnerable than men.

Women are the chief harbinger of all the domestic chores in the family. They have to look after all the household chores including cooking, cleaning as well as helping in the agricultural production such as harvesting, etc., yet their work is not treated as economically viable as they do not earn money in exchange. Their contribution in the household chores is not considered worthy of recognition as they do not receive paid remuneration for most of their tasks and thus, are considered economically futile and the liability over the family assets. They do not have a source of income of their own and thus have little resource of their own. This economic dependency gives rise to the decline in their status in the family. In addition, lack of inheritance rights or material possessions also makes them economically insignificant having low standing in the family.

This economic dependency gives rise to several other constraints such as depriving them of decision making authority in the family. It has been found that women who are economically secure are given a say in the family decision. In addition, in case of crisis, these women are able to take decisions on their own, supporting their family against other odds. Also, economically sound mother can take better care of her progenies. It has been reported that parents' individual non-labor income is associated with larger positive effects on the nutritional status of children of their same gender, that is, mothers invest more in daughters and fathers invest more in sons (Smith & Bryon, 2005, p. 5). Further, economically independent women can support her family in the crisis and in the resettlement and reconstruction post floods.

4.1.4.3 Gender and household decision making

In patrilocal society, the head of the family is generally a male and inheritance runs in the husbands' side such as husband to son and his son, and so on. In such kinds of families, husband is the chief of the family and is responsible for the maintenance of the family. All the major decisions such as the diversion of the household income, division of the resources, or choice of the marital partner, and so on are taken by the head of the family and others have to simply comply with it. In case of the unavailability or the death of the male leader, the reign of the family is automatically diverted towards the next senior male member of the family while females have little or no say in this regard. Even if the elderly mother may be alive or may have major family resources in her name, yet she is not authorized to take any decision on her

own and is dependent on her sons. Even in case of crisis, females have to depend on the wisdom of the male heads although her ideas may be more worthy of pursuit.

In the village, there is a strict patriarchy. Males are the heads of the household and all the major household decision is the males' prerogative. Females do not have any say in the decision making in the family. They have to follow the dictates of the males of the family in all cases such as the division of the resources, education of the wards or marital issues. Although, they do exercise some liberty in the household unit such as the choice of the food to be cooked or the freedom to interact in the community, yet these rights are not all exclusive. They are not free to interact with the male members outside the family. In fact, they have limited access to the disaster mitigation and prevention team post disaster. In a group discussion with the females in the village, it was disclosed that women are not allowed to interact with the rescue officials. Whenever any official visits the house, for the interrogation of the losses incurred, male members of the family do not allow any female to interact with the officials.

During group discussion with the women on the issue of the access to relief and welfare packages most of the women described that they never had a direct interaction with the rescue team. Most of the time, their spouses or other males took part in such delegations. Further, they never received assistance or compensation amount. They even do not have idea about the welfare or compensation amount as this was her husband's prerogative. In an interview with the women informants, it was disclosed that the traditional practice of the purdah system also posed barrier in the access to the relief packages. One of the informants, Mahua Devi described:

> "*Rahua humni bahar na niklija. Ek go bar humni sahib se baat kare gayni to vo bole hum ka mar gayal hai jot tum bahar jaigo"* meaning we do not go out frequently. Once I tried to talk to the officials but my husband was enraged that is he dead, I am going out.

Females are marginalized in the post flood reconstruction and resilience. Being the bearer of the family tasks, they have the major responsibility for the reconstruction of the family post flood, yet they have last recourse to the resources of the family. All the relief and welfare packages are also issued in the name of the head of the family who is generally a male. In fact, dispersion of the compensation amount

is the males' prerogative and females just have to comply with it. During an interview on the issue of the relief and welfare packages, most of the ladies replied that they were unaware of the provisions. They were simply unaware of the government aid provisions received from the government agencies. They had no idea of the compensation amount received during the past. One of the informants Lila Devi (45) described:

> "*A babua kitna milela, ei to unhi janena"* meaning I have no idea about the compensation grant. My husband knows all this.

This practice has a detrimental impact on the resettlement and reconstruction post flood. Sometimes males waste this money, investing in liquor or diverting the fund to worthless games. But females are helpless and can do little in this regard as elderly in the family also support the males.

4.1.4.4 Gender and access to the post disaster relief and welfare services

It has been observed that in most countries relief efforts are almost exclusively managed and controlled by men, systematically excluding women, their needs, competences and experiences from contributing to these efforts (Neumayer & Plumper, 2007, p. 11). Inequities against women are visible in the following domains such as survival challenges, access to relief, receiving compensation and ex-gratia payments, health, security, and political participation (Mohammed et al., 2011, p.44). Women continue to be discriminated against due to a gender bias in donor agencies and governments. The common Western planning misconception of men as "breadwinners" interferes with the assessment of women's contribution. Consequently, it depletes their status and wealth–"a double-barreled impoverishment". Administrative gender bias has been particularly noteworthy in the context of refugee populations, and women have been openly discriminated against in the process of decision making in assistance during the relief and reconstruction phases associated with disasters (Weist et al., 1994, p.6).

Cultural norms have been found to inhibit women from visibly accessing relief centers, or they cannot leave their homes to go to relief centers due to child care responsibilities. In settings, where women are forbidden to interact with male members of the community who are not their kin, they have difficulties in accessing

relief services from male relief workers. Further, where food distribution targets household heads, women may be systematically marginalized, as they would only be registered as household heads, if no adult male was present. Although women are primarily responsible for the coping and reconstruction post disasters, yet the women are marginalized in the access to relief resources.

Women are specifically marginalized in their access to the relief and welfare services in the rural settings.

Kalavati (50) described:

> *"The government (personnel) is quite biased and helps the rich and the affluent. The powerful and the influential enjoy the maximum support and benefits. In their village, all the post flood welfare and relief provisions are diverted towards the near and dear ones of the Gram Pradhan and they are left to live in misery and agony"*.

4.1.5 Elderly population in the flood prone area.

The elderly (over 60 years) are specifically vulnerable group as old people are meek and in case of disasters have limited access to food, housing, and healthcare, and face inequities in the labor market resulting in economic dependence on family members (Rajan 2006, cited in Mohammed et al., 2011, p.9). The groups located at the end of the age pyramid tend to present smaller mobility (displacement capacity), larger dependence, and smaller resistance to diseases and frequently they do have fewer resources (Wisner et al. 2004, cited in Cançado et al., 2008, p.4). The dependence of the elderly upon others for financial and social support causes this demographic group to be significantly more vulnerable to disasters (Myers, 2007, p.25). Further, elders may experience more stress and relatively greater personal loss than younger persons as a result of hazard events (Ollenburger & Tobin, 1998; Huerta & Horton, 1978). In addition, elderly individuals may also have heightened risk factors due to health difficulties and limitations in mobility (Ollenburger & Tobin, 1998, p.100). The vulnerability of the elderly could be discussed under the following heads:

4.1.5.1 Lower status in the family

Traditionally, the joint family system was a hallmark of Indian social system. Joint family consists of members of two or more generations living together in a single

household. All the household resources were pooled together and were in the hands of the male head of the family. He was supposed to look after the distribution of the major resources in the family. He also presided as the judicial head of the household, taking major decisions in the family, in case of conflict and other complied with it simply with respect. In case of crisis, he acted as a buffer and relieved the family from all crises. Thus, traditionally elderly population was held in high esteem in the family and was considered as an asset for the family and the household. Recently traditional joint family setup has undergone a sea change leading to the decline of the status of the elderly population in the family. The recent urbanization has lead to the growth of the nuclear families in the society whereby joint family has become a nuisance and people have grown apathy towards it. Proliferation of modernization, urbanization, or to say globalization has promoted the growth of individualism as well as led to the decline of the traditional norms and values where elderly population was respected and given due prominence. Further, economic dependency also led to decrease in their social status. Their economic dependency made them economically unviable and useless for the community. Economic dependency also limits their decision making power, and thus their needs are downplayed and not given due prominence in the family.

During an interview on the status of the elderly in the family and the community, one of the informants Challan Mallah (68) said:

> "*haman kounu kam ke naikhe na bani, inha the haman bhoj na hoi gail ja, raua hi baitai ke poochi haman ke*" meaning thereby in the changing world our presence is burden for our family, as we cannot do as much as other can do, we are not so useful in terms of productivity, so, we have lost our prominence in society.

4.1.5.2 Elderly and the health

The elderly are prone to several health hazards due to floods. Ageing makes them physically weak, thereby increasing their susceptibility to hazards due to health difficulties and limitations in mobility (Ollenburger & Tobin, 1998, p.102). Old age makes them physically fragile and prone to several diseases. With aging, body gets less immune to wear and tear, and is slow to heal. Also, elderly has special dietary requirements which gets disrupted during disasters or may have lesser food then

required leading to the problem of malnutrition amongst them (Ministry of Health & Family Welfare Bangladesh, 2004, p.6). During floods, paucity of food grains has a direct toll on dietary intake of the family where often the needs of the elderly are compromised which makes them physically weak and leads to the decline in the resistance of the body. Further, old age makes one prone to several diseases due to the loss of the immunity of the body. The elderly are found to frequently fall ill and are slow to recover.

In Shival, life expectancy is not very high and the average life span is around 60-65 years. During group discussion with the villagers, it was disclosed that earlier the life expectancy was higher as of now but it has deteriorated due to the decline in the quality of life through these years. It has been found that frequent floods have a direct toll on the health and hygiene of the community including the elderly in the community. Scarcity of the resources under weighs the needs of the elderly, having a last recourse to the necessary resources such as food, health care services, and so on.

One of the informants Shivpal Singh described:

> *"Bhudai dav rog vog na hoi tha ka hai babu, haman ke chhot mot rog se kuch na na hoi kuch, hamni ke jindgi beet gail ab rog vog ka kari"* meaning old people are quite prone to several diseases and it is a common event not a matter of serious concern. Our life has come to an end and we have nothing to bother about.

It has been found that elderly people are prone to mental or psychological setback in the aftermath of disasters. Old age makes them fragile and prone to depression in case of crisis. The elderly are quite attached to their land and other assets, the loss of which has a harmful impact on their psyche making them prone to mental illness and depression. The elderly must be given prominence in the rescue and relief operations as they may serve as major resource personnel for rescue and relief programme. It has been found that they have wider experiences to share which could be harnessed for the welfare of the community. This may also have a positive impact on the outlook of the community towards the elderly and the elderly themselves. The shift from the passive recipient to active participant may cure them of behavioral oscillations common in the old age.

4.1.5.3 Elderly and gender

Elderly women are likely to be particularly vulnerable, especially in developing countries where resources are scant and social safety nets limited or non-existent (Brody et al., 2008, p.3). Elderly women may have heavy family and caring responsibilities which cause stress and fatigue while also preventing wider social and economic participation; and their incomes may be low because they can no longer take on paid work. They may also not understand their rights to access community and private sector services, such as local clinics. Even when they are aware of these services, even nominal amounts for clinic visits and drugs may not be affordable. Also, an older woman is more likely to suffer from health and mobility limitations, increasing their disaster vulnerability (Ollenburger & Tobin, 1998, p.102). Access is further restricted for older women living in rural areas, who are often unable to travel the long distances to the nearest health facility (Brody et al., 2008, p.4).

