

**Occupation-based Risk Reduction Approaches for
Climate-related Hazards in Gujarat, India**

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Occupation-based Risk Reduction Approaches for Climate-related Hazards in Gujarat, India

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ABBREVIATIONS

ADB – Asian Development Bank

AUDA – Ahmedabad Urban Development Authority

CBOs- Community Based Organizations

CSPC - Coastal Salinity Prevention Cell

CWC - Central Water Commission

DFID – Department for International Development (UK)

DPOs - District Project Officers

DRM – Disaster Risk Management

FAO- Food and Agriculture Organization of the United Nations

GLPC – Gujarat Livelihoods Promotion Company

GoI – Government of India

GoG – Government of Gujarat

GSDMA - Gujarat State Disaster Management Authority

HFA- Hyogo Framework for Action

IFRC - International Federation of Red Cross and Red Crescent

ILO – International Labor Organization

IMD- Indian Meteorological Department

INR- Indian National Rupee

IPCC - Intergovernmental Panel on Climate Change

JADA – Jamnagar Area Development Authority

JMC– Jamnagar Municipal Corporation

JNNURM - Jawaharlal Nehru National Urban Renewal Mission

NGOs – Non Governmental Organizations

NWRWS - Narmada Water Resources Water Supply

OBRR – Occupation-based Risk Reduction

PGs- Producer Groups

PHD- Public Health Department

Pph- persons per hectare

RBA - Rights Based Approach

SHGs – Self-help Groups

TDS – Total Dissolved Solids

UN - United Nations

UNISDR - United Nations International Strategy for Disaster Reduction

USD - United States Dollar

USAID – United States Agency for International Development

EXECUTIVE SUMMARY

Background

Climate-related hazards affect the poor and marginalized population directly through impacts on livelihoods, reductions in crop yields, or destruction of homes and indirectly through, for example, increased food prices and food insecurity. IPCC (2014) warns with ‘high confidence’ that “Climate-related hazards exacerbate other stressors, often with negative outcomes for livelihoods, especially for people living in poverty”. The population with minimum resources has the least capacity to adapt and therefore is the most vulnerable (IPCC 2001, IPCC 2014). IPCC (2014) also states with ‘very high confidence’ that “Impacts from recent climate-related extremes, such as heat waves, droughts, floods, cyclones, and wildfires, reveal significant vulnerability and exposure of some ecosystems and many human systems to current climate variability”.

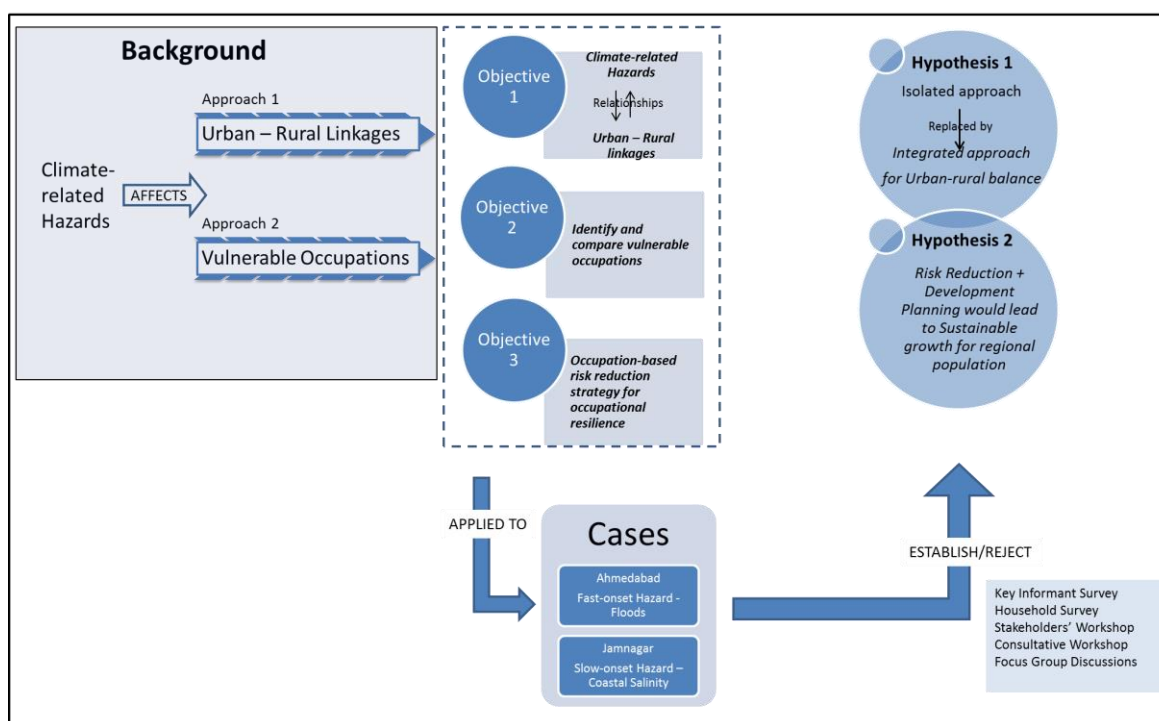


Figure 1 Conceptual Framework of the research

Research Objectives and Questions

Given the above mentioned issues and challenges, this research builds on the notion that occupation based approaches can reduce the risk due to climate-related hazards in Gujarat, India (see Figure 1).

The study has three main objectives:

1. Understand the regional transformative processes in Gujarat with reference to climate-related hazards and identify urban-rural flow elements impacted by such hazards.
2. Identify and compare vulnerable occupations in the cases of climate-related hazards
3. Prepare an occupation-based risk reduction strategy at the regional level by synthesizing urban-rural areas for the benefit of people engaged in vulnerable occupations

Research Questions

1. Do urban-rural linkages get affected by climate-related hazards?
2. How to make vulnerable occupations more resilient to the effects of climate-related hazards?

Research Locations

The study explores, compares and analyzes two climate-related hazards, namely: floods and coastal salinity in Greater Ahmedabad and Jamnagar respectively. Both the study sites are situated in Gujarat state of India (see Figure 2). These locations were selected as the two diverse cases of climate-related hazards, on the basis of Government of Gujarat's data of extent and scale of these hazards.

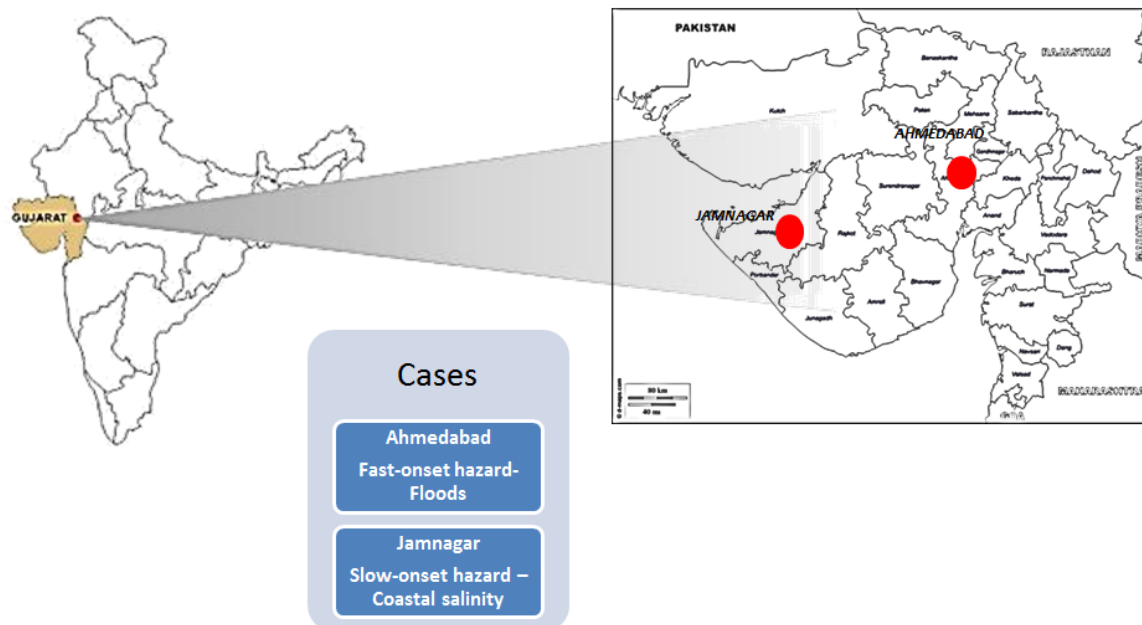


Figure 2 Research locations - Ahmedabad and Jamnagar, Gujarat, India

Structure of the Research

Table 1 gives the structure of the research with four major components: background, methodology, results and findings, and discussion and conclusion. The following paragraphs explain in brief the flow of the thesis report and the content of the following chapters:

Chapter 1 introduces to the research and its key points.

Chapter 2 interlinks the aspects of employment and hazard over the geographical domain. Occupations have many attributes which gets affected during a hazard and this chapter enumerates them into nine parameters of vulnerable occupations. It also primarily elaborates on the underlying characteristics of vulnerable occupations and introduces the new concept of occupational resilience. It highlights the current approaches which outlines the occupation-based risk reduction approach.

Chapter 3 deals with the urban-rural linkages that exist in India. It also identifies the elements within a framework; which flow from urban to rural area and vice versa, and how these elements get affected during the times of hazards and disasters. Additionally, this chapter explores the interrelationships between employment, poverty reduction and urban-rural flow elements.

Chapter 4 deals with the climate related hazards experienced by the state of Gujarat, India. It further elaborates on the hazard profile of Gujarat with special focus on floods and salinity issues in the state. The role of the stakeholders is also discussed to gauge their potential and scope in risk reduction.

Chapter 5 puts the parameters developed in the last two chapters to test through the first case of climate related hazard of urban floods in the region of Greater Ahmedabad. The survey had two major steps: key informant survey and the household survey. The results of the household survey are presented spatially and then discussed analytically to derive policy directions.

Chapter 6 presents the overview of the salinity problem in western India and the associated issues. It takes up the case study of Jamnagar district in the state of Gujarat in India, which has been plagued by coastal salinity problems for more than 50 years. Focusing on the urban-rural interrelationship, the chapter tries to identify the links between the slow-onset hazard and the components of local occupations. It also presents the findings of a household survey in the form of coping strategies adopted by both urban and rural communities and individuals.

Table 1 Structure of the Research

BACKGROUND	METHODOLOGY	RESULTS AND FINDINGS	DISCUSSION AND CONCLUSION
Cases : Climate-related Hazards	Preliminary Questionnaire based on literature	Identification of Vulnerable Occupations	Adaptation-led Strategy at the regional level by synthesizing urban-rural areas for the benefit of people engaged in vulnerable occupations.
1.Ahmedabad – Fast onset hazard (Urban Flooding)	Stakeholders' Opinion	Identification of Urban-Rural Flow Elements	Capacity building towards occupational resilience
2.Jamnagar – Slow onset hazard (Coastal salinity)	Household Survey at each study location	Occupational Coping Strategies	Determinant of Regional Growth - U-R Flow Elements
Urban-rural Flow	Focused Group Discussions		Policy Suggestions
Establishing Urban-Rural Flow Elements for the above mentioned cases	Qualitative Analysis		
Vulnerable Occupations	Quantitative Analysis		
Establishing parameters for Vulnerable occupations for climate related hazards			
Chapter 1 Introduction Chapter 2 Occupation-based Risk Reduction Chapter 3 Urban-Rural Linkages, Poverty Reduction and Climate-related Hazards Chapter 4 Climate related Hazards in Gujarat	Chapter 5 Vulnerable occupations in Urban Floods in Greater Ahmedabad Chapter 6 Vulnerable occupations in Coastal Salinity in Jamnagar		Chapter 7 Occupational resilience across Urban-rural domain for Risk Reduction Chapter 8 Conclusion

Chapter 7 explores the role occupation based risk reduction approaches can play in climate-related hazards in Gujarat, India. The chapter discusses the results from the previous chapters 5 and 6, and explores their implications in the risk reduction. It also highlights the importance of identifying impacts of the vulnerable occupations and devising an adaptation strategy based on the findings.

Chapter 8, the conclusion chapter, stresses on the key findings of the research study and draws key suggestions for future research on vulnerable occupations.

Research Process

1. Development and utilization of **parameters for identifying vulnerable occupations**

2. **Establishing flow elements** for identifying Urban-Rural linkages

3. **Application of urban-rural flow elements** to the two cases of Ahmedabad and Jamnagar

4. **Comparative evaluation** of vulnerable occupations

5. Identification of **Issues and Challenges** with Occupation-based Risk Reduction

Figure 3 Research Process for both the cases

Key Findings

The following key conclusions were derived from the research conducted in two diverse climate-related hazards of floods in Ahmedabad (fast-onset disaster) and coastal salinity in Jamnagar (slow-onset disaster) following the research process as shown in Figure 3.

1. The eight **urban-rural flow elements** have been identified and established for Ahmedabad and Jamnagar based on the literature survey and key informant survey, which are: people, natural resources, products, financial transactions, waste, information, social interactions and governance. The flow of 'people', 'natural resources', and 'social interactions' are most sensitive to both the cases of floods and salinity.
2. Nine **parameters of vulnerable occupations** in climate-related hazards have been established based on literature survey and key informant surveys in case study areas, which are: loss of productive assets, displacement and migration, loss of employment, decline in productivity, reduced income, workforce participation, change in occupation, effect on social structure, and recovery time.
3. In the case of floods in Ahmedabad (fast-onset disaster) in urban area, the 'recovery time' parameter is the most affected, while in rural areas the 'decline in productivity' shows the most significant results. Urban population's dependency on rural population is higher than

rural population's dependency on urban areas. The government is the most trusted stakeholder and other non-traditional stakeholders exist in lesser number.

4. In the case of salinity in Jamnagar (slow-onset disaster) in urban areas the parameter affected the most is 'workforce participation' and in rural areas it is 'decline in productivity'. The rural population's dependency on urban areas is significantly higher than urban population's dependency on rural areas. Non-Governmental Organizations (NGOs) are the most trusted stakeholders followed by the government with the existence of a significant number of Self-help Groups (SHGs).
5. The study suggests that **the temporal aspect of disasters affect the vulnerability of occupations**. For rural areas 'decline in productivity' is the most significantly affected parameter for the case of both fast and slow-onset disasters. While fast-onset disaster shows higher dependency of urban population on rural areas, the slow-onset disaster shows higher dependency of rural population on urban areas.
6. The occupational resilience in these cases can be achieved through **policy revisions** (enriching existing employment schemes to take into account climate-related disasters), and **reassigning roles for non-traditional stakeholders** in Gujarat's context (such as Self-help Groups, Women Associations, Occupational associations, and slum associations) to include disaster preparedness and disaster recovery in their activities.

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Chapter 1

Introduction

This chapter presents an overview of the thesis. It describes the problem statement, objectives, hypothesis, research questions and methodology of the research undertaken. The research is put into context with the background of the key issues and challenges faced due to the climate related hazards by the low income population inhabiting in both urban and rural areas of the developing countries. The chapter concludes with the brief summary of the ensuing chapters of the thesis.

1.1 Background

Natural hazards such as flood, fire, earthquake, tornado, and windstorms affect thousands of people every year. At the same time, the world has seen an increase in the number of natural hazards in the last two decades. As per World Bank report, earthquakes, storms, and other hazards caused the death of approximately 3.3 million people between 1970 and 2010, on an average of 82,500 deaths worldwide annually (World bank 2010). In the same period even though the number of deaths has been fluctuating, noticeably the number of affected people has been on the rise (World Bank 2010) (Also see Figure 1.1). In 1980s there were around 120 large natural disasters per year. In the first decade of the 21st century, the occurrences had multiplied by five times. These included some major catastrophic hazards which caused huge destructions of lives and infrastructure such as Indian Ocean Tsunami (2004), Hurricane Katrina (2005), Kashmir Earthquake (2005), Sichuan earthquake (2008), Haiti Earthquake (2010), East Japan Earthquake and Tsunami (2011).

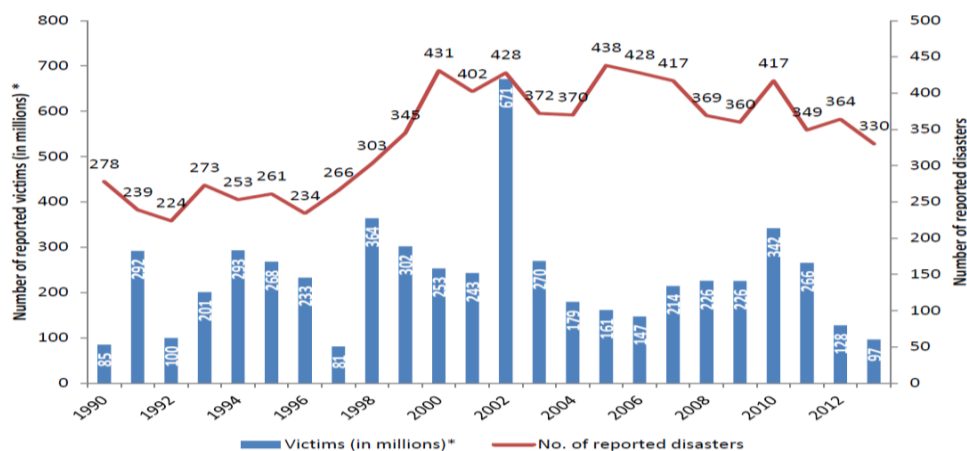


Figure 1.1 Trends in occurrences and victims (sum of deaths and total affected) from 1990-2013

Source: Guha-Sapir et al. (2014)

In Maplecroft's 'Natural Hazard Risks – Absolute Economic Exposure Index', which factors in non-agricultural economic exposure to hydro-meteorological and geophysical hazards, Japan, USA, Taiwan, China, India (extreme), Mexico, Philippines, Italy, Australia, and Indonesia (high) make up the ten countries facing the highest total financial costs from natural hazards (Maplecroft 2014). This index is computed based on analyses of twelve major natural hazards worldwide, including: seismic activity, tsunamis, volcanoes, landslides (both driven by earthquakes and heavy rain), flooding, tropical storms and cyclones, storm surges, severe storms, extra-tropical cyclones, wildfires and drought.

Additionally, in the last two decades, changes in climate have bearing on natural and human systems on all continents and across the oceans. The effects on these systems generally range from the impacts on "lives, livelihoods, health, ecosystems, economies, societies, cultures, services, and infrastructure due to the interaction of hazardous climate events" (IPCC 2014) occurring within a specific time period and the vulnerability of an exposed system. These systems include both natural and human systems on land and in ocean, comprising of mainly water resources; agriculture and forestry; human settlements, energy, and industry; coastal zones and marine systems; insurance and other financial services; and human health. The vulnerability of these systems varies with geographic location, time, and social, economic, and environmental conditions amongst other factors.

Climate-related hazards affect the poor and marginalized population directly through impacts on livelihoods, reductions in crop yields, or destruction of homes and indirectly through, for example, increased food prices and food insecurity. IPCC (2014) warns with 'high confidence' that "Climate-related hazards exacerbate other stressors, often with negative outcomes for livelihoods, especially for people living in poverty". The population with minimum resources has the least capacity to adapt and therefore is the most vulnerable (IPCC 2001, IPCC 2014). IPCC (2014) also states with 'very high confidence' that "Impacts from recent climate-related extremes, such as heat waves, droughts, floods, cyclones, and wildfires, reveal significant vulnerability and exposure of some ecosystems and many human systems to current climate variability".

In developing countries, the effects are maximum in terms of loss of lives and relative effects on the economy. This is due to limited adaptive capacity, fewer resources, and pressure from forces such as population growth, resource depletion, and poverty. There is need of policies that lessen pressures on resources, improve management of environmental risks, and increase the welfare of the poorest

members of society can simultaneously advance sustainable development and equity, enhance adaptive capacity, and reduce vulnerability to climate and other stresses.

1.1.1 Scales of disaster – Geographical and Temporal scales

The scale of the disasters determines the indicators to be adopted for estimating the vulnerability of occupations or livelihood. It also plays a role in devising the policies for vulnerability reduction (Birkmann 2007). The literature of disaster management tends to distinguish between two different types of disasters, those that arrive suddenly with little warning, such as floods (rapid onset), and those that are more gradual in nature, such as coastal salinity (slow onset) (Galbraith and Stiles (2006). Also, vulnerability vary over time and place (Cannon 2000).

This study deals with a case of rapid onset hazard of floods at Greater Ahmedabad and slow onset hazard of coastal salinity at Jamnagar. In both the cases, smaller scale natural hazards are considered which are higher in frequency but show lesser visible impacts. The smaller natural hazard events have the potential of seriously affecting the welfare of the household or community in question, but are not considered as hazards as their impact is not collectively significant in the bigger picture. Nevertheless, the cumulative effects of high-frequency smaller events over a longer period might have an appreciable effect at aggregate levels, like changes in the behavior of economic factors because of the perceived risks. The recurring nature of hazards does not allow the communities to recover, countermining their resilience. Therefore, it is important to account for and analyze these events and their impacts. The calculation of indirect economic loss to the population becomes incomprehensible, yet identification of the spheres of loss would certainly help prepare for reduced loss in the event of next hazard.

1.2 Research Approaches

1.2.1 Research approach 1: Vulnerable occupations and Occupational Resilience

The occupations or economic engaging activities which are vulnerable to the adverse impacts of climate-related hazards are termed as **vulnerable occupations**. These can be defined through a set of nine parameters, as discussed in Chapter 4. These occupations can be identified as vulnerable to particular hazard by comparative evaluation.

Occupational resilience is defined as the ability of an occupation exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner,

including through the preservation and restoration of providing livelihood to its erstwhile employees. An occupation-based recovery would be a sustainable model of recovery as it strengthens the assets and capabilities to earn by provision of economic opportunities (Srivastava and Shaw 2014). Figure 1.2 explains simplistically that in an event of a climate-related hazard for a household income there can be two cases. Case 1 and Case 2 both signify abrupt loss of income just after the hazard event. While Case 1 recovers to the previous state in due course of time through the individual, community and state level coping strategies, Case 2 struggles to come to the same level of income. With frequent occurrence of such disruptive climate-related phenomena, Case 2 households fall into chronic poverty.

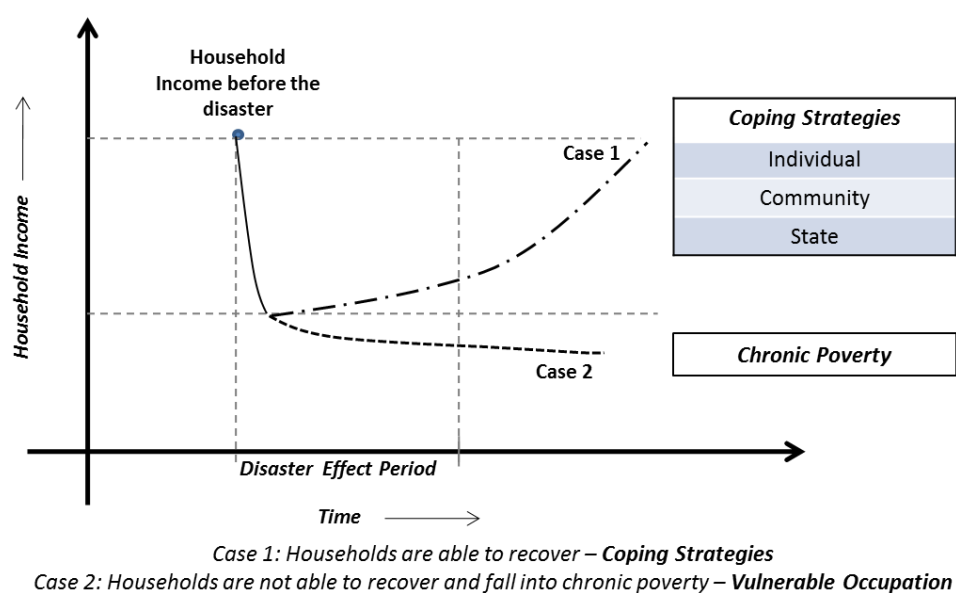


Figure 1.2 The concept of vulnerable occupations and occupational resilience

1.2.2 Research approach 2: Urban-rural linkages

The interactions between the urban and rural area have been referred as urban-rural interactions, urban-rural linkages, urban-rural continuum and sometimes as urban-rural interface. These urban-rural linkages ameliorate, decelerate or remain unchanged due to both, the development process and the effects of climate-related hazards. Urban and rural areas share their vulnerability through a number of inter-linkage elements, namely; people, natural resources, product, financial, waste, information, social interactions and governance (Srivastava and Shaw 2013). Furthermore, it has been widely recognized in the recent past that urban-rural linkages provide opportunities and constraints for poverty reduction and regional development.

1.3 Research Objectives and Questions

Given the above mentioned issues and challenges, this research builds on the notion that occupation based approaches can reduce the risk due to climate-related hazards in Gujarat, India. The study has three main objectives:

1. Understand the regional transformative processes in Gujarat with reference to climate-related hazards and identify urban-rural flow elements impacted by such hazards.
2. Identify and compare vulnerable occupations in the cases of climate-related hazards
3. Prepare an occupation-based risk reduction strategy at the regional level by synthesizing urban-rural areas for the benefit of people engaged in vulnerable occupations

Research Questions

1. Do urban-rural linkages get affected by climate-related hazards?
2. How to make vulnerable occupations more resilient to the effects of climate-related hazards?

1.4 Research Scope and Limitations

Research Locations

The study explores compares and analyzes two climate-related hazards, namely: floods and coastal salinity in Greater Ahmedabad and Jamnagar respectively. Both the study sites are situated in Gujarat state of India (see Figure 1.3). These locations were selected as the two diverse cases of climate-related hazards, on the basis of Government of Gujarat's data of extent and scale of these hazards.

Inclusion Criteria

- Communities from Greater Ahmedabad which have experienced floods after year 2001 (the year of Bhuj earthquake) and the coastal Communities in Jamnagar who are facing problems of salinity were considered as respondents,
- The respondents of key informant interviews included the head of the villages (Sarpanch) and slums, the elderly, the community leader or representative/s, NGO workers in slums, female heads of the households, traditional skill workers and hawkers,
- In household survey in both the locations, a range of 3.8 to 12% of total population was interviewed. The residents which have been considered are in the age group of 18 years or higher.

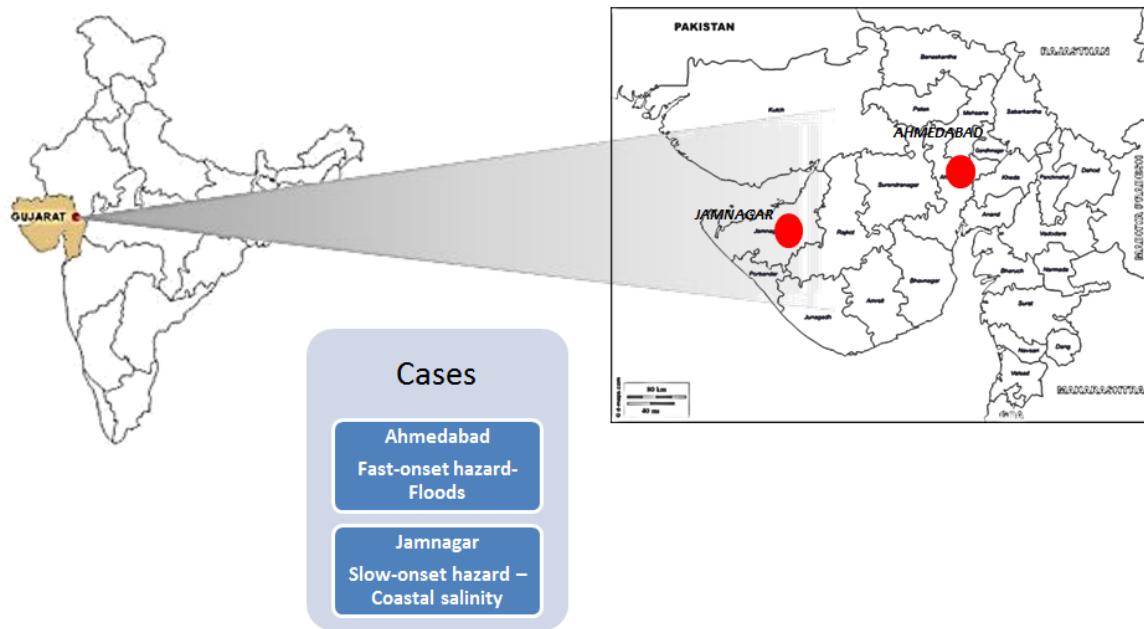


Figure 1.3 Research locations - Ahmedabad and Jamnagar, Gujarat, India

Limitations of the Study

- The study draws its conclusions on climate-related hazards from limited cases of Ahmedabad and Jamnagar.
- The occupations in each case have been categorized into fewer categories for sake of analysis of vulnerability which is comparative for a specific case.
- Stresses and shocks that impact occupations are the result of interactions between global phenomena and local conditions (De Haan 2000; De Haan and Zoomers 2003). This study looks into the local contexts and their impact on occupations.