4.1.5.4 Traditional beliefs and practices

The elderly have been found to be rigid and bound to the traditional norms and ethos. They are emotionally very weak and are quite sentimental about their land and surroundings. It has been frequently reported that the elderly are last to evacuate their land or houses even during crisis longing to die in their natal place. Cultural norms (often adhered to rigidly) may dictate the importance of "dying and being buried at home". The customary practices of burial in the native land also prevent them from leaving their land in desire of dying in their place. They are very reluctant to leave their land and place in fear of being disposed of at some other place than their native place. It has been observed in multiple case studies that some elderly insist on repatriation in order to die at home.

One of the officials Arjun Pratap Prasad described:

> *"Elderly pose the biggest problem in the evacuation of the village during floods. It is very hard to convince them to get out of their house. It becomes quite troublesome to relocate them to a safe place".*

Elderly population is often quite concerned about their land and belongings are thus quite reluctant to leave it and move during floods for the fear of theft or robbery.

One of the informants Kallan (70) described:

> "*Haman aap jingi jee liyeil gaiel jaise taise, chinta tha ee bchavao logana ke hovela, ki hamni time me kuch nahikhe badalal abahu aiseahi batai, kaise kati it"* mean that we have spent our lives, but we are worried about our children. Nothing has improved through these years, yet we try to manage the situation?

To conclude, vulnerability to natural disasters is increasing worldwide, primarily due to a rising population. Women are particularly vulnerable to disasters across the globe. Women and girls' particular vulnerability is due to a combination of factors, such as economic dependency and lack of adequate financial resources, illiteracy, discriminatory cultural and social attitudes, physical infirmity, and so on. Women's and men's differential access to social and physical goods or resources is one of the key dimensions of gender inequality which is an important predictor of post disaster vulnerability of the females. Gender inequality is a major factor contributing to the increased vulnerability of women and girls in disaster situations, which is further intensified in the aftermath of disasters.

Women have special needs and their needs should be given due recognition in the post disasters relief and welfare programmes. Women experience the greatest stress due to their multiple responsibilities. It has been found that women and girls who are involved in income-generating projects gain economic independence, improved self-esteem, social recognition and dignity and are quick to recover. The case study of Grameen Bank organization among women in Bangladesh shows that those who are organized were able to recover from flood damage much more effectively than those who did not (Weist et al., 1994, p.19).

Also, the needs of the elderly must be given due consideration in the post disaster relief and welfare services. It has been found that disaster mitigation and prevention efforts are more generalized in the country and not very target oriented. The needs of the elderly are downplayed in these programmes. The needs of the elderly such as food and nutrition, health care services and other support services are not given due prominence in the relief and welfare packages. The elderly are specifically averse to communal usage of the materials which prevents them from accessing welfare and relief packages. Further, they suffer mental/psychological traumas due to isolation when their views and ideas are not given due recognition, and

so on. Thus, disaster mitigation and prevention efforts must be reoriented to cater to the needs of the women and the elderly and other vulnerable groups in the community.

Chapter 5

State response-flood management and control

5.1 Disaster management in India

Most nations have institutional and physical infrastructure to combat floods and their effects, and in many cases these have a long history. For example, in the middle Loire valley some major flood embankments are over 200 years old and the courses of the Rivers Rhine and Danube were substantially straightened before 1900 providing improved navigation and flood control. In Hungary, there is documentary evidence of flood defense works as early as the 13th Century and in the UK flood defense legislation can be traced back to 1531 (Samuels, 2010). Indian permanent and institutional disaster management system was born long back in the decade of 1990s with the set up of a disaster management cell under the Ministry of Agriculture, following the declaration of the decade of 1990 as the 'International decade for Natural Disaster Reduction'(IDNDR) by the UN General assembly. Following series of disasters such as Latur earthquake (1993), Malpa landslide (1994), Orissa Super cyclone (1999) and Bhuj Earthquake (2001), a high powered Committee under the Chairmanship of Mr. J. C. Pant, Secretary, and Ministry of Agriculture was constituted for drawing up a systematic, comprehensive and holistic plan for addressing the disasters in the country. Later, the disaster management division was shifted under the Ministry of Home Affairs in 2002 and a permanent, hierarchal structure for disaster management in the country came into existence (Ministry of Home Affairs, New Delhi, 2011, p.55).

Although not specifically addressed in the Five Year Plan documents in the past, the Government of India has a long history of using funds from the Plan for mitigating natural disasters. Funds were provided under Plan schemes i.e., various schemes of Government of India, such as for drinking water, employment generation, inputs for agriculture and flood control measures, etc. There are also facilities for rescheduling short-term loans taken for agriculture purposes upon certification by the District/State administration. Central Government's assets/ infrastructure are to be repaired/rectified by the respective Ministry/Department of Government of India. Besides this, at the occurrence of a calamity of great magnitude, funds flow from

donors, both local and international, for relief and rehabilitation, and in few cases for long-term preparedness/ preventive measures (Disaster Management in India, 2011, p.74). However, the permanent and institutionalized body devoted to the management of disasters came into being with the National Disaster Management Act, 2005.

Disaster Management Act (2005) provides for the effective management of disasters in the country. It recommends institutional mechanisms for drawing up and monitoring the implementation of the disaster management. The Act also ensures measures by the various wings of the Government for prevention and mitigation of disasters and prompts response to any disaster situation in the country. The Act provides for setting up of a three tier hierarchical the National Disaster Management Authority (NDMA) under the Chairmanship of the Prime Minister, the State Disaster Management Authorities (SDMA) under the Chairmanship of the Chief Ministers, and the District Disaster Management Authorities (DDMAs) under the Chairmanship of Collectors/District Magistrates/Deputy Commissioners. The Act further provides for the constitution of different Executive Committee at national and state levels. Under its aegis, the National Institute of Disaster Management (NIDM) for capacity building and National Disaster Response Force (NDRF) for response purpose have been set up. It also mandates the concerned Ministries and Departments to draw up their own plans in accordance with the National Plan. The Act also had mandates for financial provisions for the creation of funds for response, National Disaster Mitigation Fund and similar funds at the state and district levels for the purpose of disaster management. The Act also provides specific roles to local bodies in disaster management. With the enactment of the 73rd and 74th Amendments to the constitution and emergence of local self-government, both rural and urban, as important tiers of governance, the role of local authorities have becomes very important.

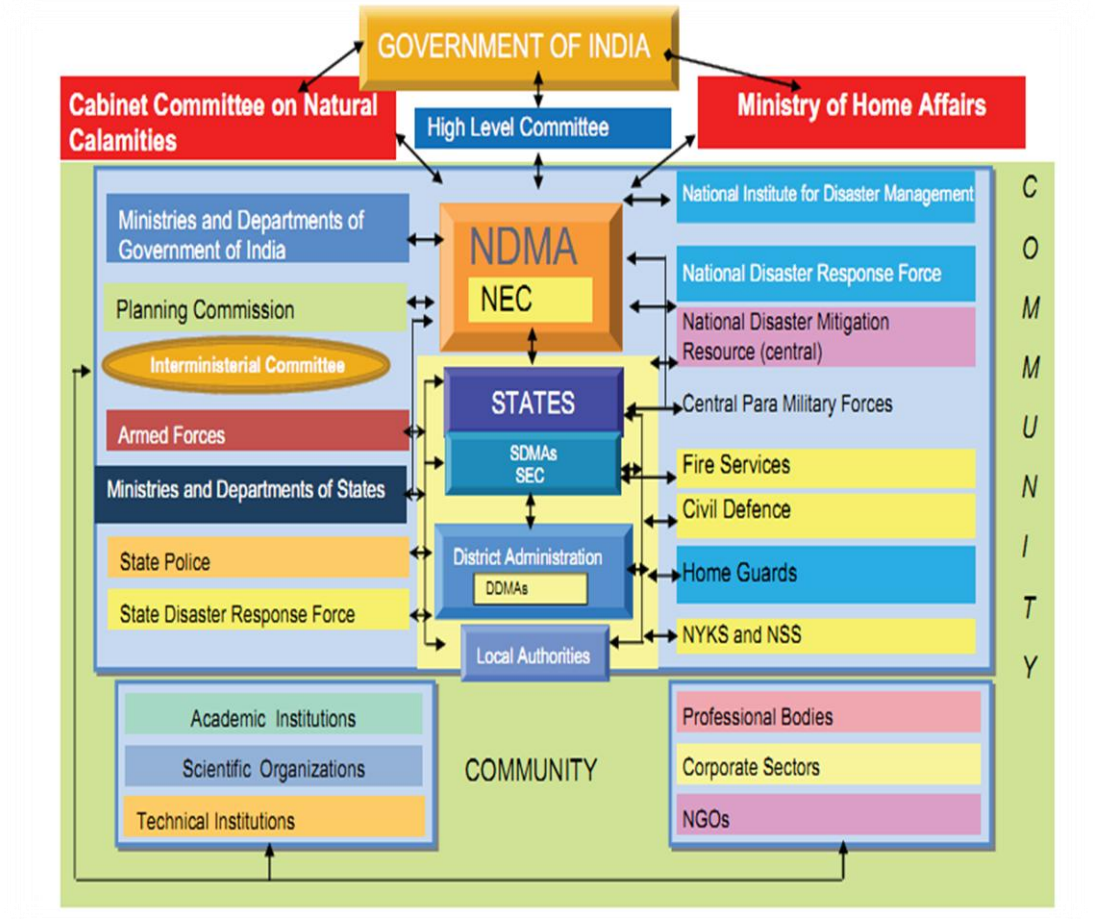
The National Disaster Management Authority (NDMA) was initially constituted on May 30, 2005 under the Chairmanship of Prime Minister vide an executive order. Following enactment of the Disaster Management Act, 2005, the NDMA was formally constituted in accordance with Section-3(1) of the Act on 27th September, 2006 with Prime Minister as its Chairperson and nine other members, and one such member to be designated as Vice-Chairperson. Its primary reasonability is the formulation of the policies on disaster management and guidelines for the disaster risk reduction. It also has to supervise the State Disaster Management Authorities in

the prevention and mitigation of the disasters. Further, its task is to draw plans and measures for the management of disasters.

Role of the NDMA as the first body of the National Disaster Management Authority (NMDA)

As the chief precursor of the disaster management in the country, the NMDA has following functions. Its primary functions are policy formulation. It is entrusted with formulation of national policies on disaster management in the country. In this process, it has the prime responsibility to devise national plan to combat disasters. NDMA thus acts as federal body and supervises the plans prepared by the Ministries or Departments of the Government of India in accordance with the National Plan for the mitigation and prevention of disasters in the country. It is also endowed with the responsibility to formulate the guidelines to be followed by the State Authorities in drawing up the State plans.

Figure 5.1 the National Disaster Management Body in India



Source: (Ministry of Home Affairs New Delhi 2011, p.56)

In addition, it has to formulate the policy guidelines to be followed by different Ministries or Departments of the Government of India for the purpose of integrating the measures for prevention of disaster or the mitigation of its effects, in their development plans and projects. It also acts as the referral body between the legislative and the executive body of the NDMA i.e. coordination of the enforcement and implementation of the policy and plan for disaster management throughout the country. It regulates the provision of funds for the purpose of mitigation and is responsible for the dispersion of the grants for disaster control in the country. In case of emergencies outside the country, NDMA is expected to support other victim countries affected by major disasters as per the National policy mandates. Further, it is responsible for the prevention of disaster, or the mitigation, or preparedness and capacity building for dealing with the threatening disaster situation or disaster as it may consider necessary.

State Disaster Management Authority (SDMA)

The Disaster Management Act, 2005 provides for the constitution of SDMAs and DDMA in all the states and union territories in the country. It is responsible for the prevention and mitigation of the disasters at the state level. Its primary task is to pursue the policies and guideline of the NDMA for the disaster risk reduction in the state. The Act also provides for the constitution of the State Executive Committee (SEC) under Section 20 of the Act, to be headed by the Chief Secretary of the state government with four other secretaries of such departments as the state government may think fit. Its task is to monitor and coordinating the implementation of the National Policy, the National Plan and the State Plan as provided under Section 22 of the Act.

District Disaster Management Authority (DDMA)

DDMA is the chief executive body of the NDMA working at the ground level. It is headed by the District Magistrate/ District Collector/Deputy Commissioner as a Chairperson. An elected representative of the local authority as Co-Chairperson except in the tribal areas where the Chief Executive Member of the District Council of Autonomous District designated as Co-Chairperson. Further in the districts, where Zila Parishad exists, its Chairperson shall be the Co-Chairperson of DDMA. The CEO of the District Authority, Superintendant of Police, Chief Medical Officer of the

District and other two district level officers designated by the state governments are also its members. The District Authority is responsible for planning, coordination and implementation of disaster management and to take such measures for disaster management as provided in the guidelines. It has the directive to examine the construction in any area in the district to enforce the safety standards and also to arrange for relief measures and respond to the disaster at the district level.

5.2 State response to the floods

Floods are a recurrent phenomenon in India. This year (2011), India has witnessed severe floods in six states, affecting more than 11.0 million people across the country[6]. After the unprecedented floods of 1954, the Government of India (GoI) took several initiatives to solve the problem of floods in the country. The *Rashstriya Barh Ayog* (RBA or National Flood Commission), was set in the year 1976 by the Government of India (GoI) to cover the flood management in India. The commission submitted its report in the year 1980 which contained 207 recommendations. The report formed the basis for formulating flood management programs. Subsequently, National Commission for Integrated Water Resources Development Plan (NCIWRDP) also, among the other things studied the flood problem and made many useful recommendations in its reports published in 1999. The National Water Policy (2002) of India also made several recommendations concerning flood control and management. Among other things, the National Water Policy (2002) has recommended preparation of basin wide master catchment area treatment plans and measures like flood forecasting and flood plain zoning for damage minimization. The NCIWRDP also studied the flood management and gave its recommendations for flood coping and resilience. The commission suggested that the emphasis should be on the management of flood plains, flood forecasting, flood preparedness and flood insurance as floods are inevitable (Jain et al., 2007, p.887). Plan wise expenditure on flood management works up to the eighth plan period ending 1997 was Rs 4,856.68 crore. For the ninth plan, the anticipated expenditure was Rs 2,629.23 crore. The recommended outlay for the Tenth Plan is Rs 10,631.84 crore. Of this, Rs 7,624 crore is for the state sector and Rs 3,007.91 crore is for the central sector. This is expected to benefit 2.781 million hectares of land (Jain et al., 2007, p.889).

[6] http://www.glidenumber.net/glide/public/search/details.jsp?glide=19564

Uttar Pradesh is a one of the flood prone state in the country. Its location amidst the flood plains of the great Indian rivers such as the Ganga, Yamuna, Ghaghara, and their tributaries, etc. makes it agriculturally very viable. The river water provides excellent means for irrigation and made the land very productive thereby making U.P. one of the most important state for agricultural productivity in the country. In U.P., the 85 per cent of average annual rainfall of 990 mm is received during the monsoon season during June to September. Often excess rainfall causes rise in the level of river water outside their banks giving rise to floods. The flood is common in the cities lying on the bank of these rivers every year. The eastern and some districts in the central part are frequently vulnerable to floods. The major reasons could be cited as excess rainfall and the discharge of water from Nepal side from time to time into the major rivers of the eastern and the central U.P. Every year floods affect the inhabitants leading to the loss of life and property. It is to be noted that U.P. has the largest population in absolute numbers as well as density, so the loss is comparatively higher than in other states. The table 5.1 gives the losses due to floods and the annual damage in U.P. during 1973-2008.

Floods are a common during monsoons in the state. The Ministry of Water (Irrigation Department) is responsible for kinds of flood prevention and mitigation activities. Although flood creates major havoc year after year yet the state has not taken effective measures to combat the floods. The flood control measures are under the aegis of the Irrigation department. Irrigation Department act in very mechanical process and they do it as a routine task during monsoons. All plans about the rainy season under the Irrigation Department consider preparedness of the flood in the reason. The Irrigation department makes necessary arrangements for the prevention and mitigation of the floods.

Table 5.1 Damages due to floods in U. P.

Year	No of Affected District	Affected Population (in lakh)	Affected Village	Affected Total Area (lakh hec)	Affected Agricultural land	Affected Household (lakh)	Life losses		Approximate loss in Crore (rupees)
							Human	Animal	
1973	40	141.50	30004	35.00	22.23	2.98	163	375	286.84
1974	39	73.90	14948	19.86	12.24	2.03	72	160	173.16
1975	35	92.84	18629	23.65	14.21	2.0	181	892	92.44
1976	36	131.95	32962	33.49	18.49	2.05	240	1434	92.44
1977	31	37.00	7536	12.87	6.42	0.51	157	887	77.04
1978	55	225.87	48889	72.50	38.82	11.92	739	7430	688.24
1979	16	21.05	3913	7.03	5.18	0.23	77	220	67.57
1980	46	303.47	44629	58.57	30.94	19.23	1309	5242	790.67
1981	33	146.27	20706	29.91	16.35	4.91	427	1356	286.38
1982	44	232.91	32459	55.38	33.09	10.18	562	2517	585.65
1983	56	155.34	24713	38.36	24.99	5.16	519	2101	754.03
1984	39	65.75	11500	16.68	0.31	0.83	209	432	26215
1985	55	195.59	27113	40.28	24.19	6.20	804	3806	1216.26
1986	45	59.19	8925	10.34	6.45	0.51	233	725	278.64
1987	9	38.24	5807	5.81	3.16	1.80	163	990	186.14
1988	46	182.04	24721	31.76	17.14	3.71	765	2102	134.68
1989	25	48.62	8281	10.03	6.52	0.78	165	516	-
1990	51	85.34	15524	22.03	10.64	1.32	471	2889	-
1991	29	24.19	3372	8.10	2.10	0.78	214	369	-
1992	20	29.24	4254	5.91	3.34	0.34	140	979	-
1993	34	75.05	11765	15.11	7.91	1.37	314	2088	-
1994	45	39.07	9627	9.86	5.98	0.66	317	4855	-
1995	51	36.91	8874	12.79	7.98	0.88	321	1287	-
1996	44	72.20	8827	11.24	6.78	0.09	313	1232	-
1997	29	10.21	2284	3.49	1.55	0.03	102	144	-
1998	55	121.19	156118	25.23	14.15	3.84	1355	3384	-
1999	11	1.83	2.99	5.39	4.069	0.0049	17	9	-
2000	40	63.86	5882	7.84	4.724	0.0839	453	977	-
2001	21	27.15	3819	4.63	2.89	0.09	201	251	-
2002	14	3.86	770	1.10	0.62	0.0061	33	36	-
2003	54	134.80	17011	23.60	15.03	0.35	964	3201	-
2004	2	14.36	865	2.439	-	-	88	217	-
2005	35	24.511	3652	3.597	3.853	0.7732	203	259	-
2006	12	4.53	678				353	588	-
2007	23	26.53	758	8.49	5.66	0.34	272	170	519.86
2008	32	41.75	6287	4.988	-	6.30	889	1898	-

Source: Revenue Department cited in Flood Report 2008

5.3 Flood control and mitigation at the village level: state response

In this section, the state response to the flood events in the state has been enumerated. Flood prevention and mitigation activities undertaken by the administration in the affected region, has been described in detail in this section. Thereafter, the major activities undertaken by the state to combat floods in the region has been presented. At the end of the section, narratives have been given to provide a better overview of the situation in the region.

As mentioned before the NMDA is a three tier body and the lowest rung of the NMDA i.e. DDMA is responsible for the rescue and relief operations at the local level. The DDMA is primarily responsible for the prevention and mitigation of the disasters in the region. Its primary target is preparedness, response, prevention and mitigation at the local level. The DDMA has divided flood preparedness in three stages for the effective preparation and mitigation. The plan is envisaged in three phases: before the onset of the floods or the preventive measures. Second, during the floods or the active season. The last is the post disaster (flood) recovery and reconstruction. This focuses on the post flood rescue and relief operations in the region. All the rescue and relief efforts are envisaged at two levels: the upper level and the lower level. The NDMA and the SDMA which is the legislative body are considered under the upper level, while the functions of the DDMA, the executive body of the NDMA and the SDMA has been discussed in the lower level.

5.3.1 FLOOD (DISASTER) PREPAREDNESS OR PREVENTIVE ARRANGEMENTS BEFORE THE RAINY SEASON

Every year the DDMA, in collaboration with the Indian Meteorological Department and the past exposure prepares a blue print for the upcoming hazard. In this stage, the focus in on preparedness. The Authority in collaboration with other departments makes necessary arrangements for the upcoming disasters. The master plan is based on the prior disaster exposure, weather condition, vulnerable area, population, and so on. Floods are a monsoon event thus the DDMA gears up itself for the flood before the rainy season.

At the upper level

The ‘before’ phase is the period of disaster when preparedness and mitigation is made in anticipation. The mitigation phase focuses on long-term measures for reducing or eliminating risk of disaster. To keep a track on the daily flood situation in the area, the irrigation department divides whole state in distinct zonal areas and established a control room in each zone. In the year 2011, the state was divided in 16 zonal areas and 45 control rooms were established all over the state to observation the situation. These centers are functional work for almost four months from June 1 to October 31. They work 24 hours a day. The Nodal officer is responsible for the activities of these control rooms.