Reference Period:

- The data was collected from the study area during the period of June 2012 to January 2014 in both the study locations.

1.5 Research Methodology

The research utilizes primarily consultative methodologies to develop the research. The flow and the conceptual framework of the research are shown in Figure 1.4. Different methods were employed to collect primary and secondary data from the two locations, as mentioned below:

Methods of Data Collection:

1. Literature Review
2. Key Informant Survey
3. Household Survey
4. Stakeholders' Workshop
5. Focus Group Discussions

Analysis techniques:

Both qualitative and quantitative analysis techniques were used for the research. It was ensured that the two methods supplemented and complimented each other. SPSS tools were used to process the data and draw correlation analysis.

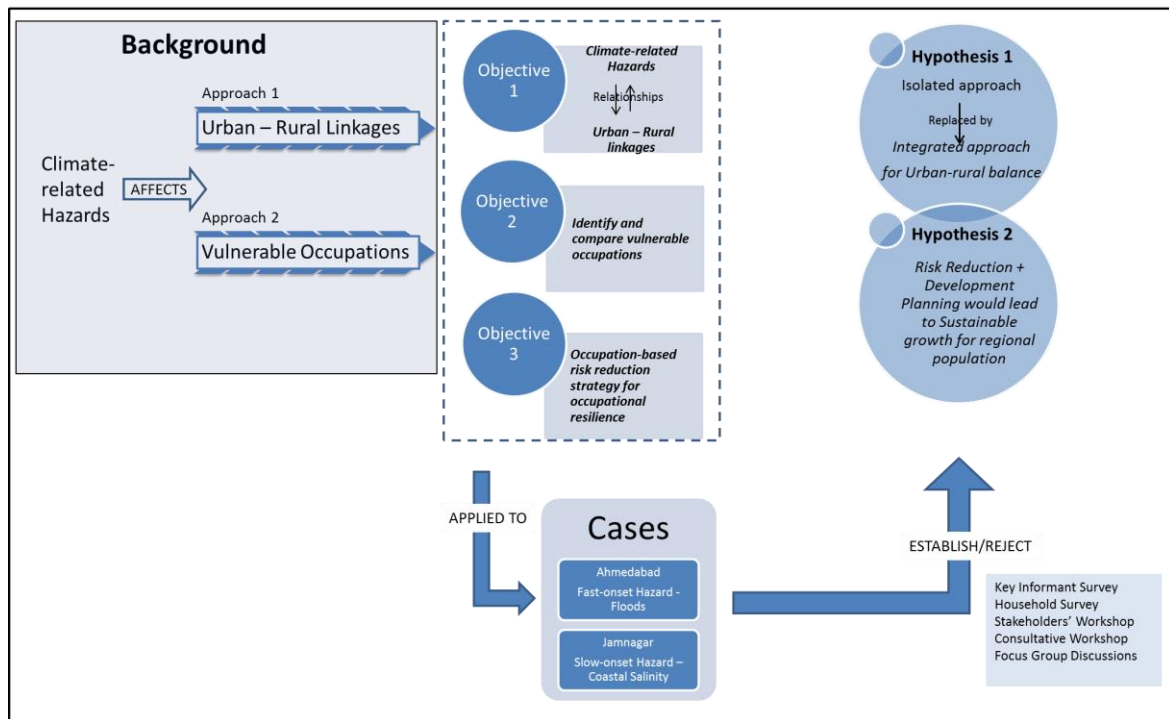


Figure 1.4 Conceptual Framework of the research

1.6 Structure of the Thesis

Table 1.1 gives the structure of the thesis with four major components: background, methodology, results and findings, and; discussion and conclusion. The following paragraphs explain in brief the flow of the thesis report and the content of the following chapters:

Chapter 2 interlinks the aspects of employment and hazard over the geographical domain.

Occupations have many attributes which gets affected during a hazard and this chapter enumerates them into nine parameters of vulnerable occupations. It also primarily elaborates on the underlying characteristics of vulnerable occupations and introduces the new concept of occupational resilience. It highlights the current approaches which outlines the occupation-based risk reduction approach.

Chapter 3 deals with the urban-rural linkages that exist in India. It also identifies the elements within a framework; which flow from urban to rural area and vice versa, and how these elements get affected during the times of hazards and disasters. Additionally, this chapter explores the interrelationships between employment, poverty reduction and urban-rural flow elements.

Chapter 4 deals with the climate related hazards experienced by the state of Gujarat, India. It further elaborates on the hazard profile of Gujarat with special focus on floods and salinity issues in the state. The role of the stakeholders is also discussed to gauge their potential and scope in risk reduction.

Chapter 5 puts the parameters developed in the last two chapters to test through the first case of climate related hazard of urban floods in the region of Greater Ahmedabad. The survey had two major steps: key informant survey and the household survey. The results of the household survey are presented spatially and then discussed analytically to derive policy directions.

Chapter 6 presents the overview of the salinity problem in western India and the associated issues. It takes up the case study of Jamnagar district in the state of Gujarat in India, which has been plagued by coastal salinity problems for more than 50 years. Focusing on the urban-rural interrelationship, the chapter tries to identify the links between the slow-onset hazard and the components of local occupations. It also presents the findings of a household survey in the form of coping strategies adopted by both urban and rural communities and individuals.

Chapter 7 explores the role occupation based risk reduction approaches can play in climate-related hazards in Gujarat, India. The chapter discusses the results from the previous chapters 5 and 6, and explores their implications in the risk reduction. It also highlights the importance of identifying impacts of the vulnerable occupations and devising an adaptation strategy based on the findings.

Chapter 8, the conclusion chapter, stresses on the key findings of the research study and draws key suggestions for future research on vulnerable occupations.

Table 1.1 Structure of the Thesis

BACKGROUND	METHODOLOGY	RESULTS AND FINDINGS	DISCUSSION AND CONCLUSION
Cases : Climate-related Hazards	Preliminary Questionnaire based on literature	Identification of Vulnerable Occupations	Adaptation-led Strategy at the regional level by synthesizing urban-rural areas for the benefit of people engaged in vulnerable occupations.
1.Ahmedabad – Fast onset hazard (Urban Flooding)	Stakeholders' Opinion	Identification of Urban-Rural Flow Elements	Capacity building towards occupational resilience
2.Jamnagar – Slow onset hazard (Coastal salinity)	Household Survey at each study location	Occupational Coping Strategies	Determinant of Regional Growth - U-R Flow Elements
Urban-rural Flow	Focused Group Discussions		Policy Suggestions
Establishing Urban-Rural Flow Elements for the above mentioned cases	Qualitative Analysis		
Vulnerable Occupations	Quantitative Analysis		
Establishing parameters for Vulnerable occupations for climate related hazards			
Chapter 1 Introduction Chapter 2 Occupation-based Risk Reduction Chapter 3 Urban-Rural Linkages, Poverty Reduction and Climate-related Hazards Chapter 4 Climate related Hazards in Gujarat	Chapter 5 Vulnerable occupations in Urban Floods in Greater Ahmedabad Chapter 6 Vulnerable occupations in Coastal Salinity in Jamnagar		Chapter 7 Occupational resilience across Urban-rural domain for Risk Reduction Chapter 8 Conclusion

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Chapter 2

Occupation-based Risk Reduction

This chapter explores the inter-relations between aspects of employment and disaster over a geographical system. Occupations have many attributes which get affected during a disaster and this chapter enumerates them as nine parameters of identifying vulnerable occupations. These parameters can be utilized by communities and policymakers alike in identifying and strengthening vulnerable occupations. It also primarily elaborates on the underlying characteristics of vulnerable occupations and introduces the new concept of occupational resilience. The parameters of building occupational resilience are stressed upon, considering the key role they can play in post-disaster economic recovery. Overall, the chapter stresses on the key question regarding the study i.e. why vulnerable occupations have been considered as the focus for the study.

2.1 Introduction

The world has been facing economic inequality and its related perils since many years. There has also been considerable improvement in the lives of the economically backward population in the last two decades. The percentage of people living on less than \$1.25 a day fell from 47 in 1990 to 24 in 2008—a reduction from over 2 billion to less than 1.4 billion (UN 2012). Nevertheless, we have to address the survival needs of one-fifth of the world's population. Additionally, if the regional scenarios are considered, millions of people have sunk deep into poverty in sub Saharan Africa, where the poor are getting poorer. The situation is worsened by the fact that the employment to populations ratio is going down for both developed (from 57 to 55 percent) and developing regions (from 63 to 62 percent) (UN 2013). International Labor Organization (ILO) states that 60.9 percent of developing world's workforce remained poor or 'near poor' in 2011, living on less than \$4 a day (UN 2013). In the last decade, the United Nations highlighted the issue of poverty through the Millennium Development Goals in which Goal 1 was stated as 'to eradicate extreme poverty and hunger' (UN 2005).

Simultaneously, there has been a rise in both the number and magnitude of impact of natural disasters. In the decade from 2002-2011, 4,130 disasters were recorded worldwide, victimizing more than a million people, with an estimated economic damage of at least USD 1.195 billion (UNISDR 2012). This increased frequency has reduced the natural resilience to the impact of disasters, delayed the recovery time, weakened the resource base, and thereby has caused a systematic degradation of environment and increased socio-economic vulnerability. Moreover, World Disaster Report (2012) (IFRC 2012) predicts that there would be an increase in extreme weather events in the coming years, which would pose increased danger to the lives of 3.5 billion people living in cities, throughout the world (IFRC 2010).

The disasters have an inseparable and detrimental relationship with poverty as the risk to the poor is of a magnanimous scale (Satterthwaite et al. 2007). When disasters strike, poor people often lose their assets on which their survival depends. The increase in their physical exposure and vulnerability is accompanied by a deficit of adaptive capacity to cope with the changing climate (McBean and Ajibade 2009). At the same time, their limited resources, lack of access to education and health services can increase their exposure to risks (UNISDR 2009 (1), UN 2012). Being poor ascribe one to be at risk, which is intensified by an increase in population and urbanization, and compounded by the climate change effects, and environmental degradation. The developing countries are more exposed to the risks of disasters as their inhabitants often lack the ability to cope with, or adapt to such events, especially in the case of re-occurring disasters.

There has been limited focus on safeguarding the interests of the population engaged in marginal occupations, who arguably suffer the most in an event of a disaster. In a country like India where 29.8% of the population lives under the national poverty line (World Bank 2010), it becomes increasingly important to revive the earning capacities of those who have been hit hard the most. Barring few non-government organizations (NGOs), most of the stakeholders involved in the recovery process neglect this aspect of disaster damage. Additionally, the damage is not only limited to economic recovery but also expands to the secondary effects of social and environmental concerns, which can be severely complex to comprehend. For example, climate induced disasters such as famine, and flood may cause poverty which may lead to an increase in drop-out rates from schools, especially among female students, thereby disturbing the social balance of the whole region.

Most of the ongoing disaster research concentrates on the 'physical wave' (Bamdad 2005); that is the loss to properties and infrastructure, and the medical wave; that is provision of medical attention to those who need it during the emergency, while ignoring the 'social wave'; that is the force that damages the structures and functions of a community's social order. The organizational studies are mainly restricted to find the direct economic losses due to disasters. It is true that in a post disaster phase the provision and restoration of physical infrastructure is required, and it directly or indirectly benefits one and all, but at the same time restoring livelihood is also essential. A city or a village, hit by a disaster, can be restored to normalcy if its citizens are provided with opportunities to earn, immediately after the disaster. For the same reason, it needs to be understood to what extent a particular occupation is vulnerable to a disaster. There is a strong need to lay down the factors that identify the occupational vulnerability due to a disaster. The same parameters would also help in determining the issues that will help the occupations to be more resilient against the disaster.

2.2 The concepts of vulnerability and resilience

The concepts of 'vulnerability', 'resilience', 'coping capacity' and 'adaptation' are used in different ways and contexts by different disciplines and communities such as disaster management, political ecology and ecological resilience (IPCC 2001; Füssel and Klein 2002; O'Brien et al. 2004; Easterling 2004; Moench and Dixit 2004; Adger et al. 2004; Wisner et al. 2004). People's own characteristics such as capacities, resilience and vulnerabilities are highly variable which define the impact of a disaster (Cannon 2000). Resilience and vulnerability are often considered diagrammatically opposite to each other (Kasperson and Kasperson 2001; Cannon 2008 and Sapountzaki 2011). High levels of vulnerability suggest low levels of resilience and vice versa (Cannon 2008). Nevertheless, the damage and losses due to a disaster are determined by both the vulnerability (inner attribute of a social-ecological system), and resilience of the affected population (reactive response to a disaster) (Lei et al. 2014).

This section explains the issues associated with the concepts of vulnerability and resilience. It also explains the social aspects of these concepts with the focus on this research as vulnerability analysis derives itself from a range of socio-economic approaches to hazards (Cannon 2000).

2.2.1 Vulnerability

UNISDR (2009 (2)) defines vulnerability in an uncomplicated way as 'The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard'. In other words, vulnerability is a function of physical exposure to hazards, sensitivity to the stresses they impose, capacity to adapt to these stresses, susceptibility, fragility and lack of resilience in socio-economic and physical infrastructures (Cardona et al. 2004, Adger et al. 2009 in Yamin et al. 2005). Vulnerability is molded by physical, social, economic, and environmental factors, socio-economic inequalities and geographic disparities (McBean and Ajibade 2009). It also depends on many other characteristics of risks such as magnitude of hazard, timing, persistence and reversibility of impact, estimation, and perception of risk (Schneider 2007, O'Brien and Heyd 2009). The causes of vulnerability are related to the environmental threat and, the economic and institutional context. Indeed changes in the social causes of vulnerability often happen at much more rapid temporal scales than some of the environmental changes.

Vulnerability which was earlier termed as a concept that included only loss of life and material, later expanded to include other dimensions as well. Cutter (1996) and Cutter, Boruff and Shirley (2003) categorized vulnerability as exposure, as social condition, and as spatial dimension of 'integration of potential exposures and societal resilience'. Hufschmidt (2011) suggests that vulnerability involves complex processes at several temporal and spatial scales, and the interdependencies at these scales.

Cannon (2000) warns against the simplistic use of the term vulnerability which can take away its characteristic of being predictive and analytic in differentiating between less and more vulnerable. The meaning of the term is lost more because of overuse in many contexts. It further adds that “vulnerability is addressed only in aspects that are susceptible to technical interventions”, a trend that would aggravate vulnerability.

Despite differences in the conceptualization of the term vulnerability, there is unanimity amongst researchers over the emergence of two main perspectives (Cutter 1996; Wu et al. 2002; Adger et al. 2004). The first major perspective treats “vulnerability as a pre-existing condition and focuses on potential exposure to hazards” (Rygel et al. 2006). It primarily includes assessment of the distribution of hazardous condition, the human inhabitation of the hazard zone, and the degree of loss of life and property resulting from a particular event. The second perspective demands that the population be considered as part of socio-economic systems that assigns risks differentially to different sets of people who display patterns of differential loss. This divergence in vulnerability is also due to differential coping capacity of those affected. Coping capacity has been described as the ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters (UNISDR 2009 (2)). Cannon (1994) identified the following as the main components of vulnerability classification: livelihood vulnerability, self-protection and social protection. Later the same author (Cannon 2000) expanded the classification to five elements of initial well-being, livelihood resilience, self-protection, societal protection, and social capital (see Table 2.1).

2.2.2 Social Vulnerability

Hewitt (1983) for the first time emphasized on economic and social processes and structures as cause of vulnerability and not only as a contributor to hazard mitigation. Prior to that, even the social science analyses of hazards were primarily technocratic and prescriptive. The social context is taken into account to understand “natural” disasters (Hewitt 1983). “Social vulnerability is the exposure of groups or individuals to stress as a result of social and environmental change, where stress refers to unexpected changes and disruption to livelihoods” (Adger 1998). The concept emphasizes on the social dimensions of vulnerability against the predominant physical dimensions. The social vulnerability approach assesses vulnerabilities already embedded in the social and political order. It puts people’s coping strategies and socio-economic structures at the focus of evaluation and assessment. The approach also causes shift in policy attention away from macro level causes of hazards, shock and stresses towards more micro level processes (Yamin et al. 2009). This approach is important as it brings to the fore the concept that vulnerability is socially differentiated, i.e. vulnerability is different for different set of populations living under salient environmental conditions or faced with complex interactions of social norms, political institutions and resource endowments, technologies and inequalities (Adger 1998).

Table 2.1 Cannon's Components of Vulnerability with author's interpretation

Components of Vulnerability	Interpretation	Variables involved	Socio-economic and Technical Determinants
Initial Well-being	These reflect the inherent material and resources with the communities	Nutrition; physical & mental health; morale/faith; Capacity for self-reliance	Class position; Gender; Ethnicity; Age; State and Civil Society
Livelihood resilience	This takes into account the earning capacities, capabilities and opportunities before and after a hazard's impact	Income opportunities; Livelihood type; Qualifications; Assets and savings	The above plus: shifts in power relations and effects on livelihood after hazard impact
Self-Protection	This takes into account the individual's and household's ability and willingness to provide themselves with adequate protection, living	Building quality; Hazard protection; Location of home and livelihood;	Socio-Economic: as above plus: Technical ability & knowledge of and availability of protective measures; Hazard-specific: Type of protection, its cost and feasibility; Return period; Duration; Intensity; Magnitude
Societal Protection	This refers to ability or willingness of social and political structures such as local government, national government, and relevant organizations	As above, plus: Building regulations Technical interventions by higher levels;	As above, plus: Level of scientific knowledge Characteristics of technical practices, Quality and robustness of insurance systems; Type of science and engineering used by state and dominant groups
Social Capital	This involves the support networks of mutual support for response and recovery.	Social cohesion; Rivalries; Number & strength of potentially conflicting groups	As above, plus: Type of state power; capacity for civil society to develop and enable positive networks and interactions

Source: Adapted from Cannon (2000)

Social vulnerability can be disaggregated into the two distinct aspects of individual and collective vulnerability to elucidate the scale and the unit of analysis (Adger 1998). The individual vulnerability can be measured by the measure of poverty and the risk of income sources to extreme events. Similarly, the changes in collective vulnerability are indicated through changes, in distribution of resources within a population, and by changes in institutional and political structures; which can be at as low as community levels.

2.2.3 Economic Vulnerability

The sensitivity of the economies to climate-related hazards can be measured by fluctuations in Gross Domestic Product (GDP) and in growth rates of agricultural and non-agricultural sector products. An unreliable water supply or surplus of water due to hydrological variability is a substantial disincentive to investments in industry and services, slowing the diversification of economic activities. Frequent droughts and floods pose a systematic risk to the economies of countries and its habitants dependent heavily on natural resources. See Box 2.1 for example which defines how climate change and its related phenomenon are impacting the tourism sector and a huge population dependent on the tourism activities.

In the context of this study, the economic vulnerability at the household level is considered. Livelihoods are at a variety of risks from exogenous forces such as health risks (accidents, illnesses, death), price risks (food costs, input/output production costs, policy changes), and disasters (wars, epidemics, droughts) (Silbert and Useche 2011). Many economic studies such as Alderman (1998) (Pakistan) and Gertler and Gruber (2002) (Indonesia) analyze behavioral responses demonstrating risk coping. These studies further conclude that disaster persistence makes coping more difficult.

Since the impact on livelihood is complex, certain asset-based were developed to analyze coping with natural disasters approaches by Carter et al. 2007 and Hoddinott 2006 (in Silbert and Useche 2011). While Carter et al. (2007) derives its results from the two disaster-hit communities in Honduras (Hurricane Mitch) and Ethiopia (three-year drought) for evidence of natural disasters acting as poverty traps. They find that in both the cases, natural disasters act as a poverty trap and have longer implications for poorer households as compared to their wealthier peers. Hoddinott (2006) analyzed the case of Zimbabwean farmers, finding dissimilar reactions to disaster shocks based on their predicted poverty status. While farmers above the poverty line cope through consumption smoothing (for example, sell assets), farmers below the poverty line prevent asset smooth (for example, decrease consumption). The latter bears a heavy human capital cost due to disasters, affirming Carter et al.'s finding that natural disasters act as poverty traps.

Box 2.1 Vulnerability to climate change of the tourism sector in Tobago

Tourism in Tobago, an island in the Caribbean, is vulnerable to climate change through various climate change effects and their knock-on effects:

“Sea level rise and storm surges. *Climate models predict that climate change will cause an increase in both average sea levels and the size of waves in stormy weather in the Caribbean. Evidence of coastal erosion and beach loss is already seen along the coastline of Tobago and other islands in the Caribbean. A recent study assessing sea level rise, storm surge and erosion impacts in the Caribbean Community (CARICOM) shows major potential impacts on tourism. These include damage to key infrastructure such as hotels, sea ports and airports that lie close to the coast. Sea level rise or storm surges could also submerge or erode the beaches that are a major natural asset for tourism and are central to perceptions and the experience of a classic Caribbean holiday.*

Warmer sea temperatures. *Tobago’s coral reefs are a major attraction for visiting tourists, supporting world class snorkeling and scuba diving. Reefs also protect Tobago’s beaches from erosion by reducing the strength of waves breaking on the island’s coastline. Warmer seas are thought to be a significant factor in the incidence of coral ‘bleaching’. Coral bleaching occurs when environmental factors—including warmer sea temperatures—adversely affect the algae that are an integral part of the coral, giving it its color and allowing it to grow. In 2005, a major bleaching event affected the whole of the Caribbean. A subsequent survey of Tobago’s reefs found that two thirds of the coral was bleached. Bleaching makes reefs less attractive to tourists because of their loss of color. It also threatens their long-term viability as reefs are eroded more quickly than the coral is replenished.*

Knock-on effects. The impact of climate change on one system often has knock-on effects on related systems that can be very difficult to estimate, particularly for natural systems and the ecosystem services they provide. For example, damage to coral reefs reduces their productivity and attractiveness, as well as their ability to sustain biodiversity, which, in turn, affects the size and numbers of economically valuable game fish further up the food chain, the resilience of the reef and interest from dive and snorkel visitors. This reduces the quality and value of tourist fishing and diving trips finally impacting employment in the sector, although the scale of this effect and the time it will take to be felt are uncertain.

A basket of goods. Tobago’s tourism product is not a single good but rather a basket of related goods that are consumed in a bundle. So, for example, the value of natural assets such as beaches, reefs and the forest reserve is realized in the economy through complementary goods such as hotel rooms, diving trips, restaurants and tour guides, on which a large part of employment depends. And the value of any one tourist activity, such as sitting on the beach, is enhanced by the easy access to other activities during a holiday. The complementary and integrated nature of tourism products again makes separating, assessing and valuing the impact of climate change highly challenging. The difficulties in evaluating these impacts do not, however, make them any less real.”

Source: IIED 2011.

2.2.4 Resilience

While ‘vulnerability’ determines the extent to which individuals or a community will likely suffer from climate-related events, ‘resilience’ is the ability to manage and adapt to these events. It incorporates the ability to learn, cope, and maintain future options and the notions of self-organization. IPCC (2001) says that “a resilient system or population is not sensitive to climate variability and change and has the capacity to adopt”.

UNISDR (2004) introduced the concept of resilience officially in the field of disasters as “the capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure”. Villagran (2006) defines resilience as “an intrinsic ability of a system, an element or a community to resist the impact of a natural or social event”. Resilience is determined by not only system’s inherent material and intangible resources, but also by external ones that are extracted from the social, economic and ecological environment at various spatial and temporal scales (Sapountzaki 2011).

Sapountzaki (2011) opines that “resilience signifies reactions towards risks, shocks, stress and adversities, with the ultimate aim of survival or persistence of the structure”. It further adds that there are two approaches of resilience. The first approach defines resilience as an outcome in relation to vulnerability as the flip side of vulnerability. It involves the fields of Ecology, Disaster and Climate Change. It takes homogeneous systems as the system of reference. The first approach considers resilience as a stable condition and a positive entity with predictable characteristics. The second approach considers resilience as a process of self-organization and self-changes. It builds on Comfort’s (1994) theory on self-organization, which is defined as “spontaneous reallocation of energy and action in response to disruptive changes in the operating environment”. It involves the fields of Ecology, Disaster and fields of Sustainability and Sustainable Development. Unlike first approach, it takes integrated systems such as socio-ecological, socio-economic and socio-institutional systems as the system of reference. It also considers resilience as the means of coping with uncertainty and change; unpredictable, positive and negative both, and a path to sustainability.

Sapirstein (2006) noted that most resilience definitions include four main components: Response, Self- Organization, Learning, and Adaptation, applicable at all levels of social units, namely individual, community or organizations. Rather, resilience is the outcome of developing those four components.

2.2.5 Social Resilience

Sapirstein (2006) states that Social Resilience includes: 1. Redundancy through overlapping social networks, 2. Strengthening response capacities, 3. Supporting self-organization, 4. Fostering learning and education, and 5. Encouraging adaptation. It is measured by the time taken by the

community to rebound from a natural hazard, respond to the event, self-organize and build-in the lessons learned before returning to a normal way of functioning. Longer time for rebounding would be harmful for the social fabric of the community. Therefore, the government should provide assistance to those who are not capable of reviving themselves on their own. Other stakeholders integrated with the community such as faith-based organizations, occupation based organizations, slum associations and private sector can provide for the expedited recovery. Sapirstein (2006) further argues that Social Resilience is a grassroots process that does not require an intervention on a macro level. It can be achieved at any level of the said social units.

Cutter et al. (2008) opines that the community resilience (akin to social resilience) to natural disasters is defined by six dimensions: ecological, social, economic, institutional, infrastructure and community competence. These dimensions vary for both urban and rural communities. Wilson (2010) simply puts the rural community resilience as the multi-functionality of economic, social and environmental capitals. Based on the completeness of this multi-functionality, these rural systems can be strongly, moderately or weakly resilient. Since the actions and responses of individuals and households within a rural community shape a community's overall resilience, such resilience can be scaled down to the household and individual level. Needless to say that economic aspect of the rural communities is important in providing strong resilience. Rigg (2006) and Chaskin (2008) highlighted that the poverty is one of the most important constraint for rural development and, therefore, makes a rural community less resilient, as most of the population's economic activities are focused on raising sufficient income for survival (Parnwell, 2007).

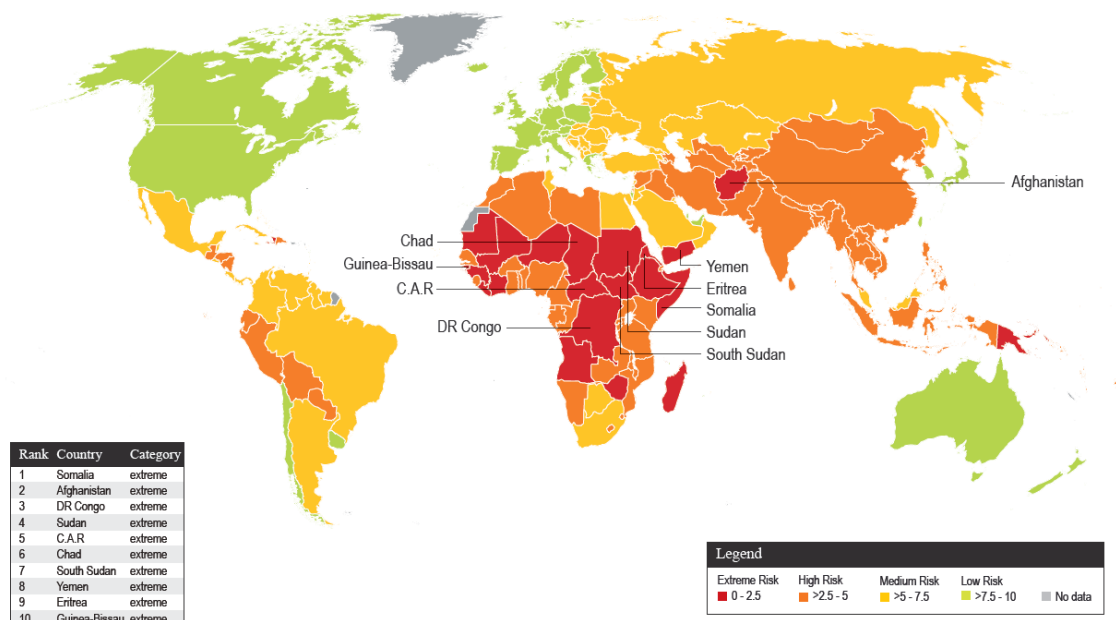


Figure 2.1 Socio-economic Resilience Index 2013

Source: Maplecroft (2013)

2.3 The conception of Vulnerable Occupations

The economies of South Asia have largely held up well during the recent recession in 2008-09 and the region resumed rapid economic growth in 2010. Yet the region has the highest rate of vulnerable employment in the world, at 78.5 per cent of total employment in 2009 (ILO 2010). International Labour Organization (ILO) states that the 'vulnerable employment' indicator is defined as the sum of own-account workers (those workers who work on their own account or with one or more partners and hold the type of job defined as self-employed) and unpaid family workers as a percentage of total employment (ILO 2010). Vulnerable employment has been a term used in the context of normal economic activities and there is a need to take the normal definition to disaster domain. It would also serve as a valuable indicator in determining the vulnerable population, through the estimation of population dependent on these occupations.

Vulnerable employment is often characterized by: inadequate earnings, less likely to have formal work arrangements, low productivity, lack decent working conditions, lack adequate social security, and lack effective representation by trade unions and similar organizations. The total number of such vulnerable workers worldwide is estimated at between 1.48 and 1.59 billion (ILO 2010). The estimation takes into account the normal scenario. In an event of disaster, all the economic activities become vulnerable. Additionally, the above mentioned characteristics can be relative to the context of the geography and economics of the country and the household. Also, the characteristics define the vulnerabilities of the economic activities during the normal time while there exists a different set of aspects which might be helpful in determining the vulnerabilities of the occupations in an event of disaster. Where applicable, often the impact of disasters on urban poverty is also underestimated, with the general absence of the metrics that include low-income groups in their assessment of disaster impact (UNISDR 2009 (1)).

2.3.1 Existing methodologies to determine vulnerability associated with livelihood

Global assessment report on disaster risk reduction (2009) (UNISDR 2009 (1)) underlines the importance of 'deconstructing disaster' i.e. to identify risk patterns and poverty trends at the local level. As Jigyasu (2011) states that a great number of tools and methodologies exist to assess the macro-economic losses; both direct and indirect, however it is very difficult to ascertain and assess the loss at the micro-economic level and loss to livelihoods, with differential losses across sectors, and varied vulnerability and recovery time.

The following existing methodologies have tried to assess the impacts of disaster on livelihood. FAO-ILO (2007) has developed a toolkit for analyzing the impact of disasters on the livelihoods of the people, based on Sustainable Livelihood Framework, and focusing on assets (natural, social, physical, human and financial capital) based assessment. The comprehensive methodology relies on three major steps of data collection: livelihood baseline (prior to the disaster), initial livelihood (immediately after the disaster) and final livelihood assessment (30 days after the

disaster). It is modeled for sudden-onset disasters, thereby discounting the slow onset disasters and places with no disaster history. It serves its purpose for big disasters and for cities which can maintain huge inventory of data, but for small disasters it is a cumbersome process. Nevertheless, the toolkit identifies the importance in assessment of following factors: seasonal impact of disasters, need for social transfers, poverty and income levels, key informants and institution for livelihood support. The initial estimates of impact includes employment loss in the form of wage workers dismissed without remuneration, loss of capital and loss of access to public infrastructure (electricity or roads). The other aspect in this regard is the additional demand for casual jobs due to loss of usual employment.

UNNATI (Rawal and Prajapati 2007) came up with a participatory framework for assessing the damage after disasters. In certain disasters a particular occupation might be impacted more than the others, that is, the contextual relation of occupations with the disaster type. Also, families with same occupation might have differential impact due to varying access to assets and resources, different poverty level, the loss of economic assets, social vulnerability and reduction in income (Rawal and Prajapati 2007). It suggests the use of wealth ranking tool which help communities to build up their own criteria based on factors like land holding, livestock, other assets and regularity of income. Cannon (2000) also suggests that vulnerability analysis needs the participation of the people concerned in the evaluation of their vulnerability.

Table 2.2 Summary of major methodologies for vulnerability assessment

S.No.	References	Framework	Salient characteristics
1	Bull (1994)	Economic and social disruption	Macro-economic impact evaluation
2	Charvériat (2000)	Physical integrity, Assets and Income	Impact depends upon loss of income-generating assets and disruption of flows of goods and services
3	UNNATI (Rawal and Prajapati 2007)	Participatory framework involving communities	Contextualization of losses based on resources, assets, poverty level; use of wealth ranking tool
4	FAO-ILO (2007)	Sustainable Livelihood Approach framework for assets based assessment	Works well for places with disaster history, huge inventory of data and fast onset disasters

Bull (1994) (in Pelling et al. 2002) in their study on macro-economic impact of disasters lists disruption to economy as one of the consequences of disasters. The measure includes number of working days lost and volume of production lost, while ‘social disruption’ consequence includes number of displaced persons. Other consequences like deaths, injuries, physical damage, emergency operations, and environmental impact are also mentioned, but are not directly

related to the occupations. Similarly, Charvériat (2000) states that there are three categories of impacts on a household welfare: physical integrity, assets and income. It further posits that the impact on the employment is largely unknown, and the impact on unemployment depends primarily on the degree of destruction of income-generating assets and the period of disruption of flows of goods and services. The impacts are magnified as the disasters occur at a time when public services are severely disrupted and individuals are out of their familiar environment lacking the community solidarity.

2.4 Development of Parameters to Identify Vulnerable Occupations

The above mentioned methodologies along with the background literature on employment-disaster linkages, and the disaster-displacement relationships on a spatial basis, focus on three prominent attributes of vulnerable occupations – i. migration; the displacement of population, ii. economics; the effect on an individual's and local economy, and iii. social capital; the changing social interactions among communities. These attributes are explained in the following sections, with a detailed account of how these attributes are impacted due to climate-related hazards.

2.4.1 Migration

Climate change and extreme weather events often lead to the migration of people towards safer places (Brown 2008, Warner et al. 2009). However, it is difficult to predict the exact magnitude of impact of climate change and extreme weather events in displacing people (Brown 2008, Tacoli 2009) due to varied pull factors acting. This can be a consequence of loss of living space and livelihood, and the impact on agriculture, sanitation, and lack of water-food supplies (Swain 1996). The migration and mobility of the affected population play a key role in the wake of urbanization and changing employment patterns. The flow of population is often directed from the rural areas towards the urban area in search of employment. Srivastava and Shaw (2012) postulates that majority of the migration in India during the decade of 1991-2001, was for employment, after setting aside the migration of women due to marriage.

Belcher and Bates (1983) states that there is an addition to the existing squatter settlements in the prime urban locations owing to rural to urban migration immediately after the disaster. As a result both urban-rural balance (such as demographic structure) and intra urban balance (such as infrastructure capacity) are disturbed. "Migration can thus be seen as an intervening variable in the relationship between urbanization and industrialization on the one hand and the strength of informal ties on the other" (Hendrix 1976).

The lack of access to assistance and protection, both social and material; lack of access to employment or other income sources for recovery, the scale of damage to property and livelihood assets, the issue of safety and security, and unavailability of natural resources, act as push factors for the outmigration of the victims. Previous migratory patterns and pre-existing

socio-economic and political context also influence the migration. Belcher and Bates (1983) reinforce the fact that the population living under poverty line needs reason and opportunity to break shackles from their existing condition. The event of a disaster is seen as an opportunity to move and as a catalyst for personal betterment. For example, in an event of drought in the Bolangir district of Orissa, India in the year 2000, nearly 60,000 people migrated to the neighboring state of Andhra Pradesh in search of employment and food (Naik, Stigter and Laczko 2007). Similarly, an annual flooding event in Bangladesh, causes people to temporary migrate to urban areas or abroad in search of better opportunities (Naik, Stigter and Laczko 2007).

Additionally most of the reports on the after effects of disasters suggest that due to intensification of traditional poverty in the villages of origin, most of the migrants were compelled to search for employment outside the zone of influence of disaster. It is however important to observe that in most cases migration is a response to the increase in poverty and limited employment opportunities caused by natural disasters, and not directly by the hazard itself (Naik et al 2007). The migration is often the last resort in case of disaster. As in the case of Orissa, India in the drought of 2003 where most of the households sold off their personal assets like utensils, animals and productive seeds and finally moved to other states like Andhra Pradesh , Chhattisgarh and Maharashtra (Julich 2011). These types of migration often happen due to inadequacy or inefficiency of employment policies in post disaster scenario.

2.4.2 Economics

As stated earlier disasters not only cause human tragedy through loss of life and physical suffering, but can also destroy the contiguous socio-economic fabric of the affected population as well as the ability of a region to sustain itself during the process of recovery and reconstruction. However, there has been an increasing amount of empirical research that attempts to examine the broad economic impact of disasters, with emphasis that the economic impact of disasters includes both direct and indirect components (Otero and Marti 1995; and Mechler 2003).

In a series of comprehensive country case analyses of the economic impact of disasters, Benson and Clay (2004) (in Galbraith and Stiles 2006) argue that major natural disasters have not only a short-run economic impact but also an increasing adverse long term effect. It is argued that this is partly caused by the increased vulnerability and risk associated with the interrelationship and complexity of economic, political, technological, and financial components from globalization and urbanization.

More and more, relief aid agencies appear to be recognizing the importance of economic recovery and economic rebuilding of the communities. Increasingly programs are being developed that encourage entrepreneurial activities as part of the overall recovery strategy. Therefore the estimation of economic impact at micro level is also crucial in gauging the loss to a

particular community. Maplecroft (2014) prepared a recent Absolute Economic Exposure Index Map which takes into account non-agricultural economic exposure to hydro-meteorological and geophysical hazards (see Figure 2.2).

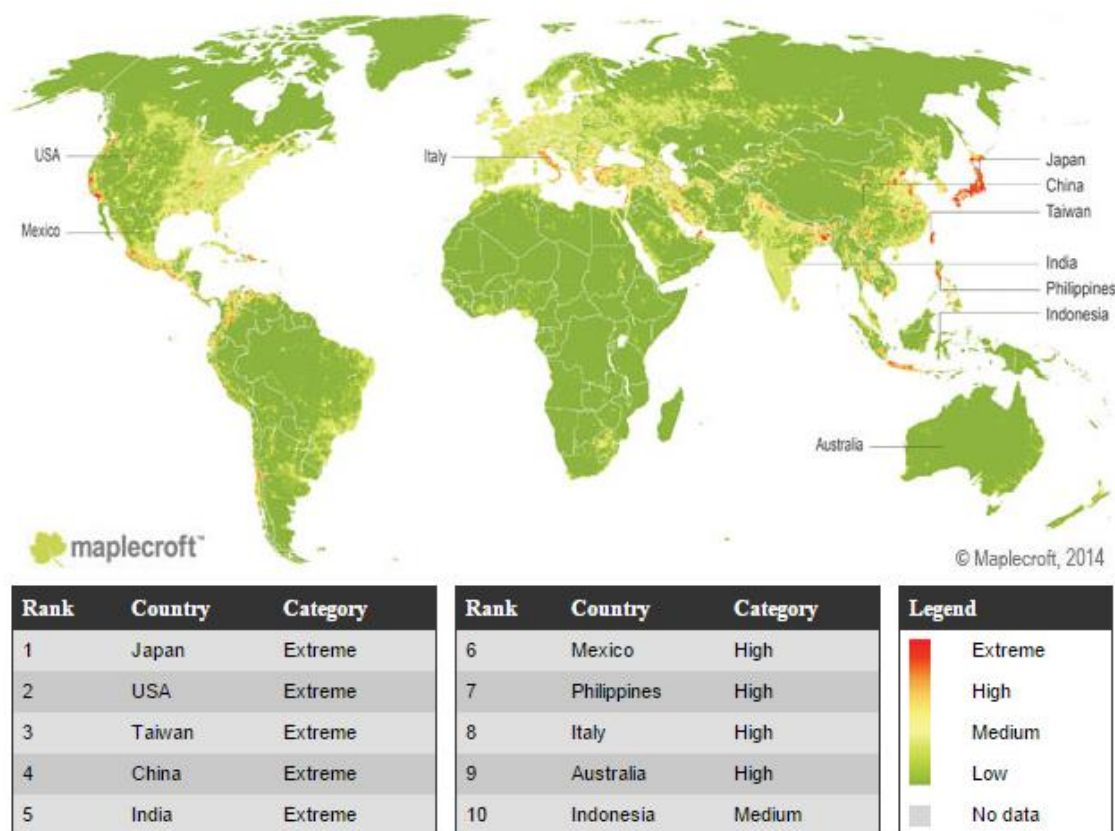


Figure 2.2 Natural Hazard Risk - Absolute Economic Exposure Index 2014

Source : Maplecroft (2014)

2.4.3 Social capital

One crucial collective asset that can prevent communities from becoming more vulnerable is the ability to act cohesively through strong community networks, known as social capital. These networks can pre-exist, be strengthened or freshly cultivated. “Social capital, in general, refers to the trust, social norms, and networks which affect social and economic activities” (Nakagawa and Shaw 2004). In simpler terms it is also known as ‘Citizen participation’ which “is the engagement of community members in formal organizations, including religious congregations, school and resident associations, neighborhood watches, and self-help groups” (Perkins et al. 2002; Wandersman 2000 in Norris et al. 2008). However, this engagement goes much beyond the realm of the formal organizations and is more evidently present in informal networks of the communities in developing countries.

Hewitt (1983) suggested that the social impacts of a disaster depend more on the underlying social structure in which a hazard occurs than the society-environmental interactions in which

the hazard takes place. The social networks are instrumental in determining how a community collectively manages natural resources and systems, resolves disputes, distributes benefits, and takes advantage of new opportunities. The stronger are these networks the better their management would be and would have a direct bearing on their poverty and vulnerability. Strong social capital can potentially enhance the resilience of both social and natural systems.

At its core, social capital describes relations of trust, reciprocity, and exchange; the evolution of common rules; and the role of networks (Adger 2003). It defines a role for civil society and collective action for both instrumental and democratic reasons and seeks to explain differential spatial patterns of societal inter-action. The concept of social capital also promises to explain how the civil society interacts with the institutions of market and state in a systematic manner, both of which are important from livelihood and policy perspectives respectively, with reference to the nature of the climate-related risks. Analyses of social capital are diverse and include research on communities, associations to economic analyses of well-being and the role of trust in carrying out economic transactions.

2.4.4 Parameters for identifying and comparing vulnerable occupations

As explained in the previous section, climate-related disasters cause migration, impact on individual and local economy and disruption to social capital (see Box 2.2). These define the exposure, sensitivity, and capacity of response of a community affected by climate-related hazards. Summarizing the impacts under these attributes we get following characteristics for each:

- (i) Migration : loss of employment and/or productive assets, change in economic activity, decline in productivity, reduced income, decline in productivity*
- (ii) Economics : workforce participation, loss of working days, recovery time, reduced income, loss of employment and/or productive assets*
- (iii) Social capital : effect on social structure, loss of social respect, detachment from earlier community, decline in productivity due to mental abasement*

As is evident from the summary, there are many characteristics which are common between the three attributes. The author establishes these parameters into nine parameters, as shown in Table 2.3, and which contribute towards the vulnerability of occupations. Using the nine parameters the vulnerability of occupations for the population at the local level can be determined, taking into account the local conditions. These conditions and disaster characteristics would determine whether a particular aspect is considered or not. All the nine aspects try to cover different yet related aspects of vulnerable occupations. The indicators are classified as both qualitative and quantitative (see Table 2.3). These indicators need to be

developed into an index to quantitatively measure the vulnerability of an occupation.

Box 2.2 Kosi Floods and its impacts on livelihood

"On 18 August 2008, the Kosi River burst through its eastern embankment about 13 km upstream of the Kosi Barrage in Nepal, 8 km north of the Indian border. At its peak, the intensity of water force went up to 166,000 cubic feet per second (cusec) compared with the regular 25,744 cusec, running straight down south through a new course 15-20 km wide and 150 long north to south. This created major flooding in Nepal and India - Bihar in particular. According to official sources, a total of 3.3 million people were affected in Bihar alone.

- *Livestock - The floods also affected livestock with Government of Bihar reporting 10,000 milk animals, 3000 draught animals, and 2500 small ruminants (e.g. goats and sheep) perishing in the floods. The substantial increase in the price of milk is a direct effect of the drop in supply.*
- *Fisheries - In terms of fisheries, Government of Bihar has reported that 519 private and public fish ponds were fully or partially damaged.*
- *Agriculture- The floods caused significant damage in the agriculture sector with damage to standing crop and sand-casting of cultivable land. Government of Bihar has estimated that 350,000 acres of paddy, 18,000 acres of maize and 240,000 acres of other crops were adversely affected, impacting close to 500,000 farmers.*

In addition to these sectors, major damages were caused to the livelihoods, health, education, social, and environment sectors. Over 90 percent of the flood affected population was dependent on agricultural livelihoods which were severely affected. Educational infrastructure and scholastic calendars were affected in all five districts, and regular curative and preventative health services disrupted. In addition, 273,000 acres of arable land has been rendered fallow due to sand-casting with long-term implications for the environment, agriculture, and livelihoods."

Source: GoB 2010

The parameters are explained in further detail in the following sections:

1. Loss of productive asset

There is a segment of population which is engaged in occupations based on assets such as agriculture and household industries. They rely on their assets for production of goods. Due to a disaster, this population might lose such assets and hence an opportunity to earn (Rawal and Prajapati 2007). These assets can range from land, machinery, tools, or workplace (Gitz and Meybeck 2012). Carter and Barrett (2006) recognize the benefits of adopting the asset-based

poverty determination in designing strategies for poverty reduction. Such analysis makes it possible to distinguish deep-rooted, persistent structural poverty from poverty that passes naturally with time due to systemic growth processes.

Table 2.3 Parameters to identify and compare vulnerable occupations with indicators

Attributes	S. no.	Parameters	Qualitative and Quantitative Indicators
MIGRATION ECONOMIC SOCIAL CAPITAL	1	Loss of productive assets	1. Classification in major, average or low loss to productive assets (land, machinery, resources etc.)
	2	Displacement and migration	1. Economic activity before and after migrating from the original place of stay, 2. Percentage of people in a region being displaced due to disasters
	3	Loss of employment	1. No income source after disaster, 2. Comparison of working members in a household pre and post disaster
	4	Decline in productivity	1. Hindrance in carrying out normal economic activities, 2. Decline in production with same productive assets
	5	Reduced income	1. By what percentage
	6	Workforce participation	1. Comparison of the duration of working days in a year, pre and post disaster
	7	Change in occupation	1. Change of occupation is temporary or permanent, 2. Distance to new occupation
	8	Effect on social structure	1. Effect on social life, such as no more part of earlier community, 2. decline in social status due to reduced income
	9	Recovery time	1. The duration of time for restoration to same level of income as prior to disaster, and other pre-disaster working conditions

2. Displacement

The displacement of population after disaster can be temporary or seasonal or permanent. This can be attributed to any of the other parameters. As stressed earlier, the displacement due to a disaster might also have an effect on social linkages within a community. Another dimension would be the percentage of people within a community being displaced due to disasters. This gives an idea about the vulnerability of the community. The inter-linkages of disaster, displacement and employment have been asserted by Hendrix (1976), Swain (1996), Belcher and Bates (1982), and Srivastava and Shaw (2012).

3. Loss of employment

In most of the cases the victims of disaster are left with no job to accomplish their economic needs. There is a loss of employment by one or more earning members of the household and

there are no alternate income sources available for the victims. Even after various attempts they may be unable to find an opportunity to earn for a long duration after the disaster. Belcher and Bates (1982) establish that the disaster causes loss of employment and thus induces migration. Therefore employment and disaster have an inseparable association.

4. Decline in productivity

In situations where the victim does not lose his/her job, there are high chances that there is decline in productivity. This can be either decline in human capacity to produce at the same pace as before the disaster, or can be a decline in the overall production of the goods produced by the affected population. This can be due to hindrance in carrying out the normal economic activities.

5. Reduced income

This can be due to one or more of the other parameters. Additionally, a person may lose income due to change in circumstances in the disaster affected region, such as change in local economy, and reduced wages. The impact can be deciphered through the scale of change in income and the duration of time for which it was reduced.

6. Workforce participation

Workforce participation is calculated as the number of days a person is employed in a year. It is an indicator of economic well-being. During the course of or after a disaster, there may be an effect on the work participation days. The workforce participation is reduced due to lack of job opportunities all the year round, especially immediately after a changed scenario in the wake of disaster, and restricted capacity to compete for the limited jobs.

7. Change in occupation

Sometimes since the pre-disaster job is hard to find again or since the wages have dropped, the population may change their occupation. This change may be temporary or seasonal or permanent. The change would be negative most of the time rather than being positive.

8. Effect on social structure

The social structure i.e. interrelationship of an individual to the community, changes drastically in the event of a disaster, either due to change of community or change within community itself. The interrelationship within the community changes due to change of circumstances, such as increased or decreased cohesion. Dynes (2002) and, Nakagawa and Shaw (2004), rally in favor of adopting social capital approach for disaster recovery. Often this aspect is ignored in analyzing the vulnerability of a community, but its importance cannot be undermined.

9. Recovery time

The time to restore the livelihood to the pre-disaster level is the recovery time. People try to

reduce their recovery time through various strategies; individual and community strategies. People who bounce back and takes less time to recover have more occupational resilience than those who take more time.

2.5 Applicability of parameters

These parameters have applicability in climate-related hazards scenario. These can be used to compare various occupations within a system and root out the less vulnerable occupations from the more vulnerable ones. This would be helpful in prioritizing the sector on which the local machinery should focus in the long run to bring down the vulnerability of such identified occupations and resurrect the population engaged in those vulnerable occupations. The following paragraph throws more light on the usability for communities and policymakers in particular:

2.5.1 Applicability of parameters for communities

Communities play the dual role of both a victim and also a rescuer in a disaster recovery phase. The rescuer's role can be expanded to the enabler of recovery, where the quick recovery of communities' livelihood can speed up the overall recovery phase. This will be primarily due to the flow of income and purchasing of goods by the community, which in turn revives the economy of the region. Therefore, the change in social structure needs to be identified to ascertain whether an individual can rely on his/her community for recovery, or whether a community is well structured to carry out the relief and recovery with little or no help from the external agencies. In case of Ahmedabad, the communities assume that the responsibility of risk reduction rests with the government and the community itself is inutile in case of disaster. This is mainly due to lack of education and technical knowledge in both urban and rural areas. The simplicity for the parameters enables the community to evaluate their own damage and design for their recovery, as also envisioned by UNNATI (2007).

In Gujarat, approximately 68 percent of the workers in the tertiary sector and 43 percent of workers in the secondary sector were engaged in the informal sector in 1998 (Rani and Unni 2002). The informal sector generated 47% of the total city income engaging 77% of total employed (Rani and Unni 2002). As part of the informal sector, that study included all own account workers and workers in enterprises with less than ten workers. Also, close to 26% people living below poverty line relying on low wage daily earnings are bound to be impacted if there is stagnation to the formal sector on which informal sector relies heavily. This establishes the strong linkage between the macro and micro economy of the city and disruption to the lives of the vulnerable segment plays a negative role on the overall economy at the macro level, at both state and city levels. These frequent floods consume the workplace of the household industries and impact the local economy relying on these industries. On the other hand the hazard like urban floods gives an opportunity to the affected rural populace to enrich their economic status

by engaging in non-traditional jobs. However, the migration might shift the onus on the city to expand its informal base and include the influx of the unskilled labor. Here, the identification of skills relevant to the local economy would facilitate to provide for such skills, which will help the macro economy and absorb the micro enterprises in its fold.

In the case of recurring hazards, the communities come up with their coping strategies, both at individual and community levels, in urban and rural scenarios. Ellis (2000) in a study on developing countries concludes that rural livelihoods should be diverse to be less vulnerable and therefore the policies should encourage adoption of multiple livelihood strategies. Ellis (2000) also classifies livelihood diversification as either 'diversification of necessity' or 'diversification by choice', where the former is an involuntary mechanism, a last resort for survival, while the latter is voluntarily and proactively selected to diversify the income. Even though the urban, peri-urban and rural communities differ in their characteristics, they may face similar constrictions in their occupations, which demands common strategy for better resilience of the occupations. This requires economic relief and promotion of micro-entrepreneurship rehabilitation.

The rural community resilience has certain positive characteristics. In the communities studied, there are certain villages which are adopting 'diversification by choice' (Ellis 2000) by recognizing the importance of education and therefore educating their children to improve their chances in non-farm jobs. Also, village communities are resorting to seasonal wage earning opportunities, to make for the loss in working days during monsoon, utilizing modern technology like mobile to find possibilities. For example, a certain villager gets call on his mobile to attend to complaints of electrical faults in far flung villages.

A significant population in urban, peri-urban and rural area is linked with household or cottage industries, and disaster at times disrupts the functioning of these units and affecting the assets to earn. This is prevalent in urban areas where cottage industries and micro enterprises trades like incense stick manufacturing, kite making, traditional stitch work, and other textile ancillary works suffers as the workplace is lost during the days of calamity. In other cases, the loss of finished or raw material has also resulted in heavy losses to the families. This stresses on the need of provision of safer workplace and storage for such communities. Another aspect of cottage industries is that the major proportion of the population possesses the skills, as against the assets, to run these enterprises and should be considered in policies pertaining to employment based on skills.

2.5.2 Applicability of parameters for policymakers

There is a need for tackling the problem through the adoption of a dual approach; part to whole and whole to part. The former approach requires empowering the employment at each constituent level, which is a pre-disaster role for the policy makers. The latter approach focuses on post disaster role of rehabilitating of economic opportunities for quick recovery. In urban and

rural areas there is a loss to livelihood opportunities after disaster. This presents a large opportunity to engage affected communities through employment programmes, and has the potential to play an important role in post disaster recovery. However, it requires the determination of vulnerable population, based on their occupations, through the established parameters and thus provide for asset-based and skill-based occupational recovery.

Government of India has various anti-poverty, employment generation and basic services programmes in operation since a long time, such as Prime Minister's Employment Generation Programme (PMEGP), Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Food for Work Programme, Sampoorna Grameen Rozgar Yojana, Swarna Jayanti Gram Swarozgar Yojana (SYGSY), and Swarnajayanti Shahari Rozgar Yojana (SJSRY). Most of these schemes are adopted by the state governments. Amongst the permissible works of water conservation, afforestation, land development and construction of roads and canals, there is provision of employment for flood control and protection works including drainage in water logged areas. That is the only reference to disaster in the scheme. In urban areas, schemes like PMEGP are in place to provide employment opportunities in rural as well as urban areas through setting up of new self-employment ventures, projects or micro enterprises. These are positive endeavors but all the good work done by such schemes in a year can be undone by one flood by draining of resources of the affected population. In major disasters, the restoration of infrastructure provides job opportunities, but in the case of smaller hazards like the one in Ahmedabad, there is no such demand for labor. Therefore either the existing employment schemes should make provision for post disaster employment schemes or specific new schemes should be devised to deal with this specific scenario. There is need to link disasters to employment and poverty.

The threat to livelihood can also be seen from other perspective of environmental degradation such as deforestation, overgrazing and land degradation which causes the damage to ecosystems and exasperate the risks of disasters such as floods or landslides. This causes increased threat to lives and livelihood of the vulnerable class. Another aspect to be taken into account is the gender profiling of the respondent. Women in developing countries suffer considerably more than men, since they have less access to social, political and economic resources to protect against disasters and recuperate from its effects. Often, women are either dependent on men for their survival or engaged in under-paying irregular jobs. This segment, especially women headed household, also needs to be targeted specifically by the post disaster employment policies.

The main objective of vulnerability assessment is to identify the weak links in the present scenario and guide the adaptation strategies of both individuals and institutions. Several literatures corroborate the absence of a standardized methodology to measure vulnerability (Birkmann and Wisner 2006, Villagran 2006; Gall 2007 in Hufschmidt 2011). It is understandable as vulnerability assessment metrics should contain 'both human well-being and recognize the

relative and perceptual nature of vulnerability’ (Adger 2006). Often the assessments of impacts of disasters sideline the low income groups and there is absence of such metric which can estimate the loss at grass root level (Adger 2006, UNISDR 2009 (1)). In coherence with Cutter’s (1996) and Cutter, Boruff and Shirley’s (2003) view of aggregating the social and spatial dimensions of exposure and resilience, this method of assessment takes the first step in assessing the impacts of the disasters on the low income strata of society spread over distinct geographical areas.

2.6 Occupational Resilience and Occupation-based Risk Reduction

Building resilience starts with reducing vulnerabilities: a system is more resilient if it is less vulnerable (Gitz and Meybeck 2012). As stated earlier, the concepts of resilience and vulnerability are often considered diagrammatically opposite to each other (Kasperson and Kasperson 2001; Cannon 2008 and Sapountzaki 2011). In this study, the vulnerable occupations state the vulnerability; significant transformations as a consequence of climate-related disasters, associated with the occupations pursued in a region while occupational resilience is an overall concept which aims at risk reduction. It denotes towards the positive aspect of the community engaged in occupations to cope with the negative change.