- The government establishes a wireless center in the state for the proper communication and quick information from the different places. In 2011 in the state, 110 wireless control rooms were established in the state and the whole responsibility was to establish and control them on the police department. One wireless center was established in Ballia District also.
- The government provides for the link between the various departments via telephones. It is temporary in nature for the dissemination of the information and communication.
- The Irrigation Department, Annex Lucknow acts as a central control room to monitor all the activities. It is a nodal body responsible for the mitigation and prevention activities in the state.
- The department gears itself for upcoming hazard based on the past records. Based on the prior records a blue print for the prevention activities and the arrangements for the rescue and relief operation are made including the provisions for the shelter camps, rescue boats, etc.
- The department establishes the rain gauge instrument in different centers in every district to keep a track on the rainfall pattern and the fluctuation in the level of the river water. This report is beneficial for mitigation maps.
- The rise in the water level is measured each day to have an overview of the hazard situation.
- The department also prepares the flood plan for the district, and conveys the message to the recommended officers for implementation.
- The department also undertakes clearing of the drains, the repairing of the sewage pipes, local drainage system and the local dams.
- The efforts are made to reach the vulnerable areas and reach the vulnerable population. The arrangements are made for the delivery of relief provisions such as shelter camps, boat, health care services, and so on to the affected population.
- The department reviews the plan from time to time and makes necessary modifications depending upon the need.

At the lower level

The higher authorities are entrusted with the planning and preparedness while the lower bodies are responsible for the implementation of these plans and policies. The important functions of the lower bodies in this phase are listed below:

- Every district has steering group for the local planning and basic decision making. District magistrate is the head of this committee and the executive engineer of the Irrigation Department is the secretary of the committee. Superintendent of Police, District Agriculture officer, district supply officer, executive and senior executive engineer of electrical department, water cooperation, and other member of the department are also its interim members.
- This committee is the link between the higher authority and the ground level. It looks after the collection of the necessary information and work plan (relief center, communication plan, etc.).
- Ensure the enough no of personnel and staff for the implementation of the programmes.
- At the village level, there is a committee know as "*BHAD SURAKSHA SAMITI*" mean Flood Protection Committee. The purpose of the body to utilize the local resource and participation of the local people for their own problem. The junior engineer is the head of this committee, and the *sarpanch,* the opposition leader, village secretary, heads of the women and youth committee of the village and member from the Non Government Organization Lekhpal, home guard, and other village volunteer are also included.
- This committee is responsible for the mitigation and prevention efforts at the local level. It monitors the condition of the dam during the flood time and other landmarks which may pose risk for the village or the nearby areas.
- It acts as an interface between the people and the government and looks after the dissemination of all the relevant information.
- Local administration gears itself for every situation. They make plans for the flood time and identify the vulnerable village and the placement of the relief center and the responsible machinery for its activities.
- Coordinate with other department and communicate the entire situation regarding the flood.

People' Experience

People are quite disgusted with the government apathy and inaction. Floods are a regular phenomenon in the village, yet little has been done to avoid or control floods

in the first instance. People are quite ignorant of the existence of the DDMA and its activities. During group discussions, it was realized that none of the informants had any idea about the DDMA and its role in the prevention and mitigation of the floods in the village. One of the informants Adinath described:

> "*Preparation is not on the government's agenda. All the programmes and activities are built for the post flood scenario. Even if they are working on the prevention, it is hardly visible. Nothing substantial is being done for the flood preparation. Even if they (the government) are working, we have no idea, what they do and how. Dissemination of the information or awareness is quite low. There is lack of flood education or preparedness programmes. We only get to read about floods in the newspapers after the flood events*".

Another informant Kallan Chaudhary replied:

> "*sarkari suchna gaven me na na deven ni, bjari me raido se ghumavela, othi ke suni, iha kuch na aavi na*" i.e. the government officials do not give any information regarding floods. Sometimes the flood warning is issued over the radios but there are no provisions for the widespread dissemination of the flood warming and information.

Thus, there is lack of preventive measures on the part of the DDMA. The DDMA does not have a strong blue print for the prevention and mitigation of the floods in the first instance. People themselves take individual steps for the flood preparedness. This is not sufficient and is based on their economic resources. Vishvanath described that people have no plans; they just have become response centric. Speaking on the flood preparedness provisions, he replied, "Flood is not an unusual event to the people. They have become accustomed to it. What we can do, we just wait and watch?" People do not have sufficient resources and are thus susceptible to recurrent damages. Often the next flood arises even before the recovery of the previous floods. In the absence of external aid, survival becomes an issue. Gradually, people resort to indigenous techniques to minimize the damages due to flood. The houses have been built on a rectangular risen structure to prevent inflows of water. Further, granaries are being built on raised platforms to protect them against flood

water. The priority is to save more and more cash as it is the only commodity which is resistant to waters and could be held easily against food grains or other commodities".

During an interview on the flood preparedness,

Hari Gond gave a very dim response.

> He replied: "***Humni ka kar sakila …….bhad to hare saal awela hum kaha se bachaiye or kaise bachaiyi***" i.e. we are totally helpless against floods. Flood is a regular phenomenon, thus we have little to save and survive.

Villagers were quite unhappy with the state response and regret the fact that there is not a single plan of action to prevent or avoid damage due to flood in the region. Shivdhar described that people are quite unaware of the NDMA or the DDMA. When the researcher enumerated the functions of the NDMA, he was bit enraged and replied:

> *"humni na jani enmada ke. Key Jane eye ka karalla or humane key ka lab mile", i.e. we have no idea about the NDMA. Nobody knows what it does and how is it going to help us. All relief and welfare provisions are directed towards the emergency needs of the victims*. Nothing substantial has been done through these years to minimize the losses due to floods.

The DDMA fares poorly in the preventive aspects of mitigation. There is a lack of blue print to avoid floods in the first instance due to the inaction and apathy of the officials. It has been found that major resources are diverted towards the rescue and relief operations which do not have larger implications in the mitigation and prevention of the disasters. It must reorient its activities and focus on proactive approach rather than the intervention after the onset of the floods, as the old saying goes 'Preventions is better than cure'.

5.3.2 DURING THE ACTIVE SEASON (WHICH IS A TIME OF FLOOD AS WELL)

The 'during' phase is the emergency time in which the disaster occurs. In this phase immediate response and help are provided. This phase includes the mobilization of the necessary emergency services.

At the upper level

- During the flood time, the primary task is to keep vigilance over the disaster region and make quick preparation for the mitigation and prevention. This stage is very crucial as prompt response can save millions. Also, the review of the programme activities is made based on the ground realities.
- Secondly, the proper coordination and information sharing between the various departments for the dissemination of the effective rescue and relief operations becomes mandatory.

At the Lower Stage

- Based on the blue print of the rescue operations, all the departments and teams gear up for the target operation.
- A team of experts keeps an eye on the day to day situation. Their primary task is to cover all the affected areas so as to keep a vigil on the loss of lives and property.
- At the village, the local disaster management authority or the *BHAD SURAKSHA SAMITI* keeps a vigil on the daily scenario and in case the team finds something unusual or if the situation seems out of control, then it immediately reports it to the higher authority to make sure the requisite arrangements are made for the rescue operations.
- In order to save the inhabitants from drowning, the local disaster management authority establishes temporary relief camps in the area known as BHAD SHARDALAY or SHIVIR. These camps are meant to save the inhabitants from drowning. Due to the inflow of water in their houses, people flock to these shelters to save their life. All the necessary commodities are provided by the government at these camps to the victims. This year (when the research has been conducted) the government has established 13 *Shivir* for the inhabitants.
- Also, the local authority makes necessary arrangements for the evacuation of the residents. The boat is run through the water logged areas for the evacuation of the residents. According to the NDMA mandates, three kinds of boats (big, medium and small) should be used for the rescue operation as well as for communication purposes. Currently, 66 small, 18 medium and 27 big boats are available in the subdivision for the rescue operations.

- The local disaster management authority provide basic commodities such as rice, wheat, flour, candle, salt, kerosene oil, tarpaulin, lighting, and other basic food materials to the camp residents. In this, often several non government organizations also take part reaching to the flood victims. To reach the residents who have not come to the relief center or are living in flooded area, the government ensures boat connectivity to provide for necessary commodities.
- The local disaster management authority entrusts the local health department to ensure the health care facility at the relief camps for the inhabitants. During floods, the health care services are delivered through several temporary agencies such as temporary medical posts at relief centers and mobile ambulances. Often help is sought from other PHCs also. Personnel are hired from other districts in case of emergencies. The target is on providing health care services to the maximum number of people with minimal loss of lives and resources
- In case of an outbreak of any disease or unusual health problem arrangements are made for quarantine and remedial measures.
- The local authority is also responsible for any mishap during the floods and has to ensure proper evacuation and rescue and relief operations.
- Land order and security is also made strong to prevent rise of criminal activities such as theft or dacoity in the area.
- In case the situation gets critical or gets out of the control of the local authority immediately help is sought from the Paramilitary forces.
- The provisions are also made for the dissemination of the flood and other information to the villagers
- Encourage the local participation in the rescue and relief operations.
- The dispersion of the flood relief funds and its distribution
- Make a report of all the events for future scrutiny and evaluation.

People's Experience

Floods are a recurrent phenomenon in the village and the nearby areas. Shival is situated on the bank of the Ghaghara and heavy rains easily leads to the inflow of water into the village giving rise to the regular floods in the villages. Although prior exposure has made people quite casual to the flood events, yet it is a tough time for the inhabitants influencing their livelihood and mundane life. The biggest problem is

the steep rise in the river level. It has been found that the river level rises very rapidly during rains leading to a flood which is a matter of chief concern. This leaves little time for pre flood preparation and evacuation to the residents. Flood waters often engulf the entire village in the span of a few hours. Thus, people have little option to save their commodities or livestock. This swift flood causes greater loss of live and property. One of the informants Chamman Chaudhary recalled his past experiences on the issue. He described:

> "Sab *Ghaghara mai pe bani kitna bigdahi kitna bachi, jaese 2008 vali bhad lagu kuchu na bachi paiel rahal baki me utna nuksan na bayel, par tabu kam nahi karab bhayel rahal*", meaning that we are living on the beds of the Ghaghara, thus the question of loss or damage is out of concern. Everything depends on the Ghaghara. In the year 2008, the flood was so swift that nothing was left and everything was damaged. Other years, it is not so severe, yet we have suffered a lot.

The villagers are quite unhappy with the state response. They criticized that the government is just concerned with the remedial measures ignoring the prevention and mitigation of the floods in the region. It has been found that there exists a lack of flood preparedness and preventive programmes on the part of the DDMA. The DDMA is concerned with the post rescue and relief operations ignoring the prevention and mitigation. The villagers accuse government body for the flood losses and damages incurred. They enumerated government apathy and inaction behind the large scale damages. They also added that they (the government personnel) are quite negligible of their duties which cause widespread damage to live and resources every year on an unprecedented scale. One of the informants Shivpal Singh described:

> *"The government provides just bare minimum which saves them from death but one has to make his own living*".

rehtonA informant Shivdhar Nath also reiterated the same thing. In his own words:

> "V***e sirf bacha laete hai bas jinda tho khud ko khud hi rakhna padta hai"*** meaning thereby that they just save the life and thereafter, one has to strive hard for livelihood and sustenance".

Also, Ramdev replied:

> "*I don't know what is the DDMA and what is its function yet I know that it has not done substantial for the villagers. I only know that flood is a curse for us and we will have to live and die with it till our death"* meaning I have no idea about the DDMA and its functions. But I know that it has not enough in the direction of prevention and mitigation. I only know that floods are a curse for us.

The *Rahat Shivirs* are also under furnished and do not have adequate provisions for the residents. The tents are made up of inferior material; often it is not sufficient for the entire village. The people are forced to spend nights in the open. There is scarcity of the washroom and lack of private space for the women and the girls. Further, there is a shortage of basic commodities such as food grains, woods and other utilities. The provisions for the health care facilities are made through mobile ambulances in the flood prone areas but this is insufficient and not adequate for the entire inhabitants.

People are not so happy with the provisions at these temporary *Rahat Shivirs.* They enumerated several problems such as the lack of adequate shelter, water supply, health facility, toilet facility, etc. at these camps. Mahesh Kushwaha described that the officials just want to do away with their duties. They think that the poor residents have nothing of their own so should be grateful for whatever is available. The residents encountered numerous difficulties at the shelter camps and never want to stay there for longer. He further added:

> "*Water logging gives rise to several other problems such as urine and excretion. Most of the people do not possess toilet facilities in their homes and resort to open air excretion practices. But due to water logging, the villages' spaces are utilized for defecation which is unhygienic. The situation becomes acute for women who are deprived of privacy and has to undergo public humiliation".* It is a common problem at the relief center but is not given serious attention in the planning and policy formulation.

When the researcher enquired about the local disaster management authority and its work? All the informants replied in negation. None of the informant had an idea about the DDMA including village pradhan. The most common response was "***Pradhan se pochi rauwa hamnni ke na malum, ihihu kounu scheam hauve ka",*** meaning ask to pradhan about this or we don't have any idea about it. Some of them even asked is it any government scheme? The people have no idea about the government provisions for the mitigation and prevention of the floods at the local level.

Government officials enumerated their own problems in this regard. One higher officer at the Tehsil described:

> "*This area is flood prone and is exposed to recurrent floods every year. Further, all the areas are not uniformly influenced by flood, flood exposure is highly uneven. But our actions and programmes are controlled by the government discretion. Though we realize the flood situation but all courses of action depends on whether the Government (or higher body) would acknowledge it as floods or not. We report flood scenario to the higher authority and wait for their decision and all welfare and relief provisions are undertaken after the DDMA approves it as a 'flood'. The relief and welfare provisions are the sole discretion of the DDMA and are disbursed only at the orders of DDMA. The whole course is decided only the whole affected area and economic basis.* He added *"In the year 2011, there was flood in the district and several parts of the district were affected by floods but since the damage was not substantial, the DDMA did not recognized it as flood prone and the district was not considered as for flood relief and welfare provisions. Thus, no substantial efforts were undertaken in this regard since the DDMA failed to acknowledge it as per the government records. So one can easily say and what I have observed is, "Flood is what the higher government body sees"*.

Other officials also gave similar feedback. One of the officials replied,

> "*The government has done adequate provisions for flood relief and welfare yet the challenges are multifold and hence it is not adequate. The dispersion of flood relief and welfare provisions is prone to several challenges such as caste, class, gender, development and communication*. He further added that "*In our society we forget our social responsibility. Everyone looks forward to the government as the donor body. When we visit a field every one presents him as a victim and it is very difficult to find out who is a real needy. All government measurement criteria fail once you reach the ground and thus the dispersion of the flood relief measures and welfare is not an easy task*".

And the situation is quite poor when one is working in this kind of physical condition where ***"Jaha kuch banane se pahle hi ukhad jata ho***" i.e. where things (infrastructure) get destroyed faster than they are built. Thus, development is a distant phenomenon. Further, lack of strong political, administrative and public will has also contributed to the problem.

The inhabitants are quite unhappy with the local authorities. It has been found that adequate flood provisions are lacking and people are left at the vagaries of nature. It could be easily observed that hazard could be minimized but for the proactive response of the local government. The officials enumerate their own limitations, especially lack of funds. It has been found that the approach of the government is response centric. Lot needs to be done to minimize the losses due to disasters. Proactive response is necessary to counter the natural hazard and minimize the vulnerability.

5.3.3 POST FLOOD RESCUE OPERATIONS AFTER THE FLOOD WATER RECEDES

The last phase is 'after' phase in which recovery and rehabilitation are undertaken. The aims of the recovery phase are to restore the affected area to its previous state. The reconstruction phase is to restore livelihood to normal state.

At the upper level

- Post flood, the administration conducts a preliminary survey of the affected areas. Based on the survey, a report is prepared documenting the disaster situation in the region. This report is very is useful for the evaluation of the losses due to disaster and the condition and nature of the disaster in the region.
- Based on the survey estimations, the physical and economical worth of the damages are calculated.
- This estimation is used for the disbursement of the government grant for the disaster recovery and resettlement.'
- Also, preparations are made for the upcoming epidemic which may crop up after the disaster in the region.

At lower level

- Based on the above survey, the grant is released for the mitigation of the losses.
- The provision for the dissemination of the public facilities in the region is made to combat any health hazard which may crop up.
- Based on the damage estimations, gross estimates depicting departmental wise damages are calculated so as to make development plans for the next fiscal year.
- The efforts are undertaken to ensure relief and welfare packages to the affected community so as to help in the reconstruction and resettlement post floods in the area.

People' Experience

As we had already mentioned, in the section on social support, the social support scenario in the village is quite restricted and is based on the class and caste networks. These limits the recovery options at the community level and in case of the unavailability of external aid or grant coping and resilience potential. Thus the government aid becomes very prominent in post flood reconstruction and resettlement. The respondents reported lack of inaction on the part of the government machinery. People are quite annoyed with the government activities and accuse it of negligent of the plight of the poor inhabitants.

Sharing his experience on the issue, Hari Gond replied that the local DDMA is just a statuary body has not done substantial for the village and its inhabitants. They

are just concerned with the distribution of temporary provisions. Due to their negligence the villagers are not able to get adequate relief and welfare provisions from the government. In his own words:

> "*I don't know what is the DDMA and what is its function yet I know that it has not done substantial for the villagers. I only know that flood is a curse for us and we will have to live and die with it till our death*".

People are not so happy with the government damage assessment criterion, and complained lack of special provisions for the poor people. Enumerating the problems in the welfare and relief packages,

Santosh described:

> "*The relief packages are very low and often do not reach the needy and poor. In the year 2008, my family suffered substantial losses during floods but received only minor compensation of rupees eight thousand only.*

Time is another constraint; the government body is quite slow and starts all the rescue and relief operation after the flood recedes. It has been found that the distribution of the relief compensation is also delayed. Sometimes it may take more than five months to reach the masses.

Kalpnath Yadav said that

> "*I need more and quick relief money for my damage and manage my situation but official work took more than 2-3 month. Only we know how we manage through this period".*

People are quite critical of the government officials for their biased attitude towards the rich and the affluent in the village. They described that they are partial towards the rich and the affluent and are quite unsympathetic towards the poor and the marginalized. Kalavati described that the government (personnel) is quite biased and helps the rich and the affluent. The powerful and the influential enjoy the maximum support and benefits. In their village, all the post flood welfare and relief provisions are diverted towards the near and dear ones of the Gram Pradhan and they are left to live in misery and agony.

While the government official cite the inadequate infrastructure and lack of personnel as a primary excuse. They do admit that this is not good but said that we are also helpless. They described that the requirements are more but we have very little resources. We know it is not adequate but what else can we do. SDM Bairiya Ram Prasad Yadav described that the lack of basic infrastructure in the village is the major constraint in the delivery of the relief and welfare provisions. There exists a lack of civic amenities in the village which gets worsened during floods intensifying the flood woes. There is widespread poverty and there exists an acute shortage of employment opportunities. People are not proactive and look forward to government help and support every time which is not feasible.

To conclude, India is vulnerable to different kinds of disasters. It has a long history of rendering relief and rescue efforts in an organized fashion in times of drought and famine. Yet there was no institutionalized set up for the prevention and mitigation of disasters in the country. The National Disaster Management Act, 2005 has been a landmark in this direction which envisage for the creation of the institutionalized and permanent body for the disaster management. It provides for the three tier body namely at the national level called the NDMA, the SDMA for the states and the DDMA which is at the lowest rung of the hierarchy. The DDMA is the executive body of the NDMA and is responsible for all the rescue and relief operations at the ground level.

The DDMA ensures the flood mitigation and prevention at the village level. It targets floods in three phases. The primary phase is preliminary preventive arrangements and prevention of outbreak of floods in the village. During the active season or floods, the course of actions take a new shift and all the efforts are diverted towards the provisions of rescue and relief. In this phase, the target is to minimize the loss of live and commodities at the village level. Provisions are made to relocate the residents to the safe habitations. The temporary shelter camps are set up to provide shelter to the residents. Necessary commodities including food and medicine, etc. are provided by the government. Post flood rescue and relief operations are very critical in the reconstruction and resettlement. In this phase, the relief and welfare packages are disbursed to the affected residents. The government disaster grants are distributed to help the residents. Plus, the development plans has to be formulated for the

reconstruction and resettlement after the floods. The efforts made in this phase have an impact on the future flood (disaster) events also.

At the village level, following lacunas has been observed in the rescue and relief operations. Firstly, there exists lack of personnel. At the village level, disaster authority is headed by the Lekhpal along with the SDM of the area. It has been found that the officers are already entrusted with loads of their own job. Thus, they do not have adequate time for the dissemination of their duties as the head of the local disaster management team. Secondly, the DDMA structure is new to the country, thus people are still not aware of its functions and responsibilities. Often various departments defer their responsibilities in the name of bureaucracy and red tapism. Further, there exists lack of proper plans and policy guidelines for the prevention and mitigation of floods. Often, the disaster grants are left unused and return to the central bodies in the absence of an adequate policy framework, and so on.

Chapter 6

Summary and Conclusion

The central focus of this chapter is to bring to light the major findings of the study, discussion and policy recommendations. The chapter has been divided into three parts. The summary of the research findings has been described in the first part. In this portion, a short precise of all the chapters of the dissertation has been discussed. In the second part, based on the research findings, certain suggestions have been recommended for policy implications and application of the research. Finally, the limitations of the study along with the future scope for further study have been discussed in the last part of the chapter.

6.1 Summary

The present study has been conducted in the one of the important flood prone village Shival in Ballia district of U.P. Shival is located in the Bairiya tehsil of Ballia which is the most flood prone tehsil in the district. The tehsil is situated amidst two rivers, the Ganga and the Ghaghara. The village Shival is located on the banks of the river Ghaghara. The river defines the boundaries of the village on the three sides. Shival is situated on the lowland tract of the district, which makes it susceptible to inundation immediately in case of the rise in the level of the river waters. Thus, flood is a recurrent phenomenon in the village in the month of July and August. Based on the suitability of the research objectives, qualitative research method has been used. Observation, interview schedule, and group discussions were the primary tools of data collection. Later, this information was analyzed to draw major research outcomes.