Box 2.3 Floating Cultivation : An example of Resilient Occupation

“The southern, south western and the coastal areas of Bangladesh remain submerged for long periods every year, especially during the monsoon season. People in these areas depend on agriculture and have been coping with submerged/flooded conditions for generations. They have adopted a method of cultivation, locally referred to as “Vasoman Chash,” meaning floating agriculture, since the time of their forefather’s. This system is similar to hydroponics, which is a scientific method whereby the plants are grown in water and derive their nutrients from the water instead of from the soil. A bio-land or floating bed is prepared from biomass using water-hyacinth, aquatic algae, waterwort and the other water born creepers, straws and herbs or plants residues. People of the area mentioned that this method was also being practiced in the north eastern parts of Pirojpur district, the north western parts of the Jhalkathi districts and in Gopalganj district.

Demonstrations of floating gardens were introduced at the 3 project locations in 2007. Their ability to contribute to food security and to provide a supplementary source of income for marginalized communities was emphasized 77 beneficiaries cultivated 43 beds of vegetables and 34 rice seed beds. On average, each beneficiary produced 85 kg of vegetables and 668 bunches of rice seedlings. The vegetables were generally consumed by beneficiaries with any excess being sold.”

Source: PAB (2009)

The concept of occupational resilience to climate-related hazards is the key to achieve overall resilience of the community. A livelihood option is considered to be environmentally sustainable

when it is capable of maintaining or enhancing the assets associated with it and socially sustainable when it can recover from the shocks and stresses (Chambers and Conway 1992). Therefore, livelihood or occupational resilience has to be a sum of environmental and social sustainability. While defining vulnerability, Cannon (1994) considers 'economic resilience' or 'livelihood resilience' as one of the key aspects of vulnerability, which determines the capacity of an individual to resist the impact of a disaster.

The author adapt the definition of resilience by UNISDR (United Nations International Strategy for Disaster Risk Reduction) to define occupational resilience, which is, the ability of an occupation exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of providing livelihood to its erstwhile employees. An occupational resilience based disaster recovery would be a sustainable model of recovery as it strengthens the assets and capabilities to earn by provision of economic opportunities. See Box 2.3 for example.

2.6.1 The concepts of Occupation and Livelihoods

All key actors within disaster recovery processes have often emphasized on the importance of taking into account the occupations of disaster affected populations and the need to protect and develop them. The basic livelihood approaches to understanding disasters, whether chronic or rapid onset in nature, has as a "fundamental intervention strategy to assist households in expanding a household productive asset base with the longer-term object of avoiding future basic aid requirements" (Galbraith and Stiles 2006).

Livelihood is defined as "a set of activities, involving securing water, food, fodder, medicine, shelter, clothing and the capacity to acquire above necessities working either individually or as a group by using endowments (both human and material) for meeting the requirements of the self and his/her household on a sustainable basis with dignity" (Oxford n.d.). In social sciences, the concept of livelihood extends to include social and cultural means, i.e. "the command an individual, family, or other social group has over an income and/or bundles of resources that can be used or exchanged to satisfy its needs. This may involve information, cultural knowledge, social networks and legal rights as well as tools, land and other physical resources." (Blaikie et al. 2004). However, 'Occupation' is "A job or profession" (Oxford n.d.) or "a person's job" (Cambridge n.d.). Occupations deals with the economic aspect only. However, the indirect implications of such jobs would have a bearing on the socio-economic conditions as well.

A **livelihood** comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. It refers to the means, activities and entitlements by which people make an adequate living for themselves. The report by Seshamani *et al.* (1997) brought out the following distinctions between occupations and sustainable livelihoods:

- *An occupation need not ensure livelihood if the financial compensations realized*

therefrom are inadequate to cater for the minimum basic needs of the employee and her/his household.

- Even when employment ensures current livelihood, it need not be sustainable. Sustainability has a durability dimension. Jobs under the various public works programmes do not merit the epithet of sustainability since they are mainly of a transitional nature.*
- Livelihoods need not imply work for payment. Those engaged in many productive activities may not be paid and yet may be contributing to their individual livelihoods as well as to the livelihoods of their households.*

Therefore, from the above argument, it can be concluded that occupation, in the traditional sense, should be regarded as a subset of sustainable livelihoods and not the other way round. This research focuses on the resilience of occupations undertaken in a local area, particularly those which are vulnerable to a particular climate-related hazard. This concept is different from the concept of livelihood resilience as it puts local occupations at the focus of both vulnerability analysis and planning for resilience.

2.6.2 Approaches to occupational resilience

The occupational resilience can be achieved through various approaches. Some of the mainstream approaches, as highlighted in Yamin et al. (2005), and their attributes are defined in the following paragraphs.

Mainstream development and its efforts have two-pronged strategy to reduce poverty as well as to boost economic growth. Both these strategies are measured in monetary terms, privileging the expertise of mainstream national and international economic institutions such as the World Bank and Ministry of Finance. This approach targets poverty and vulnerability as transitory phenomenon that can be overcome, in the long term, by properly functioning markets and governance and, in the short term, by targeted poverty reduction measures in the form of monetary transfers that alleviate poor population out of poverty. Climate adaptation, including to disasters, under this view would be taken care by economic growth, better governance and humanitarian efforts.

Basic needs or human development approaches works on the basis of the fact that mainstream development and the associated economic growth does not always improve basic requirements such as education, health or social welfare which are essential for people to develop. This approach therefore emphasizes that the development should therefore focus, not just on boosting incomes but on meeting common universal basic “needs” such as food, water, housing, health care, education, safe work and environment, and physical and economic security (Doyal and Gough 1991). The human development approach focuses on securing “well-being” or “human development” as the ultimate end, rather than on the commodities or means (income,

food, housing etc.) to achieve these ends (Sen 1999; Haq 1995). Unlike previous approaches, human development approaches stress non-material aspects, such as autonomy, security and friendship, make more use of concepts from moral philosophy and ethics than economics, and allow for different cultures and peoples to specify their developmental needs (Hulme and McKay 2005; Chambers 2005).

Rights-based approaches (RBAs) also aim to put human beings and their human rights at the center but are more focused on requiring developmental efforts to be pinned down to the achievement of fundamental rights such as those enshrined in international human rights standards and the constitution of most of the countries (IDS 2005). It is similar to Basic needs and human development approach in demanding for the basic needs as rights.

Sustainable livelihoods (SL) approaches have been adopted by many development agencies and Non-Governmental Organizations (NGOs) (Scoones 1998; Carney 2002). These approaches were derived from the dissatisfaction for top down, narrowly defined poverty reduction efforts which disregarded the different resources rural poor rely on to stay out of poverty and failed to take into account the complex interplay between these strategies and local institutional and social factors. The SL framework provides a holistic tool to identify how a wide range of assets are used in multiple ways by individuals and households in developing countries to deal with insecurity, shocks and external stresses. SL approaches put people at the center of development, within a context of external vulnerability due to (i) long-term and large-scale trends (e.g. population, technological and resource trends), (ii) shocks (e.g. epidemics, natural disasters, economic shocks such as sudden exchange rates), and (iii) seasonality (seasonal shifts in prices, production, food availability and employment and health) (Yamin et al. 2005).

2.7 Summary

Research in South Asia and other parts of the world provides preliminary insights into the critical roles diversification, human mobility (migration and commuting), transportation, financial and communication systems, resilient 'adaptive' infrastructure, institutional systems, secure water supplies and natural resource conditions play in livelihood resilience and adaptive capacity at the household and regional level in drought and flood affected areas (Hussein and Nelson 1998; oench and Dixit 2004; Wisner, Blaikie et al. 2004; Brown 2005).

An occupation-based risk reduction requires the strategies to consider the market demand and be contextually appropriate. While providing for employment opportunities, the existing skills and experience of the local population must be considered. Eventually it should enhance the dignity and options for the population engaged in vulnerable occupations (WRC 2009). Therefore the objectives of occupational resilience should be to:

1. Provide occupational opportunities with stable income through support to agrarian

interventions; microfinance interventions and enterprise development.

2. Rebuilding of assets for improved productivity and income
3. Limit migration to nearby or distant places in search of employment
4. Minimize the recovery time
5. Uplift the social status in the community

Such strategy would require the partnerships of local governments, non-government organizations, civil society organizations, community based organizations and the private sector. The solutions can range from the provision of training and placement programmes, to for-work programs: cash-for-work and food-for-work; and building in-camp economies.

The solutions of occupational resilience can range from the provision of training and placement programmes, to for-work programs such as, cash-for-work and food-for-work. Various cases talk about resilience of occupations. Neef et al. (2015) states that few small businesses in fisheries, farm sector and tourism in Thailand, could recover from Indian Ocean Tsunami in 2004. This happened due to strong individual support systems in their social networks and diversification of their business strategies. There was no government support or large scale institutional donations to these businesses. In Cambodia, fishing communities resorted to unrelated livelihood options to diversify their income and be resilient against the shocks and stresses (Marschke and Berkes 2006).

As ActionAid (2005) puts it vulnerability is not poverty. It is summary for factors that drive people into poverty, keep them in poverty and block their exit routes from poverty. This research is based on this inherent nature of vulnerability and its relationship with poverty as discussed earlier. It stresses on the pre-existing condition of the population i.e. the vulnerability of the occupations they are dependent on. Vulnerability indicators are potentially useful tools for identifying and monitoring vulnerability over time and space, for developing an improved understanding of the processes underlying vulnerability, for developing and prioritizing strategies to reduce vulnerability, and for determining the effectiveness of those strategies (Rygel et al. 2006). Also, high vulnerability, which is often seen as a negative trait, can be the basis of building up higher capacities and capabilities of the affected communities.

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Chapter 3

Urban-Rural Linkages, Poverty Reduction and Climate-related Hazards

This chapter deals with the urban-rural linkages that exist in India. It also identifies the elements within a framework; which flow from urban to rural area and vice versa, and how these elements get affected during the times of hazards and disasters. In a developing country the governance factor plays an important role in determining the other linkages and flows. This important linkage element has been ignored in earlier classifications of urban-rural flow elements. Additionally, this chapter explores the interrelationships between employment, poverty reduction and urban-rural flow elements. It further argues that poverty reduction measures can be applied through the same urban-rural framework targeting regional growth.

3.1 Introduction

Around 10,000 years ago human beings chose to settle down in clustered communities, making a shift from their previous nomadic hunter-gatherer lives. The development of rudimentary agriculture allowed them to settle in settlements, which were often located on the fertile lands on the banks of rivers, or on the coast at a major trade port. It is said that cities and towns were born when human beings adopted non-farm occupations away from the agricultural fields. Historically, the cities were surrounded by walls and the population living outside the boundary was considered rural. These walls have been replaced by administrative boundaries in the modern world. The cities became the seat of administrative and political power, epicenters of trade and commerce, and a place for cultural and social interaction.

Over time, more and more cities came into being and flourished across the globe. The world began to urbanize at a fast pace. This trend is particularly significant at the present time and will continue in the next forty years (2010 to 2050) when the world is expected to experience the largest urban population increase in India (497 million), China (341 million), Nigeria (200 million), the United States of America (103 million) and Indonesia (92 million) (UN 2011). As evident from Figure 3.1, the majority of this urbanization would happen in Asia, and be concentrated in the developing countries, where the rural population would reduce considerably and urban population would dramatically increase. The developing countries are growing economically but they are still facing challenges in distributing the benefits of this growth among all segments of their societies; urban and rural, men and women, and rich and poor. India's urban growth for example, is strongly biased towards the rich and the gap between the urban and the rural incomes is further widening as stated by the World Bank (2012).

Adjacent urban and rural areas have always been mutually interdependent for food, products and services. However, the dynamics of these relationships have been changing recently. The

rapid urbanization is directly creating huge pressures on the urban systems and indirectly influencing the population of the hinterland in numerous ways, such as encroachment of agricultural lands due to urban expansion (Davila 2002).

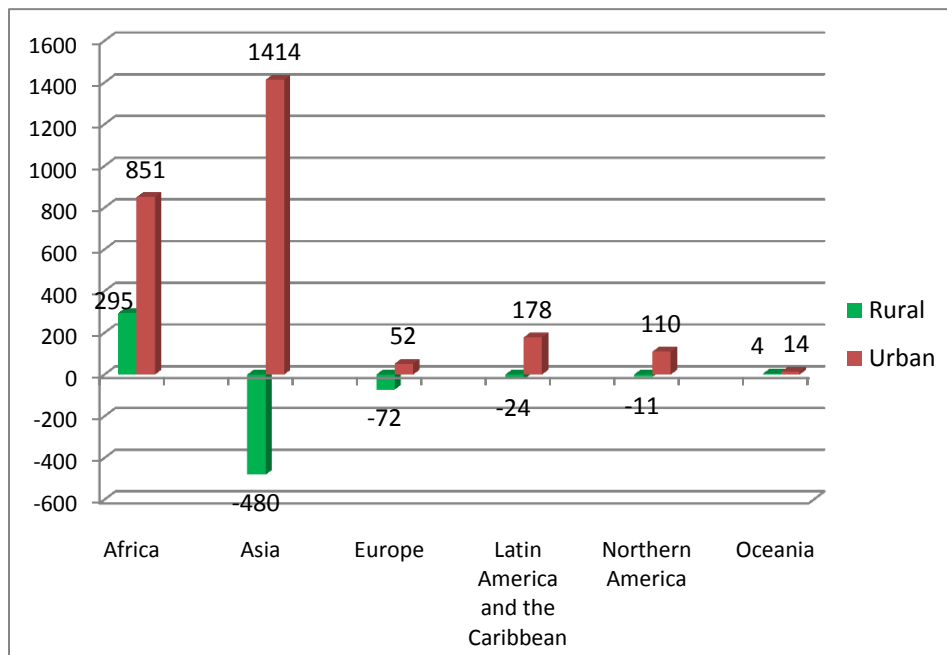


Figure 3.1 Projected changes in urban and rural population (in millions) between 2011 and 2050

Source: UN 2011

With the global rural and urban population in balance (UN 2011) and the enormous increase of urban population, there is an immediate need to understand the interactions between urban, its peripheral area and the adjoining rural area, and apply the inferences to achieve poverty reduction in the developing countries where majority of population lacks basic facilities and rightful earning opportunities. It is also necessary to probe the conflicts as well and identify the entry points for intervention. To achieve overall growth it is required to array the urban and rural investments which are traditionally aimed at urbanization intensification and rural investment respectively. This chapter redefines and establishes the urban-rural flow elements into a simple framework to enable better understanding of the urban-rural interactions in India. It also identifies the relevance of each flow elements in poverty eradication.

3.2 Defining key terms and concepts

The world has increasingly identified the relevance of urban-rural linkages, especially in the last decade (Okpala 2003). However, there have been gaps, overlaps, and ambiguity in the way such linkages are defined (Srivastava and Shaw 2012). In various scenarios, urban planning terms have been defined differently depending upon the contextual factors such as population threshold, degree of development, political categorization, and social and geographical relationships. The

parameters are different for Asian, African, American and European countries, as well as developing and developed countries. Therefore there have been great variations in how terms like urban and rural are defined. Also, the comparison of the level of urbanization at the global stage is influenced by the definition of urban areas followed in respective countries. For example even within the Indian subcontinent, there is disparity in how an urban area is defined. In the mountainous country of Nepal all localities of 9000 or more inhabitants are declared urban; in Bangladesh, places having a municipality (Pourashava), a town committee (Shahar Committee) or cantonment board are defined as urban; while in Pakistan, places with municipal corporation, town committee or cantonment are declared urban; in Sri Lanka also, municipalities, urban councils and town are treated as urban (UN 2011).

3.2.1 Urban Area

The term 'Urban' translates to the characteristic of the city or city life. An urban area can be defined as "a complex system of infrastructure, accommodating higher density of population, when compared to the adjoining areas" (Srivastava and Shaw 2012). Therefore, urban areas are higher in primacy of settlements and they have to sustain the peri-urban and rural areas falling under their zone of influence. The urban areas have strong infrastructure, services and a large pool of labor for carrying out these services. As per Census of India (2011) an 'urban area' is defined (which holds true for the state of Gujarat as well) as:

- (a) All places with a Municipality, Corporation or Cantonment or Notified Town Area
- (b) All other places which satisfy the following criteria:
 - i. a minimum population of 5,000.
 - ii. at least 75% of the male working population engaged in non-agricultural occupation.
 - iii. a density of population of at least 400 per sq. Km.

Here the phrase, 'the male working population engaged in non-agricultural occupation' has connotation on occupations and employment scenario in the area. In urban areas the secondary and tertiary sectors engage most of the population. The census define that non-agricultural occupations do not include fishing, livestock, hunting, logging, plantations and orchards etc.



Source: www.metropolis.org

Figure 3.2 Images showing urban areas of Greater Ahmedabad

3.2.2 Rural Area

The primary description of rural areas is an area which has not been urbanized yet. The Census of India describes rural area as “all areas which are not categorized as Urban area” (Census of India 2011). In classical geography, the rural area is often addressed as hinterland, i.e. ‘a land that lags behind’ or ‘a remote and underdeveloped area’. Even though some rural areas have been the center for agricultural growth in many developing countries, most of them fall behind in terms of socio-economic growth and infrastructure. These areas are more often distant from the urban centers, geographically as well as from the perspective of development. The rural population has access to the natural capital and resources like land, forests and water, but this access is restricted to only a small segment of the population. The main sources of livelihood comes from primary sector of economy and include agriculture, allied activities and fishing, livestock, hunting, logging, plantations and orchards etc. Also, an income dependent on natural resources is often inadequate and irregular.



Source: Self photographed

Figure 3.3 Images showing rural areas of Greater Ahmedabad

3.2.3 Peri-urban Area

Peri urban areas are most difficult to define as there is ambiguity over their physical boundaries. In India, there has been no official definition of the term ‘peri-urban’. From literature, a peri-urban area can be described as peripheral or an outlying part of an urban area or a residential district situated on the outskirts of a city or town. It is the transitory space between the urban and the rural areas. For the sake of this research, this category of geographical area has been considered as a part of the urban-rural system sandwiched between urban and rural areas. The urban-rural linkages are most intense in the peri-urban area (Thirumurthy 2005). In fact, peri urban locations experience the most rapid transformations characterized by frequent land use changes, agricultural intensification, changes in farm systems, changes in infrastructure systems and intense pressure on the natural resources. Kolbl and Haller (2006) postulates that peri-urban problem has always existed in India though often unrecognized. In the future, the peri-urban area will have to channelize the future development with increased share of responsibilities, i.e. the growth will have to be peri-urban centric.



Figure 3.4 Images showing peri-urban areas of Greater Ahmedabad

Source: Self photographed

The city and its effectuated adjoining areas viz. rural and peri-urban areas, combine to form an urban agglomeration. Due to the presence of interrelated interacting elements that should work in cohesion, these agglomerations are also known as urban systems. Conventionally, the urban areas lie at the acme of the hierarchical structure of such spatial systems. Within these systems, rural and peri-urban areas also have an important role to play to maintain the balance within a region. There always exists a dynamic relationship between the urban area, sub-urban areas and their hinterland within a large region, with a constant interchange of one or more of food, water, energy, occupations, products and services.

A majority of the cities expand by encroaching upon the agricultural land, over consume the resources based in rural environment, such as water resources, and in return dump the urban waste in rural areas (Okpala 2003). There have also been conflicts over resources, as well as socioeconomic conflicts, which will gain prominence in the future, with growth in urban population and widening gap between urban and rural areas (Revi 2007). As an area's growth is consistently affiliated with other's growth or decline, similarly, climate change threats associated with one part of the region are linked to other areas. Therefore, it becomes even more essential to keep "the balance between rural and urban areas" or Rurbanism (Revi et al. 2006).

3.3 Evolution of concept of urban-rural linkages



Figure 3.5 The Old Rutherford Model (left) and The Continuum Model (right) of Urban-Rural linkages

Source : World Bank (2009)

The interactions between the urban and rural area have been referred to in various texts with different nomenclature such as urban-rural interactions, urban-rural linkages, urban-rural continuum and sometimes as urban-rural interface. Interestingly, the order of 'urban-rural' is also seen to be reversed as per the focused geographical area in the study, as in Gashu (2009), where the term rural-urban linkage is used in the same context, as the focus of the study is agriculture domain and food security. The relationships have grown more a simplistic Old Rutherford model to the more complex Continuum model over the last four decades (see Figure 3.5). Additionally, it has been accepted now that urban-rural linkage is not uni-disciplinary, but involves overlapping constructs from various disciplines such as economics, geography, and urban planning. For example, spatial allocation of economic activity determined by local government in regional economic policy goes a long way in shaping the urban-rural linkages. Often these are assumed to be nationally or provincially consistent in considering the circumstances under which the urban-rural linkages ameliorate, decelerate or remain unchanged due to the development process.

These elements are strengthened by transportation linkages and there is a positive relation between adequacy of transportation infrastructure and access to employment and enhancement of income, as it improves access to markets, jobs and public service particularly for the rural population (Okpala 2003). Figure 3.6 shows how closely these linkages are correlated. Altering one of the structural or socio-cultural factors in any of the sub-area of urban, rural, peri-urban or rural areas brings about another related change in other areas (Srivastava and Shaw 2012). Sometimes these flows are uni-directional while sometimes the impact is caused in both directions, impacting one or more sub-regions. For example, agricultural growth gives rise to backward linkages in the form of augmented demand for fertilizers and farm equipment as well as forward linkages by increased demand of consumption goods and services due to increased

household income. Since 1990s, globalization has brought increased number of economic opportunities and has led to rapid rural transformation, especially in agricultural sector, goaded “by technological progress, improvements in infrastructure, and liberalization and creation of markets” (Braun 2007). It has played its role in improving urban empowerment and reducing rural poverty. The improved linkages revive the rural area and expand the Rural Non-Farm Economy (RNFE) with increased sectoral and spatial flows between rural and urban areas (Braun, 2007). Haggblade, Hazell, and Reardon (2007) state that RNFE accounts for approximately 25 percent of full-time employment, and accounts for about 30-40% of rural household income in developing countries.

There have been various concepts explaining the relationship between two settlement systems; urban-urban and urban-rural. Examples include J.H. von Thunen’s concept(1826); land use is a function of transport costs to market and the farmer’s land rent, to Walter Christaller’s concept(1933) of ‘central place theory’; explaining the formation of urban settlements and their relative location. Losch’s concept (1954) predicted that human settlements exist in a hierarchy around hexagonal shapes with settlements dealing in goods and services of higher order being larger in size compared to those dealing with goods and services of lower order. These concepts were based on idealistic assumptions such as, homogenous geographic areas with uniform consumer preferences and transportation costs being proportional to linear distances. Nevertheless, they provided clarity to the urban-rural linear differentiation based on their inherent characteristics. Therefore it may be true that there is a transition from very rural to rural to small towns to peri-urban to urban characteristics, but owing to complexities of different factors of market, economics, land, and primacy, it becomes inconceivable to predict the extent of each of this categorization of human settlements.

Economic development was majorly concentrated in urban areas till 1970s. Harvey(1973) and Preston (1975) provided a significant direction to the research of urban-rural linkages. While Harvey pointed out that there has been a development of economies in developing countries, where the countryside is controlled by the towns, Preston arguably provided a framework of interactions between the countryside and the areas. The study of urban-rural linkages gained prominence nearly 35 years ago after the publication of works by Mitra (1977) and Lipton (1977). Lipton’s analysis provides a description of spatial pattern of resources and the reasons for the same, which cause chronic poverty and explain the pattern of the development. The debate for and against Lipton’s conclusion of urban bias gave a new direction to the importance of urban-rural linkages. Prior to these publications most of the work was disjointed and isolated in different spheres where economic interrogations were directed towards development analysis but failed to envision urban and rural as distinct spatial investment opportunities (Funnell 1988).

At the start of 1990s, there was no dearth of categorization of urban and rural sub categories in

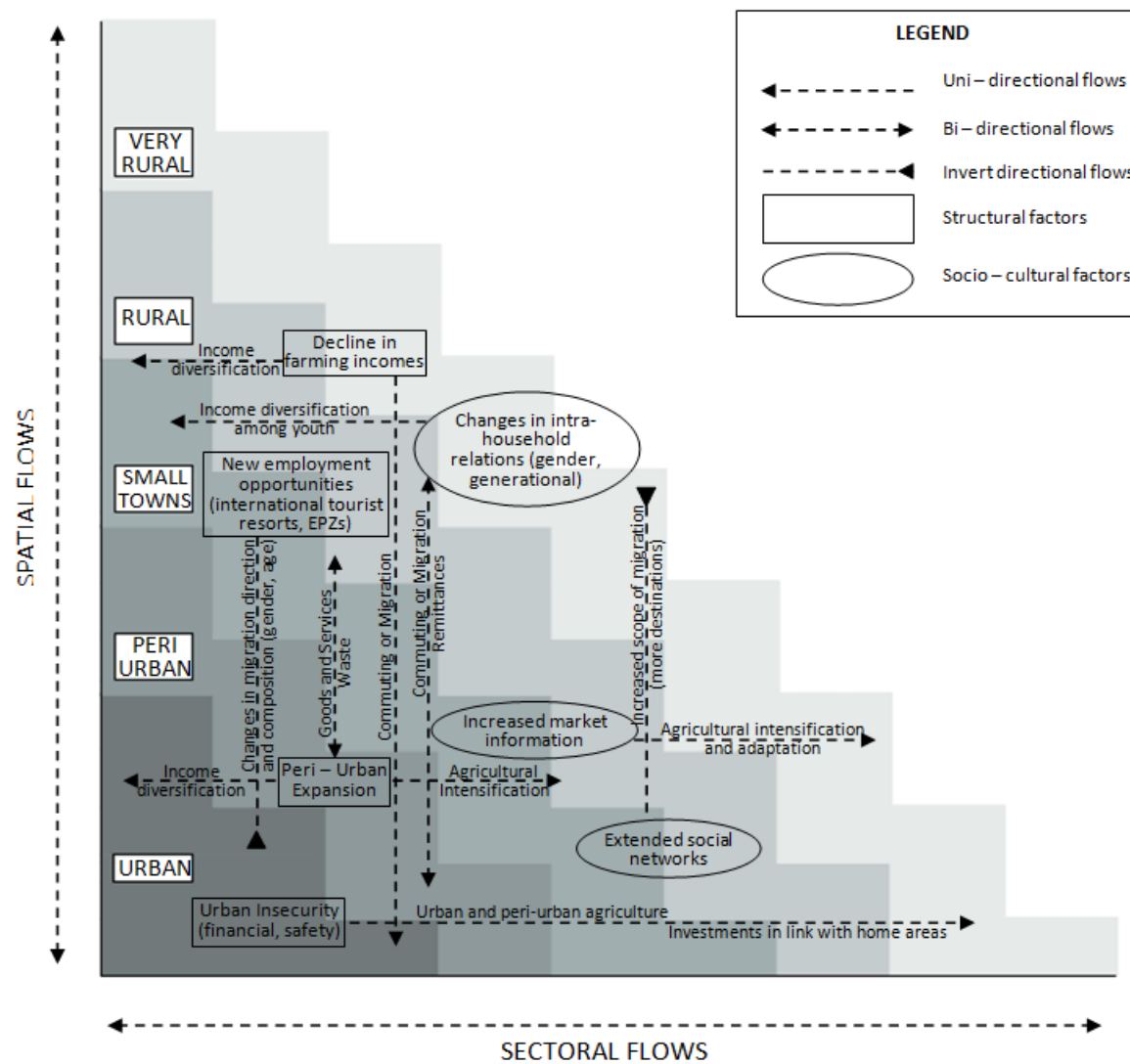


Figure 3.6 Regional Symbiosis of urban-rural linkages

Source : Srivastava and Shaw (2012)

economics, psychology and political science subjects, as pointed by Hoggart (1990). The subjects of politics and sociology had recognized the distinct social and political behavior associated with urbanization, while geography had focused on the physical linkages between the geographical areas. However, it needs to be understood that there was paucity of applied literature on combined urban-rural systems prior to 1990s (Funnell 1988 and Hoggart 1990). Urban-rural linkage is a concept being increasingly recognized at the international level, since about a decade, which is made evident by the adoption of the concept of urban-rural linkage as the key subject by various organizations in their policies, programmes and publications.

In 1999, UN-HABITAT saw the potential in promotion of urban-rural linkages in spreading the development effects across urban-rural continuum and in generation of employment for poverty reduction. The resolution was adopted by UN-HABITAT in its 17th session (Okpala 2003). The concept was further discussed at international platforms provided by UN-HABITAT in ministerial round table on Rural-Urban Interface and Slums in 2003, followed by the international conference on 'Strategies for Enhancing Rural-Urban Linkages Approach to Development and Promotion of Local Economic Development' in 2004. These initiatives tried to link the development issues with the urban-rural linkage approach, stressing on government's role.

United Nations Human Settlements Programme defined rural-urban linkages as "complementary functions and flows of people, capital, goods, employment, information and technology between rural and urban areas" at its 19th session (UNHCS 2004 in Momen 2006). Earlier, the 'Declaration on Cities and Other Human Settlements in the New Millennium', 2001 by United Nations' General Assembly recognized the role of cities and towns as engines of growth contributing to the development of both rural and urban human settlements. However this notion needs to be changed and a more symbiotic relationship needs to be established against the existing dependent relationship.