Floods have been a common topic of investigation in disaster studies. Scholars have for long investigated the impact of floods on the economy, health, civic infrastructure, and so on. The current study has some points to bring to light which has been hitherto neglected in the research studies. It has been found that the most of the flood studies has focused on flash floods. The type of the flood in Shival (or Diyaranchal) is radically different from most other areas condemned to fight flood. Floods here are almost never flash floods, like they are in the Kosi belt. The onset of floods here is not sudden. It is a recurrent phenomenon in the area for a certain period, the intensity of which depends upon the monsoons. The study has tried to highlight

the grey areas which people and administration fail to observe. The disaster mitigation and prevention must consider the nature of the floods in its policies and programme.

Secondly, there is a spate of studies confined to the urban areas while very few studies have been carried out in the rural areas. The difference in the context has a substantial impact on the livelihood activities of the inhabitants. Usually rural areas are marked by preponderance of the agricultural activities. Hence, the nature of the havoc caused by the floods in the rural areas would be far greater than that caused in the urban areas. Water logging and inundation destroys the agricultural crops, crippling the backbone of the economy in the rural areas. Further, loss of crops deprives the inhabitants of their major resource base such as food grains, etc. In addition, water logging interrupts the cultivation activities disturbing the crop cycle for the entire year. Lack of other employment options leads to the problem of unemployment in rural areas depriving the inhabitants of the basic means of survival.

Another important contribution of the study is the inquiry of the influence of the floods on the public health facilities in the area. Most of the studies conduct a piecemeal examination of the health issues focusing on certain problems such as diseases or mental health. These studies fail to provide an overview of the health scenario in the area. This study has tried to examine the influence of the floods on the public health facilities in the region. Floods generally create similar havoc for the residents and the area as a whole is vulnerable to illness and disease. Some of these diseases (or illnesses) are simply caused due to the breakdown of the regular structure. For example, floods have a detrimental impact on the health and nutrition, sanitation and hygiene, and so on. The lack of pure and safe drinking water can give rise to several water borne diseases in the area. Thus, flood mitigation and prevention should give place to the development of the physical infrastructures for exhaustive rescue and relief operations instead of dealing in piecemeal fashion. These findings are genuine, derived from the exhaustive field investigation. They could be used for future disaster prevention and mitigation as well as policy implications.

Floods have a detrimental impact on the economy of the villagers. Agriculture is the primary source of the livelihood in the village. Floods destroy the chief source of livelihood in the rural areas as water logging and inundation due to floods destroy the agricultural crops crippling the resource base of the inhabitants. Loss of crops implies loss of food grains plus income of the inhabitants. Lack of alternative source

of employment options leaves them out of employment without any means of livelihood. Further, water logging impedes other livelihood options as all other activities come to a standstill. Floods lead to lack of employment options, which in turn give rise to the problem of unemployment as well as hidden employment in the village.

Also, the flood interrupts the public health public health facilities in the village. The village is quite underdeveloped and there exists lack of health care facilities in the village. There is no PHC in the village. The nearest PHC is seven kms away from the village. In addition, the state of infrastructure is quite poor and under furnished. The floods disrupt the basic civic amenities, influencing the public health scenario in the village. Recurrent floods have destroyed the asset base of the inhabitants, leaving little with, to support others in the community. The support and aid received is quite streamlined based on the caste and class networks in the village. People are quite partial towards the members of their own caste groups.

The Livelihood asset model of livelihood has been used to measure the vulnerability of the livelihood to floods. The livelihood assets could be categorized into five types of capitals: human, social, physical, natural and financial. According to this model, people's strength and capacities (such as human capital, social capital) are also potent livelihood assets. Vulnerability has been measured using the 'social vulnerability approach'. Smith (1992) described two key paradigms used to frame the social scientific study of disasters: the behavioral and structural paradigms. The behavioral paradigm focused on the geophysical causes of disasters and the use of technology to alleviate damage as the result of such an occurrence. This paradigm holds disasters to be indiscriminate occurrences and emphasized the significance of human behavior in preventing disasters. While the structural paradigm perspective in disaster research asserts disasters are a "products of a nature/society interface which intensify daily economic and social living problems".

The structural paradigm is analogous to the Environmental Possibilism. There are no really generalized opportunities and risks in nature, but instead there are sets of unequal access to opportunities, unequal exposure to risks which are consequence of the socio-economic system. According to this paradigm, pre-disaster social cultural configuration is an important predictor of post-disaster hazards. An important approach encompassed by the structural paradigm is the vulnerability approach,

which focuses on the spatial dimensions of social and economic stratification in relation to disasters known as the social vulnerability approach. Social vulnerability means complex set of characteristics that include initial well-being, livelihood resilience, social protection, and self protection, social and political network and institutions. It relates to differences in gender, age, social position, incomes and other potential factors that determine the ability to cope with adverse impact. It has been found that poor and impoverished and marginalized social groups and individuals are more "at risk" in the wake of natural disasters. The narratives have been used to supplement the empirical observations.

India has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions. Floods, droughts, cyclones, earthquakes, and landslides have been recurrent phenomena. According to the World Bank estimates 2.25 per cent of the GDP and 12.15 per cent of the national revenue were lost because of natural disasters from 1996-2001 and the direct losses of public and private infrastructure have amounted to approximately US$30 billion over the past 35 years (TOI, 2004). The organized efforts towards floods and droughts are not a recent phenomenon in the country. Disaster Management Act (2005) is the landmark in the history of disaster mitigation and prevention. The Act provides for creation of a three tier hierarchical structure for the effective management of the disasters in the country with the NDMA at the central level, the SDMA at the state level for the disaster mitigation and prevention, and the DDMA at the lowest rung in the ladder. DDMA is the chief executive body of the NDMA. The DDMA is primarily responsible for the prevention and mitigation of the disasters in the region. Its primary target is preparedness, response, prevention and mitigation. The DDMA envisages flood preparedness in three stages for the effective preparation and mitigation. Before the onset of the floods or the preventive measures, during the floods or the active season and finally post disaster (flood) recovery and reconstruction.

The Ministry of Water (Irrigation Department) is responsible for all kinds of flood prevention and mitigation activities in the state. The flood control measures are under the aegis of the Irrigation department. Although flood creates major havoc year after year, yet the state has not taken effective measures to combat the floods. Irrigation Department act in very mechanical process and they do it as a routine work during monsoons. And most of the tasks are response centric instead of prevention.

From the field investigations, it could be easily deduced that the administrative apathy and inaction in combating disasters play an equal role in debilitating everyday life in the area long after the natural disasters like floods recede. For example, nature of flood in the area commonly referred to as 'Diyaranchal' is radically different from other areas condemned to fight floods. Floods here are almost never flash floods like they are in the Kosi belt. They are not an outcome of breach of any dams or opening up of sluice gates to safeguard some reservoir or catchment area. Quite on the contrary, they follow a pattern that seems to remain unchanged year after years. The irrigation department has meticulously maintained almost all data concerning the flood situation and keeps quoting it in their *badh prativedan* (flood reports). It is quite known that every single year Ghaghara swells with the onset of the monsoons, and finally, breaches it after heavy showers submerging the villages. Yet, when it comes to proactive action and putting safety gears in place, well ahead of the onset of the floods, the responsible agency is often found to be rather unprepared leading to major havocs in the regions.

The land holding patterns itself shows the higher vulnerability of lower strata of the society adding to their miseries. The lands belonging to the dominant castes such as the Yadav and the Thakur often occupy the high lands of the village while the low lying lands belong to the lower castes such as the Nais and the Kurmis. This result in a recurrent pattern of the lands belonging to the lowest sections getting inundated first, and remaining so till the water recedes. Rice is the staple food crop in the village. The loss of the agricultural crops leads to the decline in the income of the inhabitants. Loss of the food grains means less grain for consumption often leading to the scarcity of the food grains for the consumption in the family.

A vast majority of population is dependent upon agriculture for basic survival and a sizeable section of them is either landless or marginal farmers. The consequences of the disruption caused by the flood in the crop cycle are devastating for this section. The area often gets waterlogged in mid July and remains inundated till august. This turns the whole process of sowing paddy crops in a big gamble. If the peasants take a risk and proceed, submitting to the mercy of the rain gods, they often end up losing even the initial investment; leave aside the idea of profit. This interrupts the crop cycle influencing the next crop season as well. The poor and the marginalized are the worst sufferers as their landholdings are small yielding fewer

grains. They do not have excess to sell living hand to mouth, thus, crop failure brings them to the verge of starvation.

Women, children and elderly are frequently vulnerable to floods in the region. There exists widespread gender discrimination in the village. The women are accorded lower status in the society. Women do not have access to major resources in the family. They are discriminated in the access to the food and nutrition, education, and health care in the family. Most of the women are engaged in household chores contributing in the agricultural activities such as sowing or harvesting of the paddies but do not have material possessions in their name and are dependent upon their spouses or the males in the family for sustenance. The traditional and statuary laws prohibit them from accession to the family property such as house or lands. Further, they do not have decision making authority in the family. Strict patriarchy has made them parasites on the males depending upon their wisdom for minor chores. Females are generally segregated from public sphere and are not free to articulate their views and opinions in the wider domain. Further, they also have restricted access to the post flood welfare and relief packages. The compensation packages are delivered in the name of the male heads of the family, thus the widows and the destitute are systematically discriminated in the provision of the welfare and relief packages.

The inaction of the government goes against the National Disaster Management Act 2005, which focuses on a cyclic process of disaster management beginning with preparedness response, prevention and mitigation. In Diyaranchal, the state's action is marked by the singular absence of any preparatory strategy being in place. The only thing they seem to do is holding an annual ritual of a 'pre flood preparation plan'. The plan divides the state into several zones, identifies vulnerable areas and establishes watch and control points that keep a tab on rising (or decreasing) water levels of different rivers and reports to the zonal centers. They also update it in the flood section of the website of the SDMA. But none of this gets translated into any action on the ground level other than waiting for the flood, and then responding to it, once it inundates the area. Apparently, the whole idea of disaster management seems to be turned on its head and becomes response centric instead of the aforesaid cyclic process of preparedness, response, prevention and mitigation.

The reasons behind this are many. Firstly, the lack of communication link between the state and the people. Though social committees consisting of both the

governmental authorities and the people from affected villages exists but their mandate does not go beyond ensuring the safety of check dams, reporting about the status of the critical points of the village, and ensuring the continuous existence of a communication channel between the authorities and the victims. They are neither mandated either to make any executive decisions or utilize funds.

The consequences of this are manifold. For example, as against the villagers' suggestions of constructing several small bridges or one strong one with five pillars to mitigate the impact of the enormity of the flood situation, the authorities constructed a three pillar huge bridge at Suremanpur, a place that provides only point of connectivity between the villages in the flood zone with the rest of the area. The bridge could not withhold flood impact and immediately after its construction got damaged, leaving the flood affected villages almost inaccessible during floods.