Over the last decade or so there has been an evolution of the concept from 'urban and rural' to 'urban-rural'. The boundaries between the two areas have become transitional causing the emergence of the peri-urban approach. This approach highlights the problems and opportunities, both in terms of livelihoods and the sustainability of adjacent rural and urban areas. Due to the advancement of urbanization, the urban peripheries are transformed to provide for both poor migrants and semi-rural communities, much to the reinvention of the urban conditions and the gradational alteration of the urban-rural dichotomy.

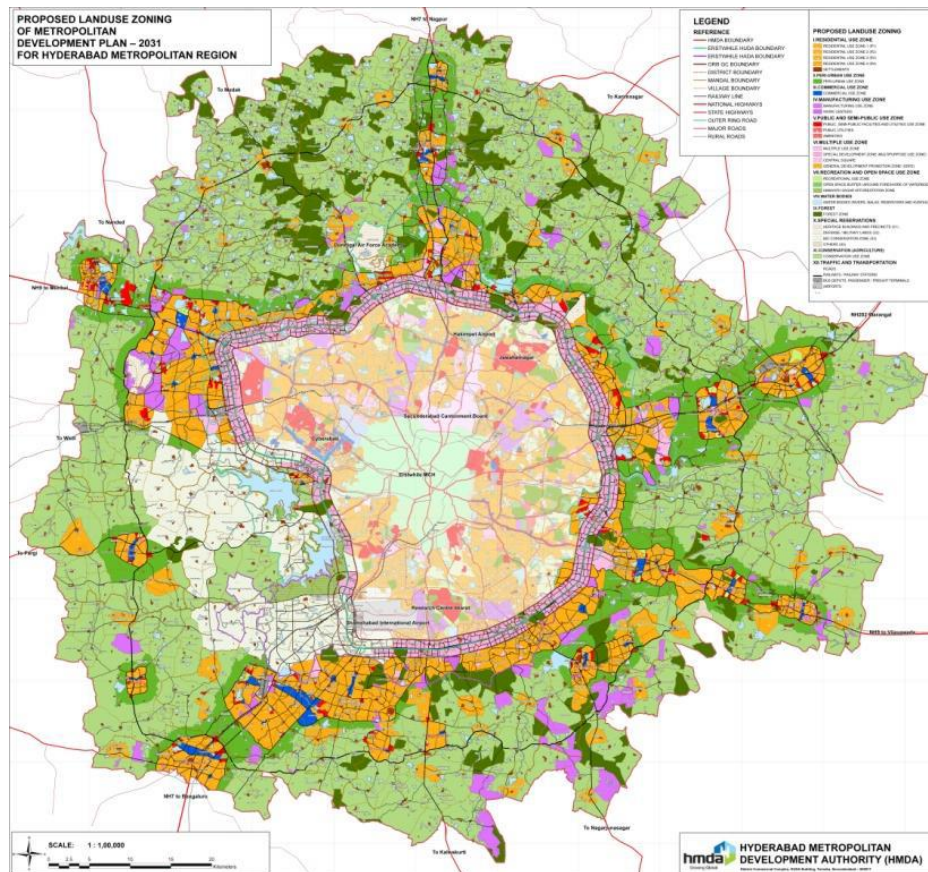
3.4 Urban-rural dynamics in India and Gujarat

Urban-rural linkages or interactions exist in numerous forms and there has been a consensus over two broad categories of interactions: sectoral and spatial (Tacoli 1998 (1), Tacoli 1998 (2), Braun 2007, Srivastava and Shaw 2012). The "Sectoral flow" includes flow or interchange of

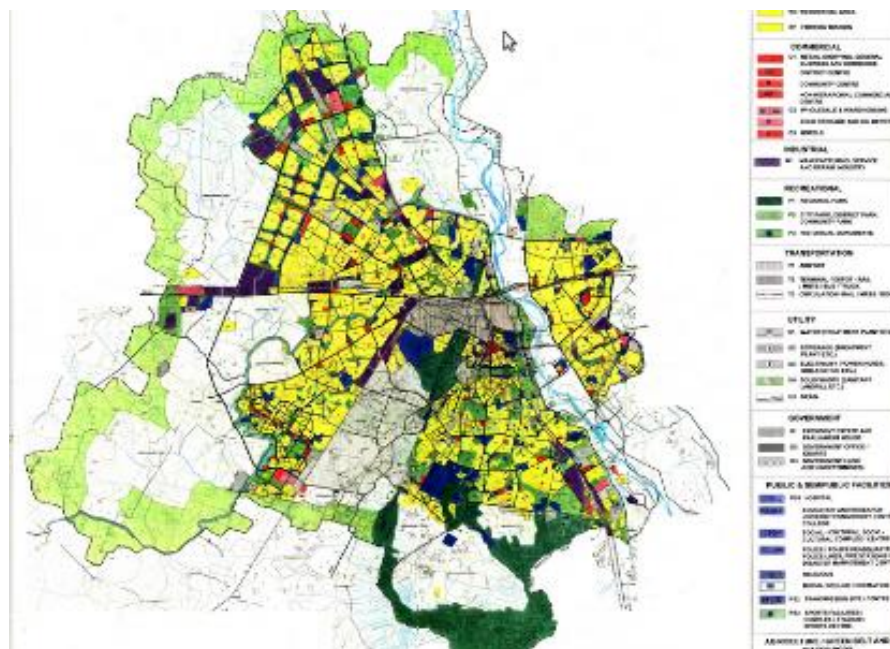
goods between agricultural, manufacturing, and services sectors from urban to rural areas and vice versa, whereas “spatial flow” relates to linkages across space, where people, goods, water, money, information, and technology are exchanged. These interactions are also referred to as “key components of livelihoods and local economies” and “engines of economic, social and cultural transformations” (Tacoli 1998 (1)) because of their vital role in a region in urban empowerment and reducing rural poverty. As per Braun (2007) three exogenous conditions are responsible for the changing opportunities for urban-rural linkages as well as the intensification of such linkages: increasing trade and capital flows, the information revolution and increasingly decentralized governance across the developing world. These conditions hold merit for India as well.

Some theorists consider these interactions as mutually beneficial transactions, while many term them as extractive relationships with urban bias (Revi 2007). World Bank (2005) favors the need for stronger urban-rural linkages, which keep societies together and the absence of which would lead to inefficient environment, increased inequality and subdued growth. Hundsatz (2001) states that certain factors have immense influence on the orientation of the regional growth and the linkages between urban and rural areas. These factors are management of production patterns, growth of trade and commerce, efficiency of infrastructure provision, protection of environment, access to health and education facilities, and response to population growth.

After Indian economy underwent globalization in early 1990s, Indian villages experienced improved economic opportunities and rapid rural transformation especially in agricultural sector, driven by improvements in infrastructure, technological progress, liberalization and creation of markets (Braun 2007). The cities started to grow into regions known as ‘development area’ comprising of urban, peri-urban and rural areas i.e. villages. For example, Hyderabad Urban Development Area, Ahmedabad Urban Development Area, Delhi Development Area, Chennai Metropolitan Development Area and other major cities. Hyderabad Urban Development Area consists of 849 villages along with Hyderabad city (see Figure 3.7). Similarly, Delhi Development Area (DDA) consists of 362 villages (135 urban and 227 rural) with only 48% urban area (see Figure 3.8). In Gujarat certain rural areas, have been facing isolation due to enhanced focus on the biased development of urban areas and consideration of the two areas as contradistinctive entities. This leads to widening of already existing gaps and ineffectiveness of various poverty reducing policies. Also, the rural settlements are spatially disordered which makes the provision of infrastructure and services costly and inutile. Here, the urban area can play a critical role in the provision of basic infrastructure and services such as roads, telecommunication, health care, education, credit, markets and information, to its nearby rural areas.



Source: <http://www.hmda.gov.in/>



Source : <http://delhi-masterplan.com/>

3.4.1 Urban-rural divide

The urban-rural divide can be comprehended by comparing various socio-economic indicators. Rural areas are backward in the sphere of education, nutrition, health care, sanitation and other assets. This forces these areas into a poverty trap (IGNOU 2011). India has a rural population of 68.84% dispersed in 0.64 million villages, against the 31.14 % urban population in 6166 urban agglomerations, which is approximately 2.5% of the total geographical area in India (IGNOU 2011). Gujarat is one of the states where rural poverty is higher than urban poverty (Himanshu and Sen 2010). Gujarat's rural poverty is 39.10 per cent while urban poverty is 20.10 per cent. The total percentage of population living under poverty line is 31.80 (GOI 2009).

Urban per capita income in India is thrice that in rural areas (IGNOU 2011) and that becomes the pull factor for rural population to move to urban areas in search of better employment. Other factors that govern the migration are better housing, education, and socio-cultural factors such as kinship, caste and regional networks of communities. This disturbs the already disarrayed sex ratio at both urban centers and the rural areas. The national per capita expenditure level of the urban population was on average about 88 per cent higher than that of the rural population of India, based on the measure of modified mixed reference period (MMRP) (NSSO 2010). Urban-rural gap had grown immensely due to industrial development strategies being followed earlier. There exist disparities at various levels which impact the linkages between the two areas. Work force participation rate in rural areas is higher with 41.97 (52.36% males, 30.98% females) whereas it is 32.23(50.85% males, 11.55% females) in urban areas (Census of India 2001). Literacy is an effective tool for empowerment. The rural literacy at 68.91% stands much below the urban literacy at 84.98% (Census of India 2011). The lower socio economic sections of the society which exist majorly in rural areas suffer from malnutrition, incidence of low weight for age, anemia, disability and hunger, which limit the full potential of children to grow into productive adults. The variance in availability of services and facilities in urban and rural areas becomes the driving factor for migration and changing urban-rural interactions. For example, in the year 2002, 736 urban households per thousand households had access to drinking water while only 275 rural households had access to drinking water (NSSO 2002). The backwardness of Indian villages is also expressed in the comparison of other factors, such as household with electricity; 59.8% rural against 92.2% urban, access to toilet facility; 34.1% rural and 80.8% urban (IIPS 2012) among many others.

Approximately 21 percent of urban India lives below the national poverty line (World Bank 2010). Poverty limits the physical, mental and social development of an individual. At the same time it can limit the growth of a family or a community, region or for that matter of the whole country. The poverty of the masses is created and perpetuated by the social systems prevalent in the society. Poverty in India is a social product which is socially generated, reinforced and perpetuated. It is a resultant of differential distribution of various castes, classes, groups in

economic, political, social and religious domains of the society (Vanishree 2011). Demographic, natural and psychological factors are secondary factors in influencing the poverty. In India, rural poor primarily consists of agricultural laborers, artisans, craftsmen, and marginal landholders, while the urban poor are engaged in the unorganized sector, or low paid jobs in the organized sector. The urban poor also include the self-employed population of rickshaw pullers, shoe repairers, vendors, owners of small shops, beggars and other semi-skilled, unskilled and low-income skilled occupations. In the absence of adequate affordable housing this part of the population is bound to live in slums or squat on pavements.

Urban-rural linkage has an important role to play in determining the economic level of the population residing both in urban and rural areas. The phenomena of urban and rural poverty need to be understood to comprehend the relation between them. In both the cases, the poor is identified by similar characteristics – negligible productive assets, low and irregular wages; sometimes unemployment, low rate of literacy, poor housing, inadequate nutrition and poor access to social infrastructure. 65.4% of the national rural population relies on less than \$40 per year, while in Urban areas only 36.7% rely on less than \$40 per year. Additionally, the Human Development Index for rural area is 0.340, while it is much better at 0.511 for urban area (HDR 2001).

There is not much evidence of the impact of high rate of urbanization on the rural poverty. However, Cali and Menon (2009) recognizes six mechanisms through which urbanization may affect rural poverty. Firstly, the backward linkages would have positive effect on diminishing poverty. The urban area with expanding population and income would have increased demand for rural goods and would increase the share of higher value added products in total agricultural demand. Secondly, the expansion would allow the diversification of non-farm economic activity in rural areas, thereby giving more opportunities to landless laborers, and low earning population. Remittance is another mechanism which augments rural income by reduction of resource constraints for rural livelihoods, and provision of insurance against adverse shocks. The fourth mechanism is agricultural productivity which may improve the agricultural labor productivity due to reduction of labor supply. The increase in rural land prices might have a positive impact on rural poverty provided that land ownership is not limited within a section of the population. The sixth linkage is the access of surrounding rural consumers to urban markets which have lower consumer prices due to competition within the producers in the urban area. However, these mechanisms are subjected to a high degree of uncertainty since these are “second-round effects” and are dependent on diverse factors.

3.4.2 Development and economic conflict

There is enough evidence to prove that there has been an increased economic divide between the rich and poor, both in urban and rural areas, amidst India’s economic growth since the 1990s.

For example, the Gini coefficients for India for the year 1999-2000 for urban and rural area were 0.34 and 0.26 respectively (Pal and Ghosh 2007). Therefore urban areas have a more pronounced income gap of income among their inhabitants. As stressed earlier, the bulk of the financial allocations for development goes to urban areas whereas the rural areas either get miniscule funding for development or their programmes are isolated in nature effective conjugation with the development plans of their primate cities. However, "Providing Urban Amenities in Rural Areas" (PURA) by Government of India is a rural programme which has an objective of "Holistic and accelerated development of compact areas around a potential growth center in a Gram Panchayat (or a group of Gram Panchayats) through Public Private Partnership (PPP) framework for providing livelihood opportunities and urban amenities to improve the quality of life in rural areas." (PURA 2011). It differs from the conventional ideas of economic development of rural areas in more ways than one. It targets comprehensive and composite rural development, government investment at urban levels in rural programmes, reverse rural to urban migration, stronger linkages with urban economies, the adequate infrastructure, supportive modern industries and investment in social and commercial service and private enterprise initiatives (PURA 2011). The development of PURA or similar programs to include the recognition of impacts of disasters on livelihoods, would bring about reduced conflict among the urban and rural population, and improved overall economic development.

The concept of regional dynamism can be explained by the processes of spread effect and backwash effect. The region experiencing rapid growth will be able to increase its competitive advantage over the relatively lagging regions, resulting in the improvement in transportation, communication, education, and healthcare facilities. Whereas the other region is drained of capital, labor, technology and entrepreneurship. This is known as backwash effect. In the case of spread effect, the benefits of economic upsurge of one city or node, is reaped by other adjoining areas (also known as catchment area of that node), resulting in an increased demand for backward areas' product, as well as diffusion of technology and knowledge. The spread and backward effect are both examples of disequilibrium produced in a region due to development or the lack of it. Similarly, the disequilibrium produced by climate related disasters within a region would affect each other.

3.5 Urban-Rural Flow Elements in Gujarat

Urban-rural interrelationships and their related issues vary across various regions of the world. A set of generic principles is therefore required to understand them. However, these principles should be flexible to be adapted to the needs of specific circumstances. The relationship between the urban and rural areas in a developing country differs substantially from one in a developed country. With unprecedented growth in urban areas, developing countries have the challenge to address the urban and rural issues with the aim of comprehensive regional growth.

In an attempt to understand urban-rural interrelationships, different authors attribute importance to different linkage elements. Preston (1975) categorized the interactions between the town and the country into: movement of people, movement of goods, movement of capitals, social transactions, and administrative and service position. Tacoli (1998 (2)) differentiates interactions between urban and rural areas into spatial (flow of people, goods, money, information and wastes across space) and sectoral (across various sectors such as agricultural, manufacturing and services). It is however felt that there is also a need to include various types of intangible social interactions as well as the role of governance in influencing these elements, both of which have not been significantly discussed in past literature.

3.5.1 People

One of the important linkages between the urban and rural areas is the element of people. The flow of people between these spatial limits provide for occupations, predominantly for the rural poor. It is an important factor in determining the well-being of the population during normal (non-disaster) scenario as “standard of living, disposable income, savings, education, health and overall psyche of the society is determined by current levels of employment and unemployment” (Sharma and Krishna 2007). People with different incomes have different resilient capacities against disaster (Surjan and Shaw 2009). Resilience is usually higher for people with higher income capacities. As economic sustenance for individuals holds paramount importance during a disaster, the human resources linkage needs special attention.

The flow of people between the spatial areas is the most evident and therefore widely considered element in the interaction theories. Zewdu and Malek (2010) considers it as the “key component in rural transformation” leading to industrial development in developing countries. This movement can be both temporary and permanent. The reasons attributed to this movement are for the search of employment, availability of better employment opportunities, education and for health services. Understandably the flow of rural population to urban areas is dominant over that from urban to rural; in few such cases urban population may move (temporarily or daily) to rural areas for their ‘rural’ jobs. This movement does have some specific implications. In developing countries it might benefit the urban economy by provision of additional labor force. At the same time the influence gives rise to dual economy with the growth of informal sector with negative environmental connotations (Gupta 1993).

3.5.2 Natural Resources

This flow element primarily includes sharing of natural resources such as water, land and energy (an output of natural resources). Zeleke and Trutmann (2006) highlights that there are negative effects on the environment between urban and rural sphere, which can be minimized through harnessing of urban and rural linkages. Rural incomes are predominantly agriculture based in a developing country relying on natural resources; therefore the impact on natural resources

consequently hurts the earning capacity of the rural population.

3.5.3 Products

This includes a bi-directional flow of products. The rural to urban flow, includes food for urban populations, raw and processed materials for urban manufacturing units, and labor flow for the non-farm sector. In the other direction, manufactured and processed goods, and inputs for agricultural sector find market in the rural areas. Another dimension is that the peri-urban area may furnish parts or preliminary products for factories in urban areas, causing product linkages to be established.

3.5.4 Financial

This linkage element includes flow of money in the form of remittances from urban to rural areas, rural savings channeled through urban institutions, and rent acquired by urban landlords. The initial money flow is from rural to urban area for establishing the rural migrant in the urban setting; thereafter there is a considerable reverse flow in remittances (Johnson and Whitelaw 1974). Another important component is investment from urban areas into peri-urban and rural areas. "The impact of greater investment in evidence based, low cost interventions" at the rural level in developing countries, is well established by Buse et al. (2008) through Millennium Village Projects in achieving the Millennium Development Goals (MDGs) especially the poverty reduction targets.

3.5.5 Waste

Although this is more of a physical linkage between the urban and peri-urban areas, yet it has spatial, sectoral and natural implications. With less investment in waste disposal in major cities in developing countries, there is a greater reliance on waste disposal in the form of landfills on the periphery of the urban boundaries. Another component is the various forms of pollution affecting the water resources and air, both in urban and rural areas. This causes the polluting of the land and water sources in the vicinity, and in the process, affects the agricultural output of the neighboring areas, thereby having indirect effects on the economy of the area.

3.5.6 Information

This includes the flow of information regarding resources or raw materials from rural to urban areas, markets and prices for the commodities and employment opportunities from urban to rural areas. It also includes the sharing of knowledge and technology within the two spheres, which is an important component of the same. The usual case with villages in developing countries is that they are undersupplied and under developed. This can be rectified with an improvement in roads, rail and other vital communication linkages.

With the advent of technology in the developing countries in the form of television, computer and mobile phones, there has been a greater flow of information. This has made a marked

difference to the lives of the rural population. This aspect of modern technology needs to be further utilized to connect distant and remote locations to the markets, as envisaged in Srivastava and Sen (2012) where up gradation of a post office to a development center through modern means can bring distant communities within the growth scope of the major urban centers.

3.5.7 Social interactions

Social linkages need to be considered under a separate category as they include the intangible interactions between the city dweller and the villagers. The cultural exchange which plays a vital role in strengthening ties is also included in social interactions. Preston (1975) puts it as including “promises of favor, the provision of protection or the establishment of a formal relation” and these intangible elements may have better value than the tangible goods in establishing the linkages. These social interactions improve the confidence of the rural migrants entering into the urban society, and the consequential improved income brings about better social standing.

3.5.8 Governance

Governance forms the medium for implementation of all policies and therefore it has an indispensable role to play in determining the flow of the abovementioned elements. Surprisingly, it has not been adequately represented in interaction theories after Preston’s (1975) dilute reference to the administrative provision. The government has the role of a facilitator in positive linkages while a constrictive role in negative exchanges. This element not only includes the formal set up of governance but also includes civil society organizations and non-government organizations who are sharing the responsibilities of governance in administering the policies of the government.

India has adopted the path of decentralized governance, as effective and accountable local government systems are a vehicle for the empowerment of rural areas. In this regard, changing the pattern of governance has also had an influence over changing urban-rural linkages, with the rural areas drafting their own policies. The governments and their policies might be biased in favor of one, geographic region and therefore requires coherence. To give appropriate significance to peri-urban and rural areas, the growing cities in India have resorted to regional statutory authorities such as Mumbai Metropolitan Regional Development Authority (MMRDA) in Mumbai, and Ahmedabad Urban Development Authority (AUDA) in Ahmedabad, India. This governance factor is all the more important as its intervention is not limited to the local governments working in the region. The macro-economic and sectoral policies drafted by national government must integrate the urban and rural areas in their policies to achieve the sustainable economic and social development, while local governments must go for overall development taking care that the national policies are adequately altered for local conditions.

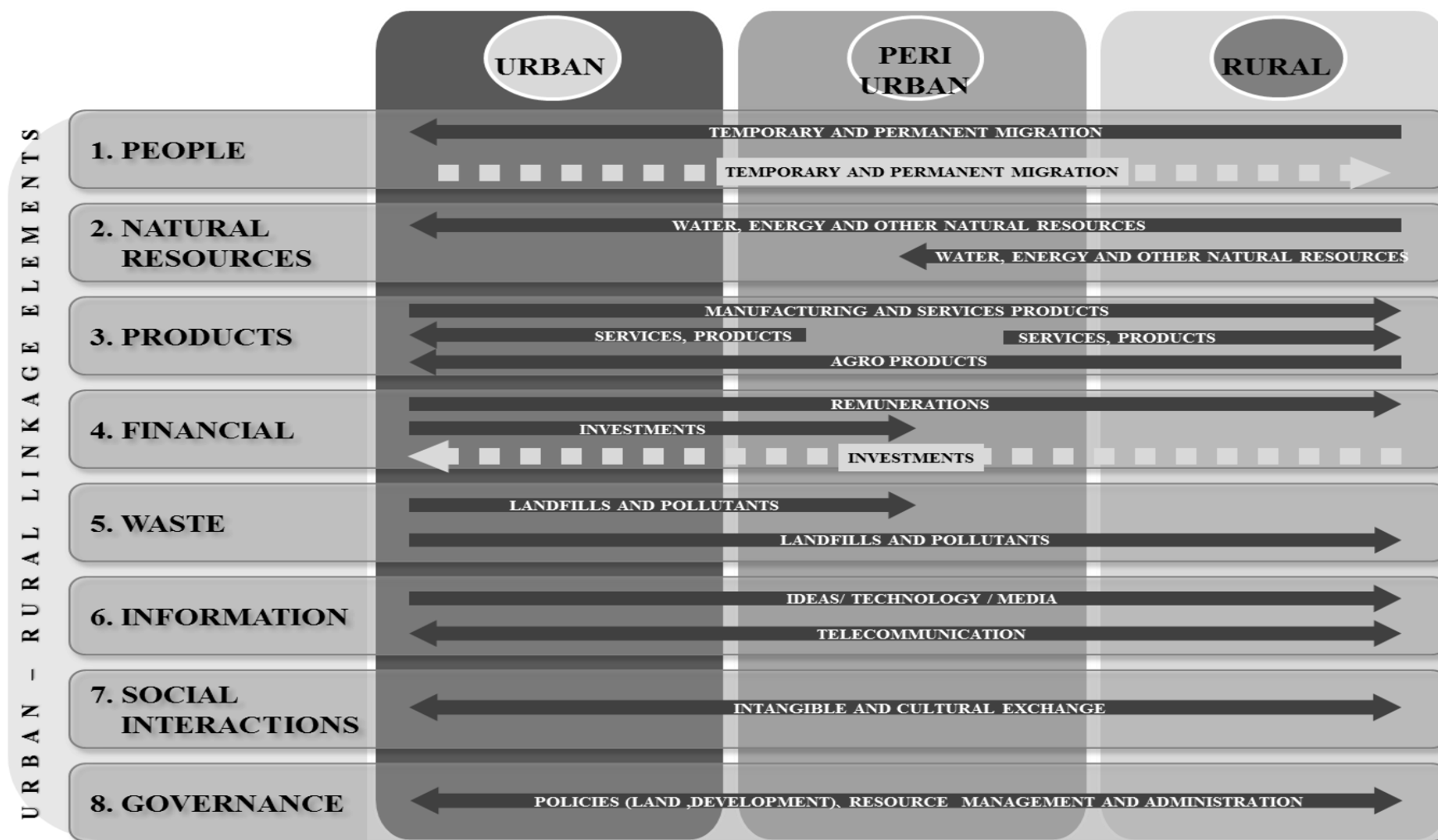


Figure 3.9 Urban-rural Flow Elements for Growth and Poverty Reduction

Having discussed the various divides that exist between urban and rural areas in the last section, it becomes important to devise a framework in the present context and focusing on the Indian urban-rural scenario. There exists a plethora of linkages between the urban, peri-urban and rural areas within a region. These linkages can be strong, weak, uni-directional or bi-directional across sectors and spaces (Tacoli 1998 (2), Srivastava and Shaw 2012). Nevertheless, the complex social, economic, political and environmental interdependence between the urban and rural area can be defined as a framework which includes eight elements (see Figure 3.9). The solid arrows show strong flow while the hashed arrows show comparatively weaker flow.

There has been a lack of framework for analysis in most of the case studies conducted earlier. Such case studies serve their purpose of bringing the core issues pertaining to the context in relationship to urban-rural linkages, however, do not provide a framework that can be adopted and modified for future research elsewhere. The first seven elements that are included in the framework are based on previous literature with a nomenclature that best describes the inherent content. For Indian case, the flow of people, products, information and financial elements is a majorly bi-directional flow between urban and peri urban area. There is a one-way flow of waste from urban area towards rural area, and natural resources from rural to urban area. The intangible element of social interactions also needs to be considered as it causes a great deal of influence over other elements without an actual flow of material. The eighth element of governance has also been included to account for the influence of governance in determining the other linkages (Srivastava and Shaw 2013). These elements have the potential to be categorized into sub-elements, as shown in the Figure 3.9, for further detailed analysis.

3.6 Potential of urban-rural linkages in poverty reduction

Since many decades, policy makers and other professionals have been perturbed to identify the vital infrastructure that need to be included and which institutional confines need to be overcome, to optimize the effects of links between urban and rural areas. To improve the wellbeing of the population, an increase in human development facilities is required in the villages, along with the development of infrastructure, and generation of employment. Urban-rural framework can help to achieve these through proper initiative at appropriate degree. Urban-rural linkages can help in determining the investment priorities and entry points for change, with the help of better attention to policies.

Urban and rural areas share their vulnerability through a number of inter-linkage elements, namely; people, natural resources, product, financial, waste, information, social interactions and governance (Srivastava and Shaw 2013). Furthermore, it has been widely recognized in the recent past that urban-rural linkages provide opportunities and constraints for poverty reduction and regional development (Zeleeke and Trutmann 2006; Braun 2007; Cali and Menon 2009;

Srivastava and Shaw 2013). There are three aspects of application of the framework – employment generation, poverty reduction, and the regional growth. Poverty and employment are two parameters which are directly related to each other under the domain of economics. Poverty causes occupations to be vulnerable while employment can help eradicate poverty. Therefore the research needs to be expanded to analyze the interrelationship of all the eight elements identified in this study.

3.6.1 Employment generation

A diversification of the economic base would result in the increased job creations in non-farm sector, thereby arresting rural to urban migration. The importance of non-farm income has been recognized and emphasized in the past in improving the household income by income diversification (Yao 1999, Smith et al. 2001 and Davis 2003). Bates (1983) propositions that the increase in overall income level would weaken the conflicts between producer and consumer, thereby lessening the urban-rural disputes. Provision of access to markets would help improve the market linkages for the benefit of both urban and rural poor. Provision of assistance to small scale enterprises, which have the capability to sustain on their own once they get a start would allow the rural population to be involved in the mainstream economy. Also, the informal sector is playing an important role in rapidly growing cities in developing and transition countries. This role is a consequence of growth in the labor force without a matching response in the level of formal employment opportunities. The informal sector has great freedom of action, being free of government interference, and will tend to deliver labor resources to productive areas of the economy.

3.6.2 Poverty Reduction

It is argued by many scholars that reduction of rural poverty would allow sustainable urban growth. Often urban and rural domains face market failures and stagnation due to one or more of labor market, services market or goods market failures. Eradication of rural poverty would require access to social facilities like education and health, but mere social welfare schemes would not help to eradicate chronic poverty. It needs fundamental transformations of the society, through a mix of capitalist and social paths of development, thereby requiring a partnership between private and public sectors. The government needs to focus on labor intensive programmes of development in a country like India where there is an abundance of labor force coupled with underemployment. The minimum wages need to be regularly revised as per the economic growth of the country and should be properly implemented. Poverty has a two way relationship with the linkages; it contributes to the flow of people, while urban-rural linkages can contribute to the poverty by biased policies. The urban-rural framework can therefore help in alleviating poverty. For example, the Rural-Urban Partnership Programme (RUPP) in Nepal (31% urbanized) focuses on overcoming the bottlenecks in commercializing agricultural and rural production with the objective of alleviating poverty. The linkages between urban and rural areas

can provide markets to rural products achieving “Regional Economic Resilience” (Hill, Wial and Wolman 2008). In Guinea and Zimbabwe, Action Contre la Faim (ACF) found that urban-rural linkages had a major effect on food security and nutrition: rural production often plays an important part in supporting family members who have moved to the city (Vaitla 2012; Egal 2011).

3.6.3 Regional Growth

Most developing countries like India are experiencing an unprecedented growth. However it needs to be debated whether this growth is inclusive or urban biased. An inclusive growth is possible only when the effects of socio economic growth are shared by all segments of a region. Both sustainable rural development and urbanization can only be achieved by integrating poverty alleviation efforts with urban-rural dimensions.

Urban-rural linkages drive the growth of a region in more ways than one as discussed earlier. This is influenced by the structure of the settlement system which has an immense potential to be a positive force in the process of economic development (Funnell 1988). Conversely, growth can regulate the linkages between the urban, peri urban and rural areas. Therefore, the linkages should be linked with the wider government vision of regional growth. Authorities often fail to distinguish the differentiated needs of urban and rural areas and aim for overall growth, assuming that the effects of such economic growth would trickle down to the poor with more employment opportunities and higher wages. The growth oriented approach has to be replaced with ‘growth with social justice’ approach (see Figure 3.10).

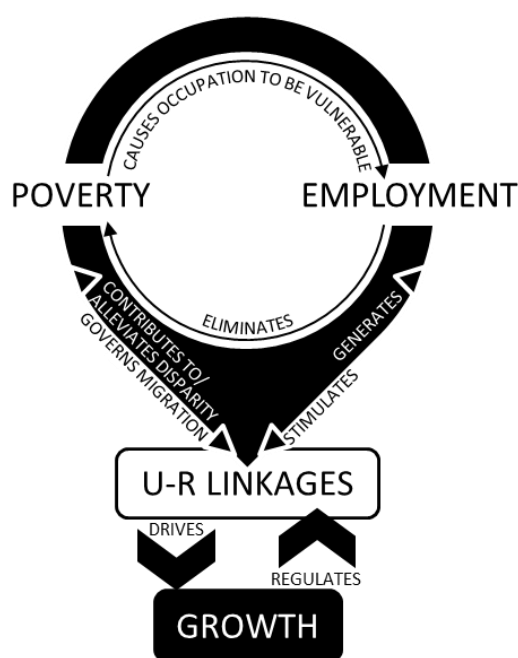


Figure 3.10 Role of urban-rural linkages in eradicating poverty and overall growth

(Source: Author's interpretation)

3.7 Implementation Strategies for regional growth

Regional growth can be achieved through integration of poverty reduction measures with employment generating policies. To realize these objectives many approaches can be adopted and applied. This section deals with four such approaches, which can accelerate the process of growth. Although these are simple well known approaches, they need to be employed as strategies for bridging the urban-rural gap and synchronizing their growth patterns. These may not necessarily be employed simultaneously and only provide the options that have worked in the past. Additionally, such strategies and approaches influence the livelihoods, in particular of the more vulnerable groups, through interlinked processes.

Augmenting infrastructure: This has two aspects; connecting economic centers to the backward areas and providing physical and social infrastructure within the backward regions. The peripheral urban population might find it easy to commute to the city for work, which may generate growth of sub-urban non-farm jobs in services, such as consumer services and retail trade required by the urban population. This will of course not reap the same results for distant rural areas.

Increased flow of resources would cater to the demand and supply chain in the region. Efficient infrastructure and improved services would improve the markets as there would be better exchange of goods, both agricultural and non-agricultural. Equal access to social services can also be improved by improved physical linkages. Better transportation also allows better flow of labor and provides livelihood opportunities during the non-agricultural days to the landless laborers who rely on seasonal farm sector. Hence transportation helps in provision of diverse jobs for survival and sustenance.

Strengthening production structure in peri-urban and rural areas: Better economic opportunities can be offered to both urban and rural poor through strengthening of the production structure of peri-urban areas and distant rural areas. The labor intensive and low-value added production activities can be transferred from urban areas to better interlink peri-urban or rural areas. This would reduce manufacturing cost of the products and also benefit the rural population in getting employment close to their residential locations. With better opportunities for employment, it would improve the household income by increased number of employed members within a family or community.

Public-private partnerships: The encouragement to locally embedded business systems by the local governments through provision of common institutions and common infrastructure enables competition within the local economy thereby contributing to local economic development. This comparatively new approach is known as cluster approach. The private sector can act as an interface between the government and the local population through provision of skills training,

finding ties with external private support and as information and support installation. In most developing countries, the agro-industries can also be encouraged through incentives from the government to spearhead rural economic growth, which can find markets in urban areas. The self-reliance in food sector would only help the overall growth of the region.

Multi sectoral approach: Emphasizing on only one sector would not solve all the problems. It has to be a combination of all three-regional, economic and spatial strategies. In addition, all sectors need to be given priority simultaneously such as infrastructure, land, agriculture, health and education to deal with the underlying reasons of poverty such as urban and rural landlessness, unemployment and underemployment.

3.8 Urban-rural linkages and climate-related hazards

Changing urban-rural interactions affect the livelihoods of low income and vulnerable groups in urban and rural settlements. This is an important rationale in considering urban-rural interactions in understanding employment and disaster together. There is a scenario of urban biases in this relationship, which needs to be changed to a homogeneous network relationship to assist urban and rural areas to sustain the stress caused by disasters in unison. The developmental growth of metropolitan areas, vulnerable to natural hazards, can be sustained if, in addition to the consideration of the attributes of the relationship of development and urban-rural linkage, there is emphasis on how these linkages behave in disaster situations. Also, the role of community needs to be strengthened to build their occupational resilience, including adopting appropriate technologies while making the most of traditional knowledge, and diversifying their livelihoods to cope with current and future climate stress and develop “Disaster proof activities” (UNFCC 2009).

The poverty stricken urban communities fail to gather resources to withstand a shock and pre-existing stresses erode resilience and increase vulnerability of the population in a slow manner, over a long period of time. At the same time, the villages are becoming vulnerable as well, due to lack of infrastructure, scattered population, lack of disaster management capabilities and limited alternative employment opportunities. There exist complex linkages between the shocks and stresses of disasters in urban and rural areas, which affect displacement and employment.

Poverty, employment and climate related hazards have a strong correlation. The push factors associated with hazards and disasters range from lack of access to material assistance and protection, access to employment or other income sources, the degree of damage to property and livelihood assets, lack of safety and security, availability of natural resources, pre-existing socioeconomic/political context, previous migratory patterns, and scale of damage. The research done by Belcher and Bates (1982) discusses the impact of a disaster as a “push” to leave the area

and to see the event as an opportunity creating a reason to move and as a catalyst for personal betterment. For example, during the year 2000 drought in Bolangir district of Orissa, India, nearly 60,000 people migrated to the neighboring state of Andhra Pradesh in search of food and work (Naik, Stigter and Laczko 2007). Similarly, an annual disaster, such as flooding, in Bangladesh leads to temporary migration to urban areas or abroad (Naik et al. 2007). Majority of the reports on the after effects of disasters suggest that most migrants were compelled to seek employment through migration because the natural disaster had intensified traditional poverty in their villages of origin. It is critical to note that in most cases, migration is a response to the increase in poverty and limited employment opportunities caused by natural disasters, and not directly by the hazard itself (Naik et al. 2007).

3.9 Summary

The traditional definitions of “urban” and “rural” have been challenged with growing complexity of urban systems. Conventional urban activities like manufacturing are sometimes found in rural settings, while urban agriculture has become a worldwide phenomenon to tackle the urban heat islands. Modern technologies and globalization is causing unprecedented linkages between geographical spheres. These overlaps of boundaries and exchange of inherent activities, demand a precise diagnosis of linkages.

In the approaching decades, the quality, magnitude, nature and frequency of urban-rural linkages would determine the future distribution of population, their growth and well-being. Therefore, the future of human settlements in developing countries would depend on urban-rural positive interactions, which are also the countries where majority of the demographic change is concentrated in the next four decades. Funnell (1988) stresses upon the fact that there is a need for theoretical classification set within specific historical circumstances of a particular region. The same holds true in the present. This allows case by case evaluation of the mechanism of exchange between the urban and rural. The framework needs to be adapted considering appropriate categories of interactions as per the critical matters for the case. The framework provided in this chapter has the potential to be extended into sub-elements for quantitative assessment. Based on an empirical analysis, the observed relations between settlements can be identified over a period of time. Such analytical results would help to identify the loopholes and bottlenecks for positive urban-rural interactions. Furthermore, the urban and rural area can be interlinked to achieve growth through the ‘medium of governance’, a parameter which takes into account all the other parameters, as discussed in this chapter.

It may be argued that complex social relations cannot be converted into a simple categorization of explanatory variables. However these variables provide an understanding of continuum of relationship rather than divide the two geographic areas as per their characteristics. The aim of

such a framework is to provide an insight into the social transformation associated with the urban and rural areas, which would enable the decision makers to mould, if not control, the future growth benefitting both the domains.

The decision makers, however, need to be careful to consider the rural settlements which are overlooked, when a strong network is established between certain urban, peri-urban and rural settlements. In this age of globalization, there is an increased need to stop the marginalization of the rural area from the region's growth. The endeavor should be to include these neglected rural communities and new linkages be suggested to mainstream the lagging areas. Nonetheless, the overall development has to be 'urban-centric', careful enough not to be 'urban biased' as was the case with development post World War-II in the developed countries (London and Smith 1988).

The relationships between the urban and rural area are undergoing transmutation (Bah et al. 2003), and influencing not only those living in cities but also those who are directly or indirectly reliant on urban prosperity. The urban and rural poor rely on daily wages, and are most vulnerable to disaster. Their lives come to a standstill if they lose their productive assets to earn. They are also deprived of their employment either due to closure of the factories and enterprises, or due to non-availability of resources for industries or agriculture. As they have small earnings, they fail to have savings to sustain through the disrupted days. Therefore, in order to minimize the effect of disasters, occupations need to be more resilient. The ensuing chapter 4 discusses this vulnerability of the occupations across spatial domains in the wake of climate-related hazards and how they can be made more resilient.

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Chapter 4

Climate-related Hazards in Gujarat

This chapter deals with the climate related hazards experienced by the state of Gujarat, India. It further elaborates on the hazard profile of Gujarat with special focus on floods and salinity issues in the state. These distinct hazards show different characteristics in urban and rural scenarios. It also explores the theoretical relationships between climate adaptation and disaster risk reduction. The occupations of the population have distinct relationships with these hazards which are discussed in the next section. The role of the stakeholders is also discussed to gauge their potential and scope in disaster risk reduction.

4.1 Introduction

A geographical area is exposed to two types of risks: shocks and stresses (Sharma, Surjan and Shaw 2011). A shock is defined as an event whose likelihood of occurrence and the consequent effects are unknown, unplanned for, and unmapped. These sudden events impact the vulnerability of a system and its components (DFID 2011). These include weather-related and geophysical events including floods, cyclones, landslides, droughts or earthquakes, flood tsunami and man-made hazards like fire, bomb blast, conflicts, economic volatility or an unexpected accident. On the other hand stress is a long-term trend that counteracts on the potential of a system and thereby increases the vulnerability of actors within it (DFID 2011). These may include degradation of natural resources, loss of agricultural production, urbanization, sea level rise, climate change impacts, demographic changes, political instability, economic decline, poverty, slumming, or soil salinity.

The Indian cities, including Gujarat's cities, are experiencing certain transformations that regulate the regional growth patterns. Amidst the economic growth of the country and its citizens, the urban transformations are inevitable (Revi 2007). These are primarily of three types: 1) demographic transition; from the current 1.21 billion to a population of 1.6 billion in 2060s, 2) rural to urban transition; an addition of around 500 million people in approximately 7000 to 12000 settlements, and 3) environmental transition; brown (water, sanitation and environmental health), grey (air and water pollution) and green (climate change) transitions (McGranahan et al. 2007). It also necessitates that the climate change risks should be seen in conjunction with these continuing urban transformative processes. The extraordinary "development transition" (Revi

2007) would have repercussions on the regional constituents, primarily on the villages in the vicinity of strong urban centers, which needs to be apprehended. There would be certain positives associated with this alteration. However, the associated advantages and disadvantages need to be channelized for the benefit of each constituent in the wake of probable climate change threats.

4.2 Climate-related hazards and disaster risk reduction

According to Wahlstrom (2009), 76% of all disaster events were hydrological, meteorological or climatological in nature over the last two decades (1988–2007) which accounted for 45% of the deaths and 79% of the economic losses caused by natural hazards. Hoppe and Pielke (2006) concluded that climate change and variability are factors that influence trends in disasters, while noting the importance of increasing vulnerability. Hence the adaptation to extreme weather events would play a central role in reducing societal vulnerabilities to climate and climate change.

4.2.1 Climate-related hazards

Hazards are defined as “a potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation” (Yamin et al. 2005). These hazards can have natural origins or be induced by human processes and can also include certain unknown conditions that may induce future threats. For example, due to change in monsoon, the El Nino amplitude increases, the thermohaline circulation weakens, sea level rises at unanticipated rates or droughts in impoverished semi-arid zones lead to social unrest (Obersteiner 2001). IPCC (2001) stated that the impacts of climate variability, demonstrated by floods, droughts, unseasonal rains and extreme events, not only create immense developmental challenges for developing countries but also pushes the poorest communities to the brim due to their dependence on climate sensitive economic sectors, such as rain-fed agriculture, and their limited economic, technological and human capacities.

A significant number of natural hazards are shaped and determined by the climate of a region. With the drastic change predicted in the global and regional climate (IPCC 2007, IPCC 2014), there are ought to be a higher number of climate related events. Climate change increases disaster risk by causing changes in magnitude and frequency of extreme events. It also changes the climatic variability and conditions generating new threats in certain regions. This renders the

present coping and response mechanisms inadequate and inefficient to cope up with the renewed challenges. The climate-related events threaten the development of human societies and natural ecosystems; cause reduction in water and food availability; and changes to livelihood. In brief, these events cause ‘economic, social, and environmental bankruptcy’ (Obersteiner 2001). The impacts are felt more at the individual, familial and community level. Various components of livelihood such as agriculture, fisheries, and livestock are also negatively influenced, requiring strengthening of adaptive capacities of these communities and the governments in developing countries (Adger et al. 2003).

There have been three major approaches to the study of natural hazards (Adger 1998). These are: 1. engineering approaches to hazard management; stresses on objective risk, 2. related social science approach; stresses on the management of such risks by institutions such as governments and NGOs, and 3. a critique of both of the previous two approaches; stresses on the structural social causes of vulnerability to hazards (Adger 1998). This research focuses on the third approach in both the cases of coastal salinity and floods.

4.2.2 Disaster Risk Reduction

Disasters

Climate-related hazards do not cause disasters by themselves; it is the combination of an exposed, vulnerable and ill prepared community with a hazard event that results in a disaster. Simply put, a disaster is the sum of hazard and vulnerability (Cannon 2000). Disaster has been defined differently by various researchers from different fields (Perry 2007). Nevertheless, there are two important attributes to a disaster event which define them; the time period and the scale of the impact.

“A disaster is a destructive event which, relative to the resources available, causes many casualties, usually occurring within a short period of time” (Rutherford and de Boer 1983). It can also cause a loss of property, damage to infrastructure and critical services, and means of livelihood on such a scale that inhibits the normal recovery of a community without any aid. It is defined comprehensively by UNISDR (2009) as “a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources”. However, Quarantelli (1987) argues that there cannot be a single universal definition for disaster applicable for all the cases. Kroll-Smith and Gunter (1998) also advises the

sociologists to source out the definition of disaster from those who experience it, as per the context. This is true as every event is unique in regards to loss, the scale of the impact, the profile of the victims, and many other factors.

On one hand, when ill-managed or inadequately prepared for, the climate-related hazards can easily transcend into disasters of grand scale (World Meteorological Organization 2004). On the other hand various literature and examples (Adger et al. 2007, Adger et al. 2009 and Schneider 2007) prove that the measures can be taken to prevent climate-related hazards from becoming major human catastrophes.

Types of Disasters

Disasters are categorized on the basis of a number of criteria such as cause and origin, the initiation time, and the period of effect (Rutherford and de Boer 1983) (see Table 4.1). A series of man-made disasters have been added to the increasing natural disasters (IPCC 2007) due to “the interaction of crowded humanity and escalating energy” (Rutherford and de Boer 1983). These events can expose large regions to disastrous weather phenomena like strong winds, storm surges, various forms of precipitation such as heavy flood producing rains, heavy snowfall, freezing rain, and coastal flooding and extreme hot or cold temperature conditions for periods of several days. The High Powered Committee on Disaster Management set up by Government of India in August 1999, under the chairmanship of Dr. J. C. Pant had classified disasters into five major types (as shown in Table 4.2 (GOI 1999). This research deals with the Category I (Water and Climate related) disasters. The varied spatial and temporal scales of these hazards make them different from the short-lived, fast onset phenomena.

Table 4.1 Disasters categorized as per origin and cause

Man-Made	Naturally-occurring
Traffic	Earthquake
Explosion	Flood
Collapse	Hurricane
Fire	Volcanic eruption
Poisonous gas	Avalanche
Panic	Meteoric collision
Civil disturbance	Drought
Nuclear accidents	Epidemic

Source: Rutherford and de Boer 1983

Table 4.2 Government of India's disaster classification

I. Water and Climate related disasters	II. Geologically related disasters	III. Chemical, Industrial and Nuclear related disasters	IV. Accident related disasters	V. Biologically related disasters
1. Floods and Drainage Management	1. Landslides and Mudflows	1. Chemical and Industrial Disasters	1. Forest Fires	1. Biological Disasters and Epidemics
2. Cyclones	2. Earthquakes	2. Nuclear Disasters	2. Urban Fires	2. Pest Attacks
3. Tornadoes and Hurricanes	3. Dam Failures/ Dam Bursts		3. Mine Flooding	3. Cattle Epidemics
4. Hailstorm	4. Mine Fires		4. Oil Spill	4. Food Poisoning
5. Cloud Burst			5. Major Building Collapse	
6. Heat Wave and Cold Wave			6. Serial Bomb Blasts	
7. Snow Avalanches			7. Festival related disasters	
8. Droughts			8. Electrical Disasters and Fires	
9. Sea Erosion			9. Air, Road and Rail Accidents	
10. Thunder and Lightning			10. Boat Capsizing	
			11. Village Fire	

Source: GOI 1999

Disaster Risk Reduction

Disaster risk reduction is defined as “the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events” (UNISDR 2009). Disaster risk reduction approaches consider factors such as the frequency (or probability), intensity, nature of the physical hazard and the exposure of communities to such hazards as key components of vulnerability.

Pelling and Schipper (2009) define disaster risk reduction as the development and application of policies, practices and strategies that minimize vulnerabilities. It also includes measures taken to protect livelihoods and assets of communities and individuals from the adverse impact of hazards (UNISDR 2008), disaster education, early warning systems, emergency management plans, building codes, promotion of risk wise behavior and identification of vulnerable sectors of society including groups and infrastructure and produce plans that address their special needs (Applegate 2008 in McBean and Ajibade 2009).

The climate hazards impact human settlements causing major loss of life, social disruption and economic hardship. This approach gives significance to infrequent but extreme events and focus on delineating hazard-specific vulnerabilities. However, lesser weightage is given to existing embedded vulnerabilities and the role of socio-economic conditions and power relations in structuring such vulnerabilities. Vulnerabilities exist in communities prior to and independently

of hazards. Social vulnerability approach is an alternative approach which assesses the vulnerabilities engrafted in the social and political order (Yamin et al. 2009). It keeps the communities' coping strategies and socio-economic structures at the center of assessment.

Vulnerability to climate-related hazards can be addressed through a combination of two broad approaches: disaster risk reduction (DRR) and climate change adaptation (CCA) (Birkmann et al. 2009). There is unanimity amongst scholars that climate change adaptation must be linked with disaster risk reduction to achieve the goals of sustainable development (McBean and Ajibade 2009, Venton and La Trobe 2008). The two approaches have a lot common in their scope and objectives. They both aim to achieve stronger resilience and reduce vulnerability of the communities affected by the hazards or disasters, by improving methods to anticipate, resist, cope with and recover from their impact. They also share their nomenclature and conceptual notions, and their activities and long term planning strategies. A holistic approach that tackles the proximate and root causes of vulnerability and hazards will require shared knowledge, tools, method and information from both communities is required.

4.3 Profile of Gujarat state

The state of Gujarat is the fastest growing state in India (TOI 2010) and a major engine of the country's economic growth. Gujarat is situated on the northwest coast of India bordered by the Arabian sea in the west, state of Rajasthan in the north and northeast, and by Maharashtra in the south and southeast. Gujarat has an area of 196,024 km² with 41 urban agglomerations, 242 towns, and 18,066 villages.

4.3.1 Demographic profile

The state of Gujarat is situated on the north-west coast of India bordered by the Arabian Sea in the west, state of Rajasthan in the north and north-east and by Maharashtra in the south and south-east. It has a population of 60 million people, out of which 34 million are rural and close to 26 million urban (Census of India 2011) (see Table 4.3). The stage is set for equilibrium of urban-rural population, in the near future, as the urban population growth was approximately 36% against the 9% rural growth from year 2001 to 2011. As the onus of urbanization on urban areas is increasing day by day in India, the need to accommodate exploding population is also increasing.

Table 4.3 Gujarat demographic data, 2011

Variable	2011 Census
Population Size	60439692
Population size (Males)	31491260
Population size (Females)	28948432
Population size (Rural)	34694609
Population size (Urban)	25745083
Population density (Total, Persons per sq km)	308
Sex ratio (Females per 1000 males)	919
Sex ratio (Rural)	949
Sex ratio (Urban)	880
Literates, 7+ yrs	41093358
Literates, 7+ yrs (Males)	23474873
Literates, 7+ yrs (Females)	17618485
Literates, 7+ yrs (Rural)	21420842
Literates, 7+ yrs (Urban)	19672516
Literacy rate, 7+ yrs (Persons, Per cent)	78.03
Literacy rate, 7+ yrs (Males, Per cent)	85.75
Literacy rate, 7+ yrs (Females, Per cent)	69.68
Literacy rate, 7+ yrs (Rural, Per cent)	71.71
Literacy rate, 7+ yrs (Urban, Per cent)	86.31

Source: Census of India 2011

4.3.2 Hazard profile

Gujarat is a state which has seen both natural disasters, such as earthquake, cyclones (Bhuj earthquake 2001), and climate related disasters, such as frequent floods (Surat floods 2006) and droughts (Gujarat is susceptible to droughts once in every three years). These disasters occur with alarming regularity. As the onus of urbanization on urban areas is increasing day by day in India, the need to accommodate exploding population is also increasing. Gujarat State Disaster Management Authority (GSDMA) identifies the following hazard risks to the state of Gujarat:

Cyclone Risk:

The hazard risk profile of Gujarat indicates that the entire eastern coastline of the state right from Kotesware in Kutch till around Bhavnagar coast including Junagadh district, the entire coastal area falls under high intensity cyclone hazard zone. The sea coast from Khambhat to Umargam area falls under the mediate zone (see Figure 4.1). Most of the cyclones affecting the State are generated in the Arabian Sea. They move North-East and hit the coast particularly the Southern Kutch and Southern Saurashtra and the Western part of Gujarat. Over 120 cyclones originating in the Arabian Sea had passed through Gujarat over a period of 100 years (GSDMA 2014) (Also see Table 4.4).

Table 4.4 Damage due to Kandla Cyclone, 1998

No. of talukas affected	93
No. of villages affected	3378
Population affected	55904

Source: Revenue Department, Government of Gujarat, 1998

Drought Risk :

Gujarat is one the chronic drought prone State of India, with an average annual rainfall about only 700 mm with more than half of the Talukas of Gujarat receiving rainfall within the range of 200-400 mm. Substantial portions of the State are arid to semiarid. With large parts of North Gujarat and Saurashtra having no sources of alternate irrigation, drought vulnerability increasing with groundwater overexploitation. Falling water tables put added stress on crops and water supplies (see Figure 4.2 and Table 4.5).

Table 4. 5 Incidents and impacts of Droughts in Gujarat

Year	Districts affected	Talukas effected	Villages affected	Area affected	Population affected
1973-74	42.11	29.35	14.38	22.85	10.72
1974-75	84.21	84.24	70.71	65.61	60.09
1979-80	15.79	7.61	10.08	6.06	6.24
1982-83	57.89	53.80	47.27	81.16	21.12
1985-86	89.47	84.24	74.27	68.62	51.84
1986-87	84.21	94.57	64.89	57.60	48.80
1987-88	89.47	90.76	86.39	87.31	66.62
1999-00	68.00	69.20	52.41	46.94	37.82
2000-01	92.00	88.84	72.93	57.67	39.23
2002-03	56.00	51.79	33.90	34.28	18.46
2004-05	12.00	3.57	3.47	3.35	1.27

Source: Directorate of Relief, Gujarat State, Gandhi agar, 2004-05

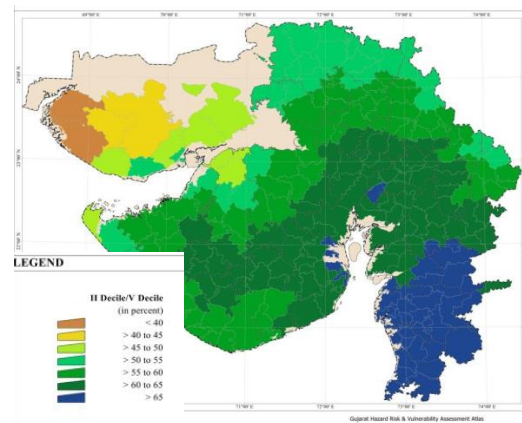
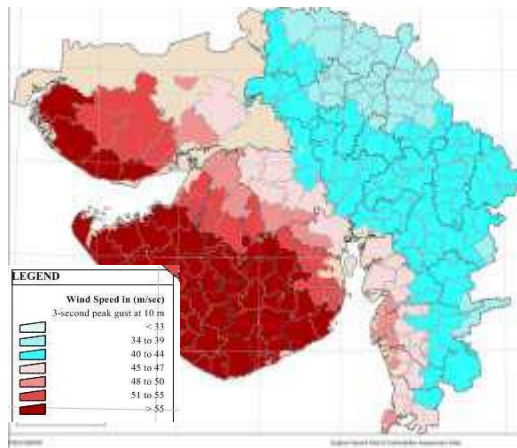


Figure 4.1 Gujarat Cyclone Risk Zonation Map - Figure 4.2 Gujarat Drought Risk Zonation Map
100 Year Return Period

Flood Risk:

Floods are characterized as long, short or no warning. The main season for floods in India is the south-west monsoon period of June to September though floods occur in some parts of the country in the pre-monsoon season (March-May) and post-monsoon season (October-December) also. Heavy rainfall on successive days in the upper catchment of a river basin is the main cause of the flooding in rivers. As seen from the flood hazard risk map of Gujarat (Figure 4.3), the majority of the area of Gujarat is flood prone, irrespective of the size of the catchment. All major rivers in the State pass through a wide stretch of the very flat terrain before reaching the sea. These flat lowlands of lower river basins are prone to flooding (see Figure 4.3 and Table 4.6). Cities like Ahmedabad, Surat and Bharuch are located on the flat alluvial plains of large rivers.

The problem of flood management revolves around two aspects – structural measures and non-structural measures. Having realized that using traditional engineering methods it is not possible to control floods completely, non-structural measures aim at reducing flood damage by involving people. Long-term measures are execution of watershed management and major flood control works such as raising of flood control structures, land-use regulations, evacuation, emergency equipment, strengthening of forecasting, monitoring and warning system and public awareness. Medium term measures are bank protection, river training and anti- erosion works. Short-term measures are assessment of vulnerability of the flood control structures, strengthening the existing embankments and other flood control works; cleaning, de-silting etc.

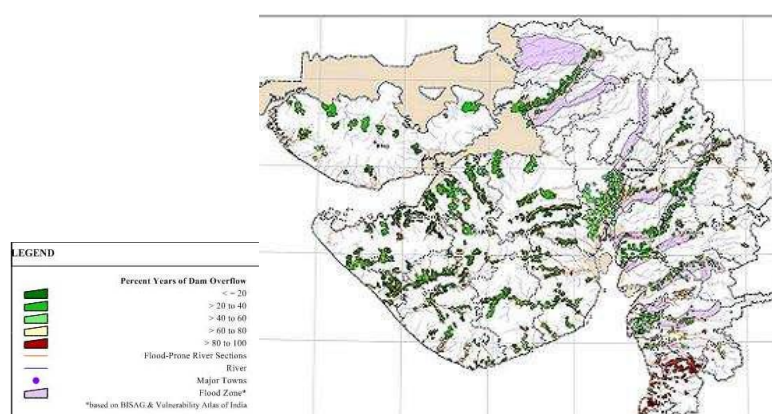


Figure 4.3 Gujarat Flood Risk Zonation Map

Source: Gujarat Hazard Risk & Vulnerability Atlas (2005)

Table 4.6 Magnitude and impacts due to Gujarat Floods in 2005

Number of districts affected	20
Number of severely affected	15
Geographical area affected	70%
Population affected	2 million

Source: Multi-sector Damage Assessment Report Gujarat Floods July- 2005

Coastal Salinity Risk :

Even though GSDMA does not identifies coastal salinity as one of the hazard in its State Disaster Management Plan, but its scale and its impact is of magnanimous nature. Therefore the author believes that it should be addressed at par with other hazards in the state. Over 1200 villages in eight coastal districts in Saurashtra and Kutch region have been affected by salinity (see Figure 4.4). In addition, 1.06 million Ha of land along 1,125 Kilometers of coastline and over 1.8 million households have been affected. This phenomenon and its impacts on occupations have been discussed in detail in Chapter 6.

For the purpose of this study, two climate-related hazards were selected as the author wanted to investigate the effects of two hazards which differ on temporal scale. Therefore a short-term hazard like floods was selected, and the other a long-term hazard such as coastal salinity. Moreover, it is interesting to study these two hazards in different regional settings- Ahmedabad is a second tier city, while Jamnagar is a third tier city as per Government's classification. These two regions present different aspects of urban-rural linkages.

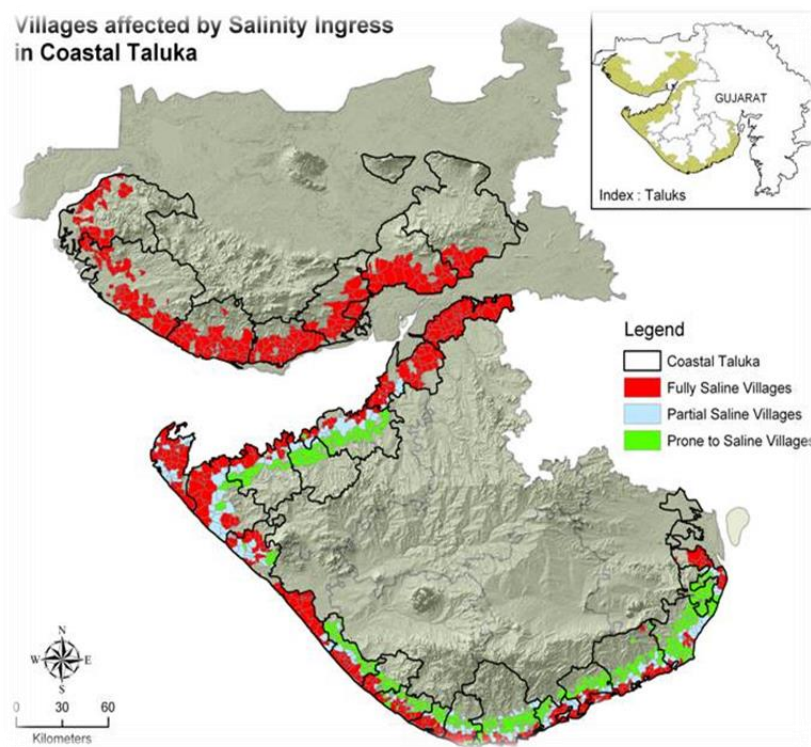


Figure 4.4 Villages in Gujarat state affected by salinity (Red color shows fully saline villages)

Source: CSPC 2006

4.4 Disaster impacts on employment in Gujarat

Local economy gets adversely affected when a natural hazard or a disaster strikes. Not only are lives lost to these disasters, but there is also loss of livelihood sources and productive assets. People find it hard to recover from the mental abasement caused. Additionally, disasters influence normal life for an extended period of time, through “ripple effects” such as unemployment, inflation, and overall production (Banuri 2005). Major occupations such as farming, fishing, small trade, micro and small enterprises in the formal and informal sector, all get hit and paralyzed. The damage is maximum for self-sustaining small scale industries relying on indigenous resources. The economic and social environment suffers a virtual collapse with the enterprises running on loans; find it hard to repay their loans, thereby experiencing a halt to income generation (FAO-ILO 2007).

Bhuj earthquake, 2001 in the Kutch region of the Gujarat state serves as a good example to comprehend the impact of a disaster on the local economy. Approximately 10,000 small and medium scale industrial units were shut down due to the damage to plants, factories and machinery. For example, the major victims were ceramic units in Morbi and Surendranagar, art

and small tools industry in Kutch, thousands of salt pans in the coastal areas, and diesel engine manufacturing and the machine and tools industry in Rajkot. Additionally, more than 50,000 craftspeople from Bhuj, Anjar, Rapar, and Hodka lost their livelihood to the damage (Vatsa 2001).

The urban and rural poor, mostly relying on daily wages, are most vulnerable to disaster. They are deprived of their employment due to loss to their productive assets to earn, closure of the factories, enterprises, or non-availability of raw materials for agriculture or industries. Due to their small earnings, they fail to amass savings to sustain themselves through the disrupted days. Another issue is that there is often only one sole earner in these families and due to demise of this principal earner the dependent family members find themselves without support. In most of the cases, these small earners are not identified by government agencies as they mostly belong to informal sector of economy, and hence are omitted from most of the beneficiary programmes or development objectives. With the diversification of jobs in India, there has been immense growth in number of jobs in informal sector in the cities. For example, a study in 1997-98, on the income and employment in the city of Ahmedabad indicates faster growth of employment in informal sector than the formal sector (Rani and Unni 2002). Even the assistance from government and non-government organizations for the population engaged in petty occupations in informal sector has failed to cast an impact in the long run. Therefore, the right strategy to minimize the effect of disasters would be to make occupations more resilient which would lead to economic empowerment of the poor sections. This would help them to break away from the cycle of poverty. Only then would the benefits of the development be shared and sustained by all.

The key linkages between the issues related to employment and disasters in Gujarat are:

1. There is an existence of a large informal sector in urban areas unrecognized by the formal institutions of government. This segment often is not considered by recovery and relief plans by the government.
2. The village economy is mainly based on primary sector like agriculture. Therefore disruption in agriculture and allied activities due to disaster paralyzes the livelihood base for a large part of the rural population.
3. The majority of rural, peri-urban and urban population in India is linked with household industries in the absence of ample formal jobs. Disaster at times disrupts the production in these industries by damaging the assets used to earn a living.

4.5 Role of various stakeholders in Gujarat in Risk Reduction

The following stakeholders have been working separately for risk reduction of the communities in urban and rural Gujarat:

4.5.1 Gujarat's Institutional Framework for Risk Reduction

Gujarat State Disaster Management Authority (GSDMA)

GoG will have the prerogative to define the occurrence of a disaster and define the boundaries of the disaster-affected site by issuing a disaster declaration. The declaration can be made on the recommendation of SRC or DC. Gujarat State Disaster Management Authority (GSDMA) was established and registered as a 'Society' under the provisions of the Societies Registration Act and the Bombay Public Trust Act on 8 February 2001 immediately after the 26th January 2001 earthquake. GSDMA was initially mandated to implement the task of rehabilitation and reconstruction programme in the earthquake affected areas of the State and simultaneously act as a nodal agency to plan and implement pre-disaster preparedness and mitigation activities including training and capacity building of all the stakeholders involved in disaster management. After the passage of Gujarat State Disaster Management Act – 2003, the Society constituted earlier as GSDMA was dissolved under Section 49 of the Act, and the Statutory Authority under Sub-Section 1 of the Section (6) came to an existence with effect from 1st September, 2003. It has an organizational structure as shown in Figure 4.6 with Chief Executive Officer (CEO) at the top with Directors and Sector managers to assist him/her. The objectives of GSDMA as listed in **GSDMA Act 2003** are :

1. To undertake social and economic activities for rehabilitation & resettlement of the affected people that would include new Housing, Infrastructure, Economics Rehabilitation, social Rehabilitation and other related programme.
2. *To prepare programmes and plans to mitigate the losses on account of disasters as a strategy for long terms disaster preparedness.*
3. *To undertake research and study regarding causes for losses on account of natural disaster and to suggest remedial measures for minimizing the same.*
4. To obtain funds for rehabilitation and resettlement and to ensure optimum utilization of these funds obtained in the form of grant, aid, assistance or loan from Government of Gujarat, Government of India, World Bank and ADB, USAID, DFID, IFRC, and donors, NGOs, and from financial institutions, Public and private trusts or any other organizations.

5. To manage Gujarat Earthquake Rehabilitation and Reconstruction Fund.
6. To act as a nodal agency and to co-ordinate various issues relating to the deserving victims out of the funds, either directly or through a common fund created for these purpose in any other feasible mode.
7. To provide to arrange financial assistance so as to achieve the objects of the society.
8. To raise money through financial instruments, bonds, deposits or such other manner may be permissible under the provision of Societies Registration Act, 180 and the Bombay Public Trust Act 1950.
9. To develop approach, philosophy, policy guidelines and action plan and other relevant aspects for meeting out disaster of any kind; Management , Administration, Investment and reinvestment of funds out of sale proceeds received from the sale of land, buildings, equipment, furniture, fixtures, debris or any other things or articles or infrastructure.

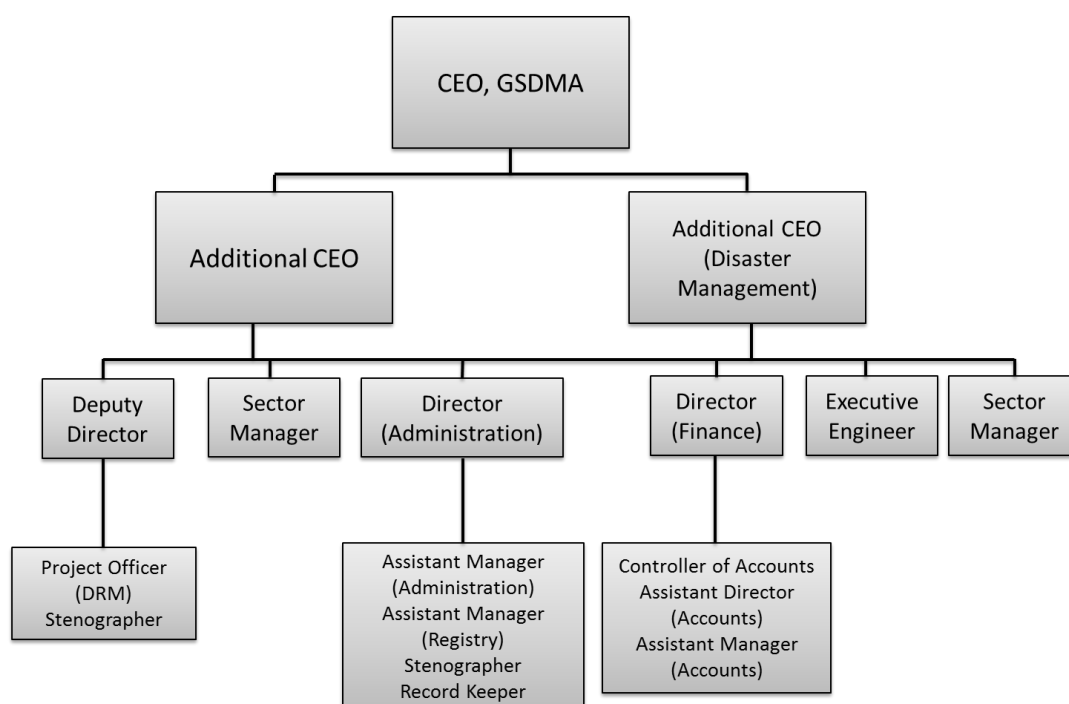


Figure 4.5 Organizational Structure of GSDMA

10. To act as a nodal agency and to coordinate various issues related to the maintenance of hygienic living conditions, welfare of victims, environmental maintenance and such other welfare measures, as may be assigned to the deserving authority.
11. To do all the acts and things conducive for the attainment of the above objectives in the most possible manner, which are relevant to fulfill the objects of society.

Here objectives 2 and 3 are of special interest as they focus on risk mitigation and remedial measures for minimizing the losses due to natural hazard.

GSDMA Policy :

The Gujarat State Disaster Management Authority (GSDMA) provides guidelines to various entities involved in disaster management in the state to discharge their responsibilities more effectively. With this in view, the GSDMA has formulated the Gujarat State Disaster Management Policy ('GSDMP' or 'the Policy'). The strategy for implementing the GSDMP emphasizes an integrated approach to disaster management, covering the following phases of managing disasters as essential components of any disaster management program:

- Pre-disaster Phase
- Disaster/ Impact Phase
- Post-disaster Phase

Pre-disaster Phase –

The key activities identified under this phase are : Planned development, Development of policies and guidelines, Establishing a proper chain of command, Risk assessment, Develop disaster management plans, Develop repositories of information, Establish communication and technology networks, Developing early warning mechanisms, Establish flexible procedures, Building capabilities and expertise, Capacity building, Health and medical care, Knowledge management, Funds generation and Identifying avenues for risk sharing and transfer. Importantly, the Risk Assessment encompasses following two aspects:

- Hazards: Classification of the region into zones based on hazard potential; and
- Vulnerability: Assessment of degree of vulnerability of any given structure/ people / region to the impact of the hazard.

Disaster/ Impact Phase –

The key activities identified under this phase are : Search and Rescue, Subsistence, shelter, health and sanitation, Infrastructure and essential services, Security, Communication, Preliminary damage assessment, Funds generation, Finalizing relief payouts and packages and Post-relief assessment.

Post-Disaster Phase – Roles of relevant agencies

The post-disaster phase will mainly comprise reconstruction and rehabilitation activities. It includes: Detailed damage assessment, Assistance to restore houses and dwelling units, Relocation (need based), Finalizing reconstruction & rehabilitation plan, Funds generation, Funds

disbursement and audit, Project management, Communication, Dispute resolution mechanisms and Implementing initiatives for recovery of reconstruction costs. Importantly, damage assessment addresses reconstruction, and rehabilitation, housing, industry/ services, infrastructure, agriculture, health/ education assets in the affected regions. However, the role of community groups and voluntary agencies in this phase is limited to the works related to rehabilitation and reconstruction.

Disaster Risk Management (DRM) Programme

DRM is one of the major initiatives of Gujarat State Disaster Management Authority to build/strengthen capacity of various stakeholders for an effective response during disasters. The DRM Programme is formulated with a goal of sustainable reduction in disaster risk in most hazard prone districts in Gujarat state. The programme activities are designed in a way which supports capacity building to institutionalize the system, undertake environment building, education, awareness programmes on different facets of disaster management including strengthening of human capacity at all levels in disaster risk management and sustainable recovery.

The DRM Programme is aiming at strengthening of response, preparedness and mitigation measures through a variety of activities at various administrative levels. Considering the impact of DRM Programme activities, GSDMA included DRMP as a new scheme and made financial provision in state budget since 2007-08 considering implementation of exit strategy of UNDP in the year 2008. GSDMA started utilizing state government resources and made necessary arrangements to maintain flow of DRM Programme activities across the state.

GSDMA focuses on disaster prone districts of the state for strengthening of response, preparedness and mitigation measures. In order to ensure effective implementation of programme activities, GSDMA has appointed District Project Officers (DPOs) at district level who is working under the direct supervision of the respective District Collector. The DRM Programme initiative includes:

1. Development of disaster risk reduction and response plan at each administrative level – Village, Municipality, Taluka and District.
2. Creation of Disaster Management Teams and Committees at various levels and their

institutional capacity building through training and hardware resources.

3. Capacity Building for various stakeholders in different subject areas.

4. Updating of national and state level online database i.e. IDRN & State Disaster Resource Network respectively for disaster preparedness and management.

5. IEC materials development for awareness generation programmes as well as training and capacity building.

6. Manual development for trainers and practitioners at different levels.

7. Integration of disaster management plans in to the development plans of local self-governments.

4.5.2 Other Government departments

Central Government Departments

India Meteorological Department (IMD) is responsible for providing meteorological data to the state government (The Meteorological Centre, Ahmedabad (Meteorological Department), a state government entity) on climate-related hazards. Some of the main research and development activities currently in progress are given below:

- All aspects of thunderstorms, local severe storms, tropical cyclones and monsoons.
- Rainfall data analysis and quantitative precipitation forecast.
- NWP and Data Processing
- Satellite and Radar Meteorology.
- Synoptic Climatology.
- Long Range Forecasting.
- Synoptic study of droughts, dry land farming and crop-weather relationships.
- Air Pollution Studies and Urban Climatology.
- Design and development of Meteorological Instruments.
- Climatology of India and neighborhood.
- Air-Sea Interaction over north Indian Ocean..
- Seismology
- Applications of chaos and neural network theories in meteorological problems.

State Government Departments

Coastal Salinity Prevention Cell –

Established in 2008, the Coastal Salinity Prevention Cell is an institutional interface aimed at

effectively addressing the livelihood issues of communities affected by salinity in the state of Gujarat. The Coastal Salinity Prevention Cell is a joint initiative of Aga Khan Rural Support Programme (India), Ambuja Cement Foundation and Sir Ratan Tata Trust. The CSPC has been recognized as an important stakeholder in salinity mitigation initiative by the Government of Gujarat and is convener of the state level Steering Committee established by Water Resource Department, Government of Gujarat.

Coastal Salinity Prevention Cell (CSPC) aims to address the issue of salinity by developing and strengthening various initiatives of the government and civil society organizations, thereby enhancing the quality of life of coastal communities in the state. Its philosophy is to promote greater interaction and learning between practitioners, researchers and policy makers so that the unique problem of coastal salinity is understood, solutions tried out and analyzed and policies and programs modified or formulated to scale up the solutions.

Key functions

1. Knowledge bank on coastal salinity issues: Develop detailed database, new research ideas and innovative concept for field level piloting, gather and document various processes and leanings generated from ongoing field projects, compile research studies, design and disseminate various IEC material and other resource material.
2. Networking and developing linkages with government and other agencies: Develop network with the government, civil society organizations, academicians, research institutes, subject experts and the community.
3. Piloting area-specific innovations and community approaches for addressing salinity related issues: Ideate area-specific pilots to strengthen and sustain the livelihoods of coastal communities.
4. Operating as the nodal agency for Kharash Vistarotthan Yojana (KVY): Co-ordinate, provide technical support and monitor the quality of implementation of different projects supported by the Sir Ratan Tata Trust.

Flood Control Cell

Central Flood Control Cell is under the Revenue Department of state government of Gujarat and is responsible for delineation of flood areas and issuing flood memorandum. Six regional flood cells (at Surat, Valsad, Rajkot, Bhavnagar, Himmatnagar and Ahmedabad) and one Central flood cell at Gandhinagar as well as dam site control rooms are made operational 24X7 from 15th June

to 15th October every year for communication.

Flood forecasting requires understanding of meteorological and hydrological conditions, and is therefore the responsibility of Central Water Commission (CWC).

- Meteorological Center and Flood Meteorological office stationed at Ahmedabad collects information regarding meteorological situation of the State.
- These Hydro Meteorological data are transmitted by flood meteorological office to the Executive Engineer, Mahi Division, (CWC) at Gandhinagar and Executive Engineer, Tapi Division (CWC) Surat as per their specific requirements.
- Meteorological Center also issue heavy rainfall warnings to those officers of Narmada Water Resources Water Supply (NWRWS) and Kalpsar Department. and Revenue Departments of Government of Gujarat who have specifically got their names registered with Meteorological Center, Ahmedabad for receipt of heavy rainfall warning by giving their specific requirements in the prescribed proforma.

Dissemination

- Keeping constant watch over the flood situation, flood warning, monitoring flood discharges through concerned project authorities, formulating flood forecast as and when required conveying these warning including conveying inflow forecast and flood level forecast from CWC. or the case may be in advance to the concerned Revenue and Police authorities for alerting and evacuating people of the area likely to be affected by the incoming floods if necessary.
- On receipt of flood warning the COR will in turn take necessary actions for alerting and evacuating the people likely to be affected in accordance with warning as per Flood Memorandum.

Various other state government departments are engaged in several acts of socio-economic upliftment through the implementation of various policies. These departments are Rural Development department (rural centric employment and welfare schemes), Department of Labor, Gujarat Livelihood Promotion Center (GLPC) (employment schemes – Mission Mangalam and National Rural Employment Guarantee Act (NREGA) programs), Irrigation department (structural measures), and Urban Local bodies (slum upliftment, employment and welfare schemes). However these policies do not constitute a part of recognized risk reduction initiatives. Nevertheless, they often target the population with minimum resources and capabilities and try

to empower them through their respective departmental agendas.

4.5.3 Non-governmental organizations

As with other parts of India, Non-government organizations (NGOs) are involved with environmental and developmental work in the state. They are instrumental in implementation of various government policies and schemes. They provide the link between the state or district authorities and the communities. These NGOs are well versed with the local population where they serve and understand the local socio-economic conditions for better implementation of such programmes. NGOs are active in both Jamnagar and Ahmedabad districts.

4.5.4 Community based organizations

Community-based organizations are seen in various forms in the state of Gujarat, but lesser in number. Gujarat's villages have presence of various dairy cooperatives (associations of dairy farmers) as the dairy production is a vital source of income for the segment of the population engaged in animal husbandry. Similarly there are other occupational associations formed to facilitate their specific activities. Self-help groups are also gaining in number in recent times because of government's efforts in entrepreneurial development. These like-minded groups borrow money from government agencies and invest in small businesses and earn their livelihood. Such groups have given an opportunity to women to diversify their household income. The presence of such community-based organizations speaks volume about the presence of social networks within these communities, and potentially become the medium for sustaining the measures in development and risk reduction fields.

4.6 Summary

The climate-related hazards in Gujarat exist in tandem with other hazard types. Most of the districts in the state have multi-hazard profiles. However, the state of Gujarat does not consider Coastal Salinity as one of the listed hazards in its State Disaster management Plan 2014. This chapter starts with the general understanding of the terminologies of climate-related hazards and disaster risk reduction, and further brings in the hazard and demographic profile of Gujarat. This chapter puts an emphasis on the relationship of hazards with the employment in the state. It also stresses on the existing direct and indirect roles various stakeholders play in the sphere of risk reduction. This chapter lays the foundation for the next two chapters which takes up the case studies of climate-related hazards.

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Chapter 5

Vulnerable Occupations for Floods in Greater Ahmedabad

This chapter puts the parameters, developed in the last chapter, to test through the first case of climate-related hazard of floods in the region of Greater Ahmedabad. The survey had two major steps: key informant survey and the household survey. The key informant survey identified the key issues pertaining to the research. These issues are reflected upon and included in the household survey of the selected study sites. The results of the household survey are presented spatially and then discussed analytically to derive policy directions.

5.1. Greater Ahmedabad and Climate-related hazards

5.1.1. Greater Ahmedabad

Ahmedabad is the economic capital of Gujarat (shown in Figure 5.1). Greater Ahmedabad is a region which has urban, suburban, and hinterland character (shown in Figure 5.2), with multi hazard profile. The area is developed around the city of Ahmedabad, a class A city on the banks of river Sabarmati. Ahmedabad city lies at 23° 03" North and 75° 58" East. Ahmedabad accounts for 7% of the state's total population and around 20% of its urban population (Census, 2001). The population is mostly concentrated in the center in Ahmedabad city (see Figure 5.3).

Ahmedabad Taluka (sub-district) is categorized as one of the 'very high' risk index Taluka in the composite index (GSDMA 2005). The index is calculated taking into account all the hazards identified by the state government. Amongst, climate related hazards, Ahmedabad is prone to drought which has increased with over exploitation of ground water resources. In Ahmedabad alone, 36 water bodies have dried up in the last 28 years. On the other side Ahmedabad is also prone to floods during the months of July to September (GSDMA 2014). Many villages lie on the flat alluvial plains of Sabarmati River and the villages lying on the downstream are particularly prone to floods. For rural Ahmedabad, floods are an annual event.

In the wake of climate-related hazards in Ahmedabad district, the depletion of own resources demands the urban areas to depend on rural areas for resources, and thereby causes conflict of interests. This interdependency is explored and mapped in the urban-rural framework based on the input from literature review and the key informant survey.



Figure 5.1 Location of Ahmedabad district in Gujarat state

URBAN - 190 sq. km. under Ahmedabad Municipal Corporation

PERI URBAN - 9 municipalities on the periphery of Ahmedabad, under AUDA, Bopal and Chatral

RURAL - 150 villages on the periphery

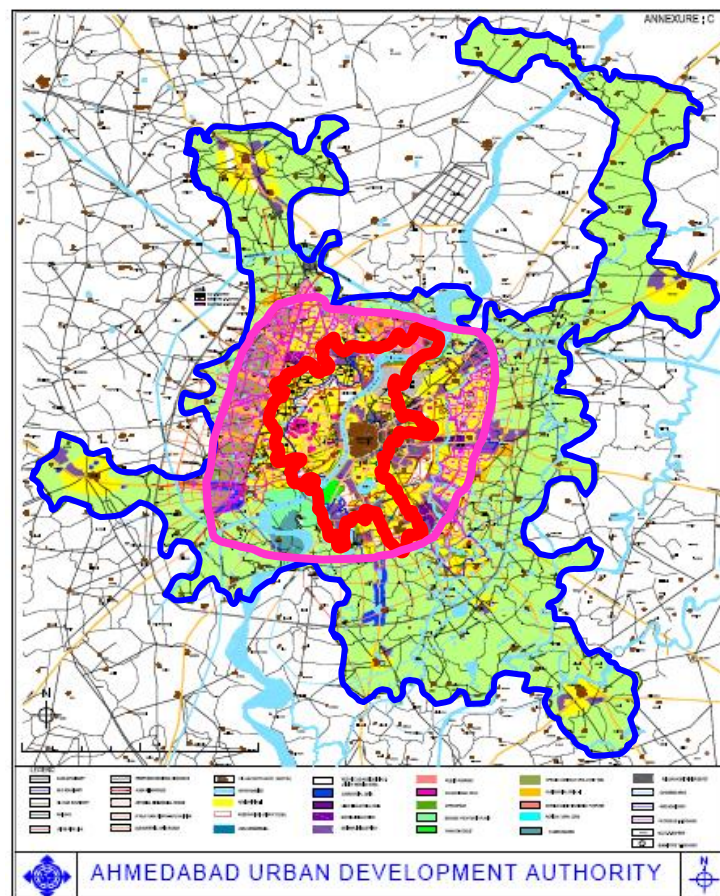


Figure 5.2 Urban-Rural constituents in Ahmedabad Urban Development Authority

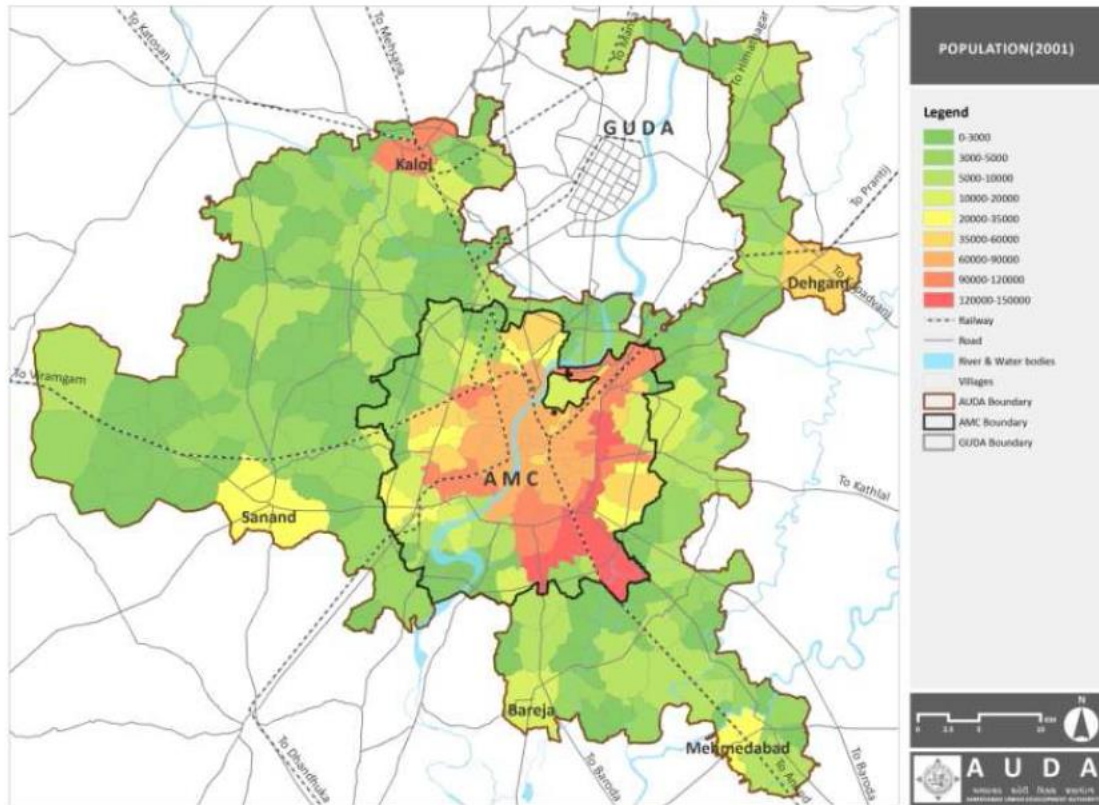


Figure 5.3 Total Population by wards and villages

Figure 5.4 shows the flow of urban-rural elements in Greater Ahmedabad. The flow of people is temporary in nature during the floods. The excess water (natural resource) is plunged to downstream villages from the 'developed' urban areas. The flow of products is traditional where agro products (food) and raw material comes from rural areas to urban areas while finished products flow from urban and peri-urban areas towards the villages. The financial flow is seen from urban areas to rural areas in the form of remunerations for the families with members in rural areas. Recently, the investments are taking place from adjoining rural areas in urban areas. The flow of waste is solely uni-directional encroaching on peri-urban and rural areas in form of landfills. In this age of technology, the flow of information takes place two-ways, but since the policies and programmes are drafted in urban area, the information mostly flows outwards from urban centers, which also defines the flow of governance and government agenda from 'urban' authorities. In Ahmedabad, the social interactions are high within communities which are bounded by similar occupational backgrounds. The villages also exhibit strong social interactions in some cases. The urban-rural dependency is further explored through questions asked in the household survey.