The governmental inaction and apathy is located not merely in administrative will. Rather, it emanates from a curious interplay of various factors that paralyze the capacity of the local administration at all levels, right from policy making to intervention, and finally rescue and rehabilitation in the flood affected regions. To begin with, there is huge shortage of manpower at the level of administration and its reasons lay in the neo economic policies adopted by the Indian state at the beginning of the last decade of the 20th century. Faced with interrelated problems like mounting fiscal deficit and the government's inability to pay even the interests on the loans, it had incurred from various international financial institutions, it was forced to adopt the Structural Adjustment Programme with an obligation to 'rationalize' government spending and 'scrutinize' the work force in the public sector. A direct consequence of this was acute shortage of manpower and overburdening of the load on the existing officials.

For example, the DDMA headed by the district collector does not have a dedicated staff of its own and has to depend upon other arms of the local administration. The major tasks of the DDMA are entrusted upon the revenue department, and the staff is expected to cater to the disaster management, in addition to everything else it has been doing. Usually, the revenue department is concerned with the preparation and updating of land records, electoral lists, identification of beneficiaries of various welfare schemes run by both the provincial and the central government, and so on. Thus, disaster management task is bound to get a short shrift.

All of this leads to a situation where year after years, the budget allocated for disaster relief remain unused. Though the actual process of assessment of the losses start as early as in the very first meetings held in May, it reaches the ground only when the water starts receding. In short, the knowledge base generated over years of data collection remains largely unused and the process reduces to a mere post disaster assessment. This too begins only after the water starts receding, often reaching the victims only around November-December and thus, impedes the victims' capacities of sowing the Rabi crops.

Sadly, the whole process is marred by the eschewed patterns of representation of different social groups in the decision making bodies of the Gram Sabha. The marginal and the vulnerable sections like the lower castes, children, women, elderly, and invalids are almost often excluded from access to these. My investigations testified caste/class differentials in the relief and rescue operations with the 'lower' caste and class receiving the relief at the far end of the whole exercise. Further, the process is engulfed by corrupt practices and it is difficult to receive the relief without having to greasing the palms. Clearly, the whole idea of decentralization of the governance has been subverted and appropriated by the forces that have held sway over the rural life for centuries and any genuine attempts to break status quo need to overcome this challenge. This can be done only through a very careful analysis of power relations and its distribution across the axes of caste, class, gender, land holdings, economic status, and so on. Till then, all disasters will affect the vulnerable far more disproportionately than the well to do sections of society.

Stratification in the area runs along multiple axes with caste being the most dominant of them all. The other factors that lead to a hierarchically organized social structure are religion, class, and gender interacting at various levels. The curious interplay of these factors produces and shapes all social relations including the distribution of the resources in the community. This unequal distribution is the major reason behind the inequality that renders different strata of the society to different degrees of vulnerability. Though all disaster plans envisages the principles of equality giving little attention to the idea (practice) of equity. The programmes foresee all the victims as essentially equal and having similar access to relief. Evidently, such a process lead to a faulty assessment of the damages suffered by different groups. The

need is to factor in the special needs of the most vulnerable groups and addressing their problems on priority.

It is not difficult to gauge the reasons behind this anomaly. The background of the policy makers has an important part to play in this regard. The composition of this group is generally highly skewed in favor of the upper castes and upper classes, and rarely do they have a firsthand account of the trauma and trouble the lower strata faces. This is also the reason for almost absolute absence of lower caste and class voices from the official discourses. In this scenario, when the disaster management officials strategize preparedness and mitigation, their policies are bound to be shaped largely by the interests of the upper castes (or dominant castes). Clearly, participation by all sections of the society, which is the key to effective disaster management, suffers heavily in this situation. My respondents pointed out that the officials are not only ignorant of power politics in society but are also completely oblivious to the role it plays in society. The issues such as representation, decentralization, participation in the decision making processes, etc. are never given any serious consideration.

Livelihood is an important predictor of vulnerability to disasters. It is dependent upon a multitude of social, political and economic factors but disaster management authority does never address it like that. They, rather, treat it as a static factor assuming it to be unidirectional. The ideas of social justice, of everyone's equal claim and access to redress and equity are never given serious attention they deserve. Life is usually tough for the vulnerable and marginalized, but in the times of disaster, the situation gets even worse for them. In disaster situations, then, with everyone including the local dominant groups, those on the lowest rungs of the society suffer the most because the dominant groups siphon off even that which is legitimately theirs. This is high time; we give a serious thought to this issue and restructure the disaster management strategies by infusing them with the ideas of social participation and equity.

The distribution of the compensation amount or the welfare and relief grants to the victims is another subject deserving a serious consideration. Usually, it is calculated by taking various factors into account including the *Badh Apada Rashi* that is decided before the onset of the floods by the government. Interestingly, neither the predefined fund nor the compensation is revised on the basis of economic factors like inflation or victim's productive capacities. Quite on the contrary, it operates on the

idea of lump sum amounts for different heads like death, loss of cattle, and loss of crops. This is a very serious flaw in the policy, in the light of the fact that most of the victims are compelled to live out of pocket expenses for both their daily needs and other unforeseen expenses such as illness, diseases or marriage in the family. It is to be noted that one such event can offset family's fortunes irrevocably. Many studies in the area have shown how such events can trigger a chain of events leading the family into debt bondage. Even on the level of everyday existence, inflation plays a major role in deciding the daily cost of living, and ignoring it, can jeopardize the family's capacities of meeting basic needs such as food, nutrition, shelter, and so on.

Further, despite all the enthusiasm of the authority in implementing special programmes like public safety, relief fund, flood management, damage cost assessment and such, they seem to be oblivious to the minute details of the problems that is the key to understand how disaster affects different communities differently. For example, in those areas where the flood is recurrent and annual phenomenon, it has become sort of an integral part of people's 'annual calendar' and has become normalized in the popular perception. People in such areas devise their own indigenous mechanism to deal with floods. On the other hand, in areas where it is occasional, it entails far more serious consequences. When villages in such area get flooded, their annual routine is jeopardized for two reasons. First, the flood destroys everything with its onset. Afterwards, in the absence of a proper drainage system that is quite common here, the village remains waterlogged for a long time, delaying all livelihood activities in the process. The farmers cannot sow their paddy, and other Kharif crops, and the water logging exposes the villagers to numerous diseases especially waterborne diseases. It also influences livestock, with their grazing grounds submerged and exposing them to insects, and other sources of diseases.

Unfortunately, it is not the flood that makes the situation critical. Flash floods recede, at least can recede, fairly quickly if there is a good drainage system. In Diyaranchal, there is scarcity of an efficient and effective drainage system in the villages. Establishing a proper drainage system could diminish lots of problems caused by these annual floods but the authorities do not even seem to be thinking in that direction. The situation gets merely more complicated by the fact that most of the lands in the villages belong to the dominant castes and no one wants to give even a very small part from his 'private' land for drainage. Further, the land belonging to the

Gram Sabha is either usurped upon by the powerful and is simply not available for such activities. The traditional drainage system that revolved around small drains culminating into the collection point called *ghoor* no longer works. Most of the *ghoors* have been usurped by the dominant groups for their personal use and even where they exist, they fall tremendously short off to cater to the needs of increased population of the village.

In this situation, water logging often proves to be far more dangerous than the floods for the village life. Still, the local government that is primarily responsible for flood relief and capacity building is not serious about the issue, in fact not even bothered with it. People's response to this issue is equally appalling for they too fail either to pressurize the administration into action or bringing out some solution out of their own. Even the politicians do not want to touch the issue for it often involves family feuds over land rights and they do not want to offend any of the parties. The end result remains the same. The government shrugs its hands off the issue, saying that it does not fall under their jurisdiction, villagers do not come up with a solution of their own and politicians do not enter into it for they would lose popular support in the process. Water logging keeps affecting the village life long after the floods have receded. Crops suffer, agricultural work gets delayed, and people get exposed to innumerable diseases. It goes without saying that those who are the lowest in village hierarchy are the worst victims.

6.2 Policy Implications of the study

Based on the field experiences, following suggestions could be made. Government should invest in the public services such as water supply, electricity, health care facility in the flood prone area. It should also ensure the investment and try to strengthen the existing institutions for better service delivery. These institutions are utilized by all sections of the society irrespective of their caste background. If these institutions deliver services to the best of their capacities, people won't have to move out to private sectors. Lack of facilities increases the vulnerability and exposure to the different problems. So, there is strong need to make sure that these institutions functions properly.

Secondly, the government services should address the idea of equity. In the flood prone area, there are different categories among the vulnerable classes with,

different needs. So, the government policies should be framed keeping in mind these differential needs of the people. There is an urgent need to estimate the vulnerability with regard to the socio-economic conditions, and identify the real damage cost with the social term and calculate it in monetary form.

Further, there is a strong need for a separate department for planning, controlling and managing disasters, especially when it is an annual phenomenon. At the national level and state level, there is an administrative body but at the ground level there is no separate body that especially focuses on disaster issue. The whole function and mechanism is depending on the revenue department and revenue department is already overloaded with lots of other programmes. It is true that every district is not disaster prone so for that identify those district or region which are disaster prone and then set up separate departments in these districts. Due to lack of a separate department at the DDMA level, the whole structure is behaving like a relief team and only gets activated during the disaster, thereby; the approach has become response centric. In this situation, the tenets of the Disaster Management Act (2005) will not be realized and the focus would still remain on the response centric approach.

Poor and vulnerable are easily victimized by the money lenders in the flood prone areas. Lack of livelihood opportunities creates lots of barriers for their survival without finance, so they are dependent on moneylenders for their monetary requirement. It has been found that in the absence of any formal norms, moneylenders charge exorbitant rates of interest and often land up paying a far greater amount than the principle amount. The vulnerable sections, find it difficult to obtain loans from the banks as bank loans are meant for specific purposes. Further, bank needs credentials of the applicant and one has to provide a security. The entire process of securing loan is quite tedious and the non literate villagers find it difficult to follow. Thus, they prefer borrowing from the local moneylenders or from within their informal networks. This practice perpetuates indebtedness increasing their vulnerability to poverty. This issue must be given a serious consideration in post disaster, welfare and relief operations. Co-operative banks in these disaster prone areas, which can give loans on minimum interest, will help them to overcome the problems and cope with the post disaster losses. The government should formulate plans and policy to address this problem and try to provide an alternative mechanism to save the vulnerable and poor people.

Also, the floods have a devastating impact on the physical infrastructure of the area. It has been found that floods interrupt the basic civic amenities such as water supply, electricity, health and hygiene, nutrition and sanitation. In addition, floods destroy the infrastructure such as roads, building, and so on. It has been found that frequents floods have destroyed the resource base of the village. And there exists an acute shortage of the basic facilities such as health, education, road and rail network, and means of communication in the village. This interferes with growth and development as these structures are the pathway of the development. Due to its interior location, the government has not done enough to improve the situation and the village continues to be underdeveloped. The administration and the political leaders turn a blind eye to the issue maintaining the status quo. But the need of the hour is development. To reach the goal of the developed India, development of rural areas is the first step as India resides in its villages.