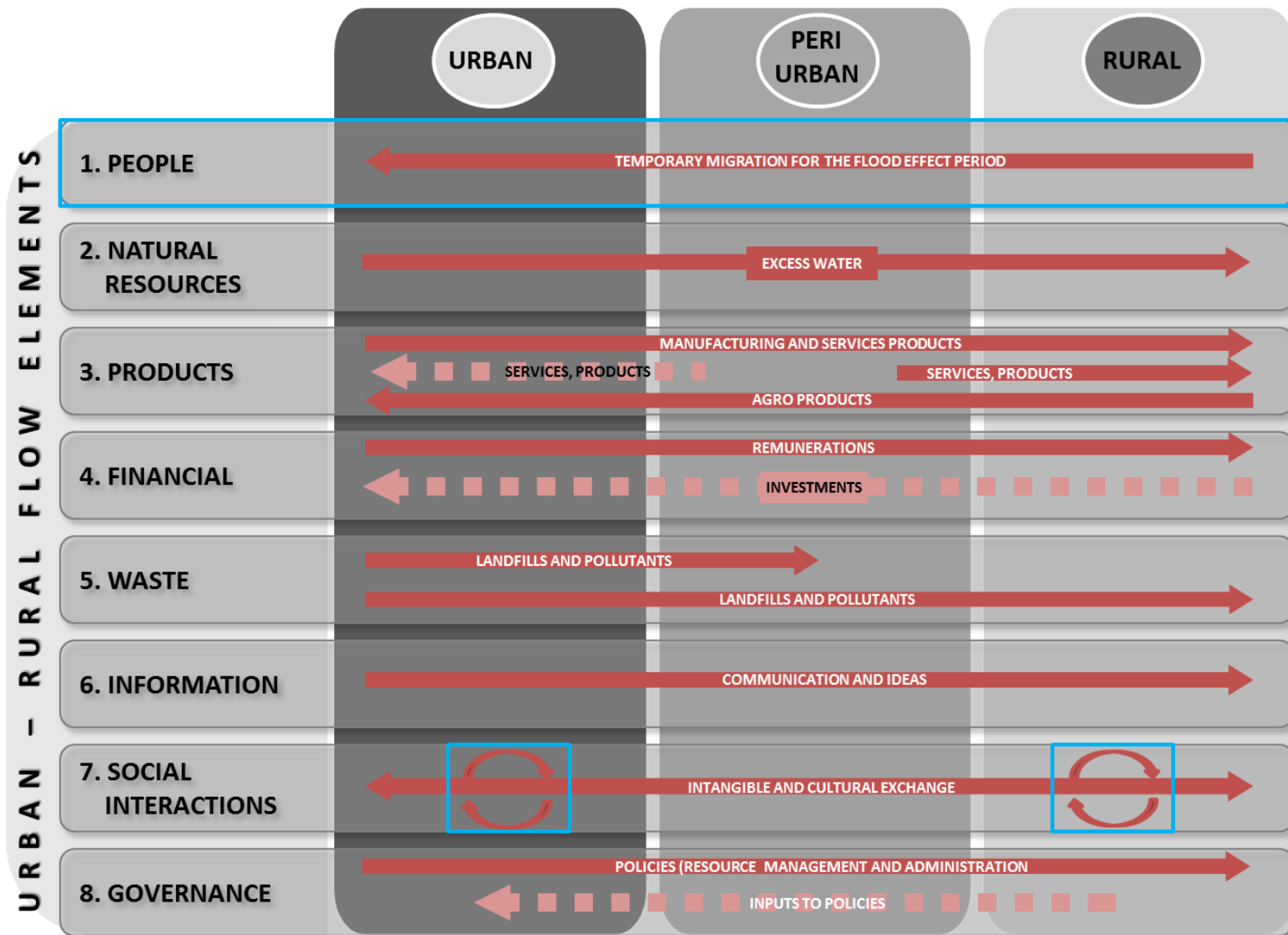


Figure 5.4 Identifying affected urban-rural flow elements in case of floods of Ahmedabad



Figure 5.5 Images showing floods in urban and rural areas of Greater Ahmedabad in 2012-2013

Source : http://www2.chinadaily.com.cn/photo/2006-08/01/content_654898_3.htm

5.1.2. Floods

The all-time record for 24-hour rainfall in August for the city is 250 mm recorded on August 30 in 1976. In the last decade, an event in 2008 was next only to the heaviest 24-hour rainfall ever recorded at Ahmedabad observatory at 325.9 mm on July 14, 2000. An overview of the past decades shows that the frequency of heavy rainfall in the city has increased from 39 in 1979-88 to 50 in 1999-2008. With the change in formation of rain mechanisms, a significant rise in the number of average rainy days in month of July has also been noted. The total average rainy days during the month of July for Gujarat were 15. The average rainy days in the state in July for the last 50 years are 11. Moreover, for the last three decades, due to climate change, the state gets more rains from Arabian Sea than the Bay of Bengal. With this, a gradual rise in heavy rainfall events and city's average rainfall has been observed by the state's weather office (Source: India meteorological department, Gujarat).

Hazards can be of various scales defined by magnitude and frequency; small and large. This research focuses on the effects of small hazards, like floods in Ahmedabad, on vulnerable occupations. Small hazards, in general, mean high frequency low magnitude hazards, which cause minimum damage to the lives of people (see Figure 5.5 for images from the study area). These hazards do not feature in

the official list considered by concerned authorities. However, it is believed that they do have an impact on the lives and livelihoods of the population. In this particular case, the floods are considered as small hazards which occur with a frequency of every two years and with magnitude of affecting up to 5 km area along the river Sabarmati within Greater Ahmedabad. The floods cause economic loss such as damages to assets, property and housing; as well as environmental loss. This has caused people to migrate from their native villages, temporarily or permanently as they lose their occupations, or experience a disruption in carrying out their economic activities. In recent times, floods have occurred in Greater Ahmedabad in 2001, 2003, 2005, 2006, 2008, 2010 and 2013 (PTI 2005).

Human life has not been the only casualty of the devastating floods that have hit Gujarat. Thousands of cattle, reared by local people for their milk, have perished or are missing, robbing villagers of their only source of livelihood. With thousands of cattle perishing in submerged farms or straying thousands of miles from their homes, in the devastating week-long floods that have affected Gujarat, villagers in Kheda and Anand district -- known as the 'milk bowl of India'-- have not only lost their homes and property but also their livelihoods.

5.2. Occupational Profile of Ahmedabad Urban and Rural Area

Similar to other major Indian cities, Ahmedabad is also experiencing various transformations. Demographically Ahmedabad has seen an increase of seven times in its population density from year 1981 to 2001, from 11 persons per hectare (pph) to 77 pph. At the same time the rural density has been more or less constant, from 12 to 16 pph as per "Revised Development Plan of AUDA - 2011 and Draft Development Plan for Gandhinagar - 2011". Greater Ahmedabad Urban Agglomeration has increased to 4,200km², mainly due to encroachment on the agricultural rural areas. This has led to limitation of agricultural sector to 0.20% (2001) of total occupations in the formal sector. The economy of the area is gradually shifting from secondary to tertiary sector. Often urbanization has certain negative impacts on environment. In Ahmedabad, 36 water bodies have dried up in the last 28 years. This depletion of local resources demands the region to depend on rural areas for resources, and thereby causes conflict of interests.

With this background, the impact of disasters in the area needs to be seen in the perspective of impact on occupations. Ahmedabad is experiencing an employment growth at 0.06 million per year.

Most of these new employments are generated in small-scale industries located within the region. During recent disasters such as Bhuj earthquake, the formal economic sector was disrupted in many areas and many households lost their primary income source or earner. The most affected people in Ahmedabad appeared to be the middle- and upper-middle class who lost their productive assets to livelihood. Another aspect, which escaped the statistic books, was that close to 26% people living below poverty line relying on low-wage daily earnings were also impacted due to stagnation to the formal sector, on which informal sector relied upon previously. Disaster such as urban flooding (case of 2000 and 2005) also throws the daily life out of gear for the city people and indirectly affects the occupations of the urban poor. In the rural domain, the floods and droughts, which have become regular in the area, cause change in occupation, household disruption, community and neighborhood changes, reduced agricultural production and uncertain agricultural prospects, reduced income, disruptions to transport and other infrastructure support.

Short-term migration is rapidly replacing agriculture as the major source of income for many families in the “flood/drought” months of June to September, which is again a point of conflict for urban and rural areas. A complex relationship between employment and disasters is seen to exist in Gujarat. In urban areas, the government’s recovery and relief plans exclude the large majority of the working age population, as they are engaged in the informal sector which is unrecognized by formal government institutions and financial machinery. In rural areas, the economy is based on primary sector industries such as agriculture, the disruption of which paralyzes the livelihood base for the rural population. Additionally, a significant population in urban, peri-urban and rural area is linked with household or cottage industries. These are also disrupted by disasters, hence affecting the assets and earning capabilities of the concerned population (Vatsa 2001). To understand this complex relationship the case of Greater Ahmedabad region in the state of Gujarat is taken up as a case study.

5.3. Methodology for analyses: Exploring vulnerable occupations

The study was conducted to investigate to a greater extent the two major concepts of ‘Urban- rural linkages’ and ‘vulnerable occupations’ through the field study in urban and rural areas of Greater Ahmedabad, Gujarat in India, along the river Sabarmati in February-March 2013. This section explains the methodology used for the household survey and subsequent analyses. The questionnaire was based on the concepts of urban-rural flow elements and vulnerable occupations,

as explained in the following paragraphs.

The objective of this study is to observe the effects of floods on the occupations carried out by population in different spatial locations. These effects are assessed using the parameters established in an earlier study (Srivastava and Shaw 2014). It also identifies the coping strategies adopted by the communities to minimize the damage to their economic activities and accelerate their recovery processes.

The findings of the survey have been evaluated qualitatively and quantitatively for the three spatial locations – urban, peri-urban and rural Ahmedabad. The study was split into two major parts:

1. Key informant survey and
2. Household Survey

5.3.1 Framework of the study

India's population is predominantly rural with 68.84% population distributed in 640,000 villages, compared to 31.16% urban population in 6166 urban agglomerations, occupying 2.5% of the total geographical area in India (Census of India 2011). The complex social, economic, political and environmental interdependence between the urban and rural areas can be defined as a framework which includes eight elements (See Table 5.1 (a)). These linkages can be strong, weak, uni-directional or bi-directional across sectors and spaces (Srivastava and Shaw 2012).

There is an absence of a standardized methodology for measuring vulnerability (Birkmann and Wisner 2006, Villagran 2006; Gall 2007 in Hufschmidt 2011). Often the impact of disasters on urban poverty is also underestimated, with the general absence of the metrics that include low-income groups in their assessment of disaster impact (ISDR 2009). Table 5.1 (b) illustrates the parameters used to identify the vulnerable occupations established by Srivastava and Shaw (2014). These parameters were included in the questionnaire to understand the effect of floods on the occupations and to determine the vulnerable occupations in this particular case of floods.

Three important parameters for assessing vulnerable occupations in this region are recovery time, loss of working days and workforce participation as established in an earlier study of the same region (Srivastava and Shaw 2014). The recovery time is the time taken to restore the household earnings to the pre-disaster level. The recovery period was divided into four categories of 0-2 days, 3-10 days, 11 days to a month, and more than a month. Similarly, the loss of working days was also categorized

into the same categories. Individuals and communities try to shorten their recovery period through various coping strategies, thereby contributing to the occupational resilience. The parameter workforce participation is an indicator of economic well-being and is calculated as the number of days a person is employed in a year. The workforce participation is reduced due to lack of job opportunities all the year round, especially immediately after a changed scenario in the wake of disaster, and restricted capacity to compete for the limited jobs, or lack of skills for the available jobs.

With regards to urban-rural linkages the survey examines three out of the said eight elements, namely; people, finance, and social interactions. The key informant survey conducted at an earlier stage had given evidence of these three parameters being affected significantly during the floods (Srivastava and Shaw 2014). The urban-rural linkages vis-à-vis disasters are explored through the urban and rural survival strategies of households residing in the study area. The urban survival strategy is defined as the reliance of rural population on urban areas, and may be in the form of financial assistance, shelter, or as an opportunity for employment. Similarly, the reliance of the urban population on rural areas is known as rural survival strategy.

Table 5.1(a) Urban Rural flow elements and (b) Parameters to identify vulnerable occupations

S. no.	Urban Rural flow elements	S. no.	Parameters to identify vulnerable occupations
1	People	1	Loss of productive asset
2	Natural Resources	2	Displacement and migration
3	Product	3	Loss of employment
4	Finance	4	Decline in productivity
5	Waste	5	Reduced income
6	Information	6	Workforce participation
7	Social Interactions	7	Change in occupation
8	Governance	8	Effect on social structure
		9	Recovery time

(a) (Source: Srivastava and Shaw 2013)

(b) (Source: Srivastava and Shaw 2014)

The respondents were asked questions about what would be their strategy in case of a disaster, and in case of unemployment (see Annexure 2 and 3 (page xxvii)). The correlation of the responses in the two different cases was investigated to understand the degree of differentiation in the people's

perspectives related to disasters and unemployment.

Two important parameters for assessing vulnerable occupations are recovery time and loss of working days. The recovery time is the time taken to restore the household earnings to the pre-disaster level. The recovery period was divided into four categories of 0-2 days, 3-10 days, 11 days to a month, and more than a month. Similarly, the loss of working days was also categorized into the same categories. Individuals and communities try to shorten their recovery period through various coping strategies, thereby contributing to the occupational resilience. Another parameter studied is the workforce participation, which is an indicator of economic well-being and is calculated as the number of days a person is employed in a year. The workforce participation is reduced due to lack of job opportunities all the year round, especially immediately after a changed scenario in the wake of disaster, and restricted capacity to compete for the limited jobs, or lack of skills for the available jobs.

5.3.2 Correlation Analysis

The bivariate correlation between the parameters of vulnerable occupation and the elements of urban-rural linkages needs to be determined to identify the factors which affect a particular decision of the respondents in case of unemployment and disaster. In this study, Pearson correlation coefficient has been determined using the correlation analysis. It is a numerical measurement of the strength of the linear relationship between the explanatory and response variables. For the purpose, interval data for the variables such as household annual earnings, loss of working days, loss in social respect, number of visit to rural/urban areas, asset ownership in villages/cities, change in occupation, family residing in rural areas and rural/urban survival strategy have been correlated with rural/urban survival strategy in cases of unemployment and disaster. The data is represented in percentage. In the analysis of the results, only those correlation coefficients have been considered at 0.05 significance value (i.e. at greater than 95% confidence level). The correlation values are categorized into three categories: 0.2 to 0.4 (low), 0.4 to 0.6 (medium) and greater than 0.6 (high).

There are two major sources of uncertainty of the methodology. Firstly, the occupations have been categorized into fewer categories for the sake of analysis of vulnerability on comparative basis. This categorization is done by the author based on their understanding on the basis of skill set, income, and number of working days. Secondly, few responses are based on the perception of the respondents.

5.4. Key Informant Survey and Results

This section presents the results of the preliminary study conducted in Ahmedabad district of Gujarat, India to validate the identified parameters, if they are capable to gauge the effects on the occupations. It is understood that these aspects would behave differently in different cases and therefore this study is an exercise in testing, redefining and refining the theory of parameters at the community level. This study examines a small scale yet recurring disaster, to observe the effects on 40 communities based in flood zones of Greater Ahmedabad. These communities have been victims of urban floods in urban and peri-urban areas and river floods in the rural areas in the last decade, almost every alternate year since 2001. The recurring nature of disaster throws the life out of gear for these communities, countermining their resilience. The key informant survey included the interviews of representatives from 40 communities located in 12 locations in Greater Ahmedabad (See Table 5.2 and Figure 5.7; and Figure 5.8 for images from the study field). It included questions based on the background, past disaster experience, migration or displacement, occupation and alternative livelihood activities, the impact on the assets (human, natural, physical, social, and financial capital). It also included perception on urban-rural linkages and potential role of stakeholders. The answers were open-end type which enabled to collect information without prompting any answers. Please refer to Annexure 1 (Page xxiii) for details. Other objective of the study was to identify the coping strategies taken up by the communities to minimize the effects of floods on their economic activities and speed up their recovery process. The findings of the survey have been evaluated qualitatively for the three spatial locations. The communities interviewed are situated on the banks of river Sabarmati in urban, peri urban and rural areas and have experienced floods. Although not severe; the impact of these small hazards on the lives of the vulnerable population is worth examining.

The overall survey followed four-stage methodology: 1. Preliminary questionnaire based on the literature, 2. Stakeholders' opinion, 3. Mapping of observed parameters and identification of vulnerable occupations spatially, and 4. Identification of parameters. The methodology is illustrated in detail in Figure 5.6. The interviewed communities include 20 urban, 5 peri-urban and 15 rural communities which have experienced floods, being situated on the banks of river Sabarmati. These areas were selected on the basis of data on the flood prone areas provided by Flood Control cell of Gujarat Government. The flood prone villages classified by Flood control Cell is based on the affected settlements. Please see Figure 5.9 for survey images.

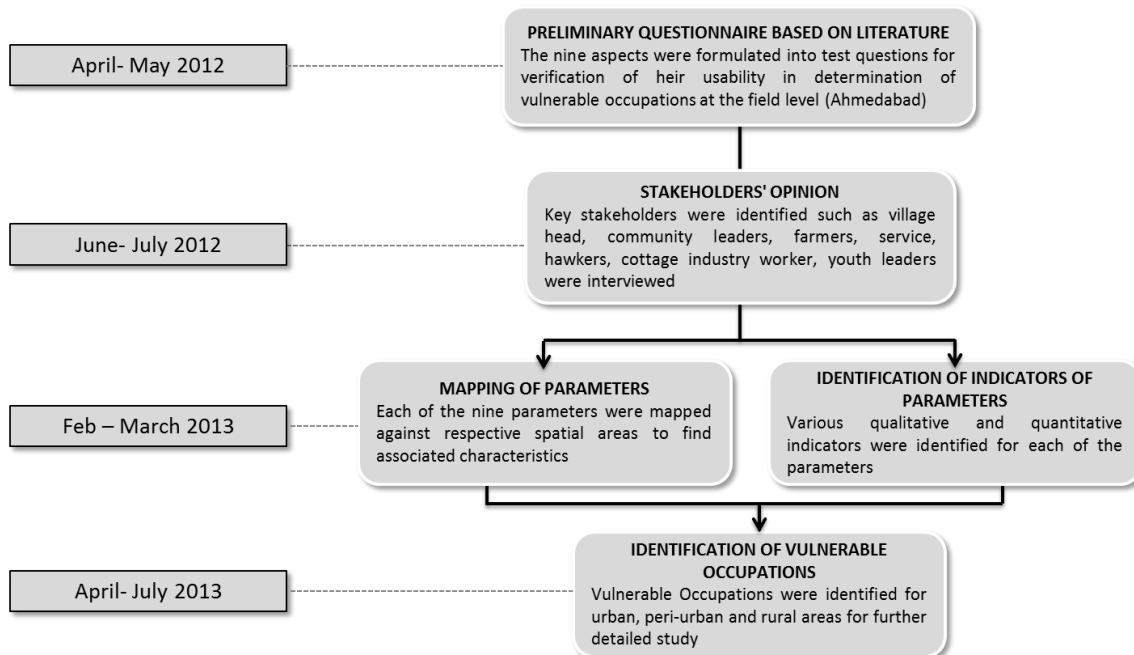


Figure 5.6 Research methodology of the study at Greater Ahmedabad

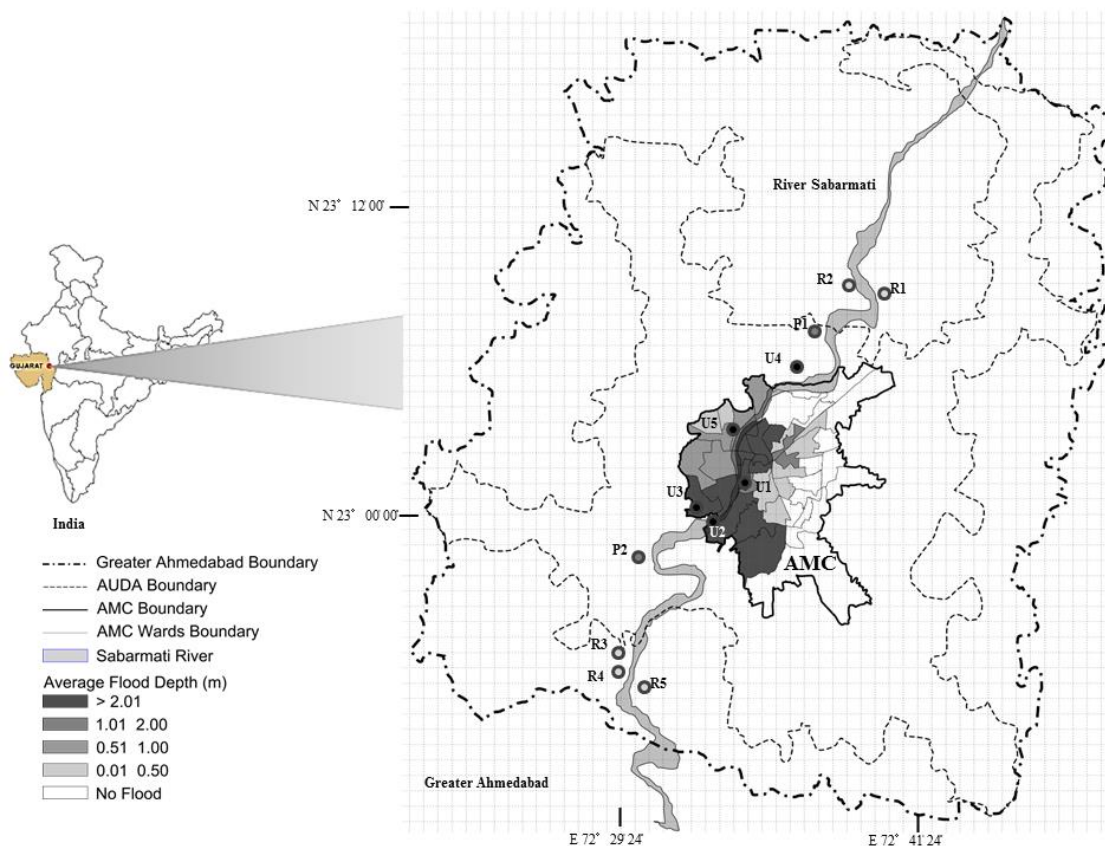


Figure 5.7 Location map of Greater Ahmedabad with study locations in urban, peri-urban and rural areas

5.4.1 Study area

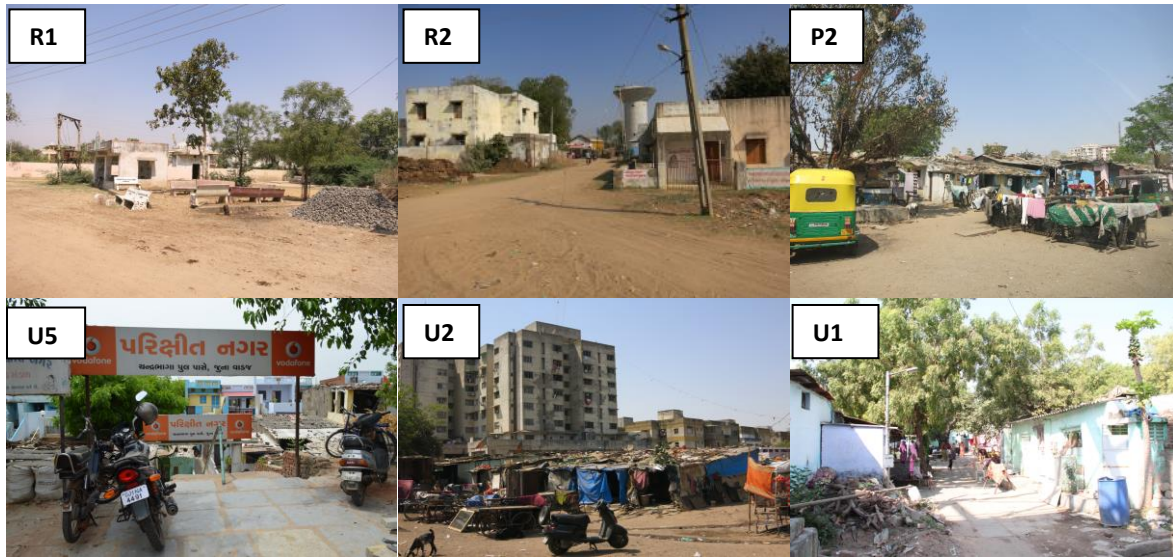


Figure 5.8 Images showing various study locations- 1- R1, 2- R2, 3- P2 , 4- U5,5- U2, 6- U1

As discussed earlier the respondents were selected from the 12 locations, on stratified random sampling method technique. The respondents included the head of the villages (*Sarpanch*) and slums, the elderly, the community representative/s, NGO workers in slums, female heads of the households, and hawkers. The respondent by stakeholder type is provided in the Table 5.2. None of the 40 communities have suffered deaths in the recent years due to floods, yet the reconnaissance survey shows that there has been little or poor growth of the communities and individuals suffering from floods.

5.4.2 Results of Key Informant Survey

The following paragraphs deal with the results under the three factors of migration, social capital and economics (as laid down as main factors of determining vulnerable occupations in Chapter 2).

Migration : In all three spatial locations; urban, peri urban and rural, migration is not a major issue. It is non-existing in urban and peri urban areas while in rural areas the few cases of permanent migration is seen, while the population with minimum assets such as land, house and likewise, migrate temporarily to urban areas in search of jobs. Floods are also seen as an opportunity by the people engaged in vulnerable occupations, to enhance the quality of life with a better job than their existing ones. With the dearth of non-agriculture based jobs in rural areas, the rural population has to rely on urban areas for better opportunities. This causes a shift in the local economy and its workforce distribution.

Table 5.2 Characteristics of locations and stakeholder type amongst the respondents

	STUDY LOCATIONS	LOCATION	OCCUPATION	HAZARD	NO. OF COMMUNITIES	RESPONDENT TYPE
URBAN						
U1	DARIYAPUR	CENTRAL	Primarily Daily Laborer, Hawkers and enaged in Other occupations. Also comprise of Construction laborer , Government Sector, Private Sector	Local Flooding (and River Flooding)	4	Community Leader -1, Woman Head of Household-1, Cottage Industry Worker-1, Hawker-1
U2	BEHRAMPURA	SOUTH		River Flooding and Local Flooding	4	Community Leader -1, Woman Head of Household-1, Cottage Industry Worker-1, Hawker-1
U3	MANGAL TALAWADI	SOUTH		Local Flooding	4	Community Leader -1, Woman Head of Household-1, Cottage Industry Worker-1, Hawker-1
U4	SABARMATI	NORTH		Local Flooding (and River Flooding)	4	Community Leader -1, Woman Head of Household-1, Cottage Industry Worker-1, Hawker-1
U5	RAMAPIR TEKRO	NORTH		Local Flooding