6.3 Limitations of the study and future scope

The study suffers from following limitations. The study is retrospective in nature i.e. the study has been conducted after the floods and the responses were elicited based on the memories of the informants. In the retrospective research, often there is a possibility of missing information as with time the intensity of the problem decreases or is quite different than when it is immediately held. Thus, in such studies, there is a probability of missing response. Secondly, the study could be duplicated using quantitative scales. Further, the study has been confined to one flood season. Longitudinal study would have yielded better results.

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Appendix -1

Interview Schedule

1. Demographic Information

1.1 Name: _____

1.2 Address: _____

1.3 Age (years): _____

1.4 Religion: (1) Hindu (2) Muslim (3) Other (Specify) _____

1.5 Gender: (1) Male (2) Female

1.6 Caste: (1) SC (2) ST (3) OBC (4) General

1.7 Types of family: (1) Nuclear (2) Joint (3) Extended

1.8 Total annual income of the family (Rupees): _____

(1) Above 5000 (2) Below 10,000 (3) Below Rs 15,000 (4) Below Rs. 20,000 (5) Above Rs. 20,000

1.9 Education: _____

(1) Non Literate (2) Lower primary (3) Upper primary (4) High school (5) College (+ 2, +3), (6) Higher Education (P.G. or above), (7) Vocational training

1.10 Employment status: (1) Self-employed (2) Employed (3) Part-time employed, (4) Unemployed (5) Retired

1.11 Marital status of the head of household (1) Unmarried (2) married (3) divorced (4) widowed

1.12 Total number of family member (1) 2 to 4 (2) 4 to 6 (3) 6 to 8 (4) 8 to 10 (5) more than 10

1.13 Location (1) Upper Basin (2) Lower Basin

1.14 Housing

1.14.1 Ownership (1) Own (2) Rented

1.1.4.2 No of rooms

1.1.4.3 Wall type

1.1.4.4 Roof type

1.1.4.5 House type

1.1.4.6 Electrification

1.1.4.7 Water Supply

1.15 Category of land

(1) Homestead land

(2) Irrigated land

(3) Non irrigated land

(4) Forest and other land

1.16 Indebtedness

(1) Source

(2) Frequency

(3) Causes

(4) Total debt (amount as well as value)

1.17 How long have you been living in this village? _____

1.18 If you are a migrant, what reasons made you to migrate and year?

1.19 Do you possess any of the following?

(1) APL card

(2) BPL card

(3) Any other

2. Livelihood

2.1 Agriculture

2.1.1 Crops cultivated

2.1.2 Frequency

2.1.3 Production for sale / personal consumption

2.1.4 How do you sustain your family in case of crop failure?

2.2 Livestock

2.2.1 Animals

2.2.2 Use

2.2.3 Fodder for the livestock

2.2.4 How do you feed your livestock during flood?

2.2.5 Where do you house your livestock during flood?

2.2.6 Do you think your livestock was affected in any way due to flood?

2.3 No of wage days in a year

2.4 Were you out of employment (temporarily or permanently) during the flood within a year?

2.5 Major activities undertaken when out of employment.

2.5.1 Migration

2.5.2 Starvation

2.5.3 Begging

2.5.4 Any other

2.6 Did you suffer loss of income due to flood? Please elaborate.

2.7 Were other members of your household temporarily or permanently out of employment during the floods?

2.8 Were you forced to take any subsidiary occupation post flood?

2.9 Migration (in no of days, destination).

2.10 Please indicate annual migration patterns within the village/villages as dictated by economic activities.

2.11 Were you forced into indebtedness due to flood?

2.12 Did you sell your livestock or other assets post flood for consumption?

3. Flood experience

3.1 How do you perceive floods as a phenomenon?

3.2 How frequent is the flood in the area where your house is? Have you experienced flood previously?

3.3 Did you have any flooding in the area you live in last one year?

3.4 Do you think flood or any damage due to flood was unexpected in any ways?
3.5 Did you get water into your establishments e.g. house, agricultural land or any other piece of land during the flood?
3.6 Were you forced to evacuate your house due to floods during the hazard?
3.7 Did your near ones suffer damages, loss of resources or injury due to flood?
3.8 Have you seen any flood hazard zone maps for your district and state?
3.9 Do you know the disease and other risk involved during and after flood?
3.10 Do you know have any idea about the flood warning system in the state?
3.11 Do you know what steps to follow immediately after the flood warning is issued?
3.12 Do you know what precaution to follow to avoid the risks?
3.13 Do you think prior experience makes you prepared for the future events?

4. <u>Social Support</u>

4.1 What is the most important source of help in the community?
4.2 What is the most important source of help in the community post floods?
4.3 Do you think your household is efficient to deal with the crisis?
4.4 What is the most potent form of assistance available to you post flood?
4.5 Do you think your kinsmen/relatives offer you potential help in the post flood recovery with respect to the following:

(1) Shelter
(2) Food
(3) Monetary assistance
(4) Agricultural assistance
(5) Child care
(6) Any other

4.6 How do you reciprocate this assistance?
4.7 Do you think you can get help easily in case of a hazard?
4.8 Do you think villagers work together and help each other post flood?
4.9 Do you think community mobilization can produce better results without any external aid (such as government body or NGOs)?
4.10 When there is a decision to be made in the group, how does this usually come about?
4.11 How are leaders in this group selected?
4.12 In case of emergency (e.g. crop failure or natural disasters), who would approach to the local authority for the petition?
4.13 Is there any committee for the common decision in the group and who is the member of this community?
4.14 Role of the vulnerable section (women, children, elderly population) in the groups.
4.15 Is there any community center for the social support?

5. Public Health Facilities

5.1 Describe the public health facility in your area?

5.2 How many dispensaries or health centers do you have in the village?

5.3 Do you think essential and life saving drugs is available at the centre?

5.4 What types of outreach services are available at the health centre?

5.5 Are you satisfied with the personnel and resources available in the health centre? Please elaborate.

5.6 Are you financially capable of paying for the services offered?

5.7 Health centre was closed during the flood or its services were disrupted in any way due to flood?

5.8 Is your area fit for living from health perspective? Please elaborate.

5.9 What are the prevalent diseases in the area?

5.10 Did you notice any outbreak of disease/s in the area immediately after the flood? If yes, name them.

5.11 Was health centre prepared to counter the disease?

5.12 Do you think health facilities available post flood were sufficient?

5.13 The patients received prompt first aid treatment and later proper medical care?

5.14 Did you had any illness or injury due to flood?

5.15 Was anyone in your household ill or injured due to flood or as a consequent of it?

5.16 Was there any death in the area due to flood?

5.17 Do you think your health has suffered as a result of flooding in any ways? Please elaborate.

5.18 How health centre could be improved to tackle any future flood phenomena?

6. For Aganwadi Workers/ ASHA

6.1 How many infant/children/pregnant women/lactating mother covered by your centre?

6.2 What are the common illnesses for children in this village?

6.3 How many children were born during the past 1 year?

6.4 How many children died during the past 1 year??

6.5 Does your centre give locally available foods for supplementary nutritional feeding?

6.6 If yes, what are the locally available foods that are used for supplementary nutritional feeding?

6.7 Who prepares this food?

6.8 Where is the food prepared?

6.9 What are the provisions of supplies that you receive?

6.10 How frequently immunization/health check up/nutrition and health education conducted in the village?

6.11 Does your centre provide non-formal pre-school education?

6.12 Do you conduct home visits?

(1) If yes, how often?

(2) If not, why?

6.13 What are the messages carried out during the home visits?

7. Question for ANM

7.1 What are the services that you provide as an ANM?

7.2 How many days in a week do you go to the PHC?

7.3 How many days in a month do you go for field visit?

7.4 What are the major immunization programmes carried out at the PHC and through home visits?

7.5 Provisions for the pregnant and expectant ladies in the community.

7.6 Enumerate the problems encountered in child birth and delivery?

7.7 Enumerate the problems encountered in the non institutional deliveries in the village.

8. Questions for the Doctor

8.1 Describe the health scenario in the village?

8.2 What are the common illnesses for children in this village?

8.3 Describe the state of the health care services in the village.

8.4 Major constraints in the delivery of the health care services in the village

8.5 How do you manage the health care services post flood with such limited resources?

8.6 The blue print of the special plan during and post disaster for the delivery of the health care services?

9. <u>Coping and resilience</u>

9.1 What type of relief was available after the floods? Please elaborate.

9.2 Did you had adequate resources post flood or were depended on external aid for survival?

9.3 Do you think adequate aid is available post flood in the area?

9.4 Did you observe any discrepancy in access to aid post flood? Please elaborate.

9.5 Do you think you have adequate resources to deal with flood hazard on your own?

9.6 Do you think you have adequate skills to deal with flood hazard on your own? Please elaborate in terms of education, age, physical strength or any specific features which you would like to mention.

9.7 Did anyone help you during this time? How did they help you? Please elaborate.

9.8 Do you think the education of your household members (who were already engaged in education) has suffered due to flood?

9.9 Is there anything, you would like to share or prepare others for flood?

10. Government Support

10.1 How long you have been working in this area?

10.2 Do you think flood is a manmade or human disaster?

10.3 It has been found that minor flood events do not get adequate coverage in the media. Do you think preoccupation with the major floods, underscores the aid and assistance for minor floods?

10.4 Do you think losses due to flood could be averted through proper planning and management?

10.5 Do you think media (local newspapers and TV channels) can play a positive role in flood preparedness?

10.6 People learn more from the empirical experience, then other sources, such as newsletter containing flood related information, or other popular means of communication about flood preparedness and flood hazard.

10.7 Do you think that local community groups such as self help groups play a positive role in coping and resilience in the community post flood?

10.8 The formation of such groups should be encouraged by the government or not?

10.9 What are the major barriers that hamper effective flood assistance between communities and government?

10.10 What are the factors that help create and maintain effective flood assistance between communities and government?

10.11 Do think local resource capacity and local knowledge is being utilized in flood planning and management?

10.12 Do you think flood is given adequate attention in disaster mitigation and preparedness programme in the region?

10.13 Elaborate the factors which undermine the position of flood in disaster mitigation and preparedness programme in the region?

10.14 Do you think government programmes are meant for post disaster recovery and focus little on preventive efforts?

10.15 Do you think sufficient information is available for the stakeholders?

10.16 Do you think information is loud and simple for layman to understand?

10.17 Do you think people make adequate use of information available prior flood?

10.18 Do you think government has adequate flood aversion techniques?

10.19 Do you think non agricultural economic activities must be promoted to minimize losses due to floods to agriculture?

10.20 Any think you would like to suggest or add based on your flood experience and management?

Appendix -2

Picture 1

The Ghaghara River site

Picture -2

The alternative way to the Tehsil as the main road is damaged

Picture -3

The damaged bridge

Picture 4

The bridge built by the local people with indigenous materials

Picture 5

House pattern in the village

Picture -6

Main Livelihood option: Agriculture and livestock

Picture 7

Different types of hand pump: Traditional hand pumps, India Mark hand pumps and the India Mark with special filters

Picture – 8

View from the primary school in the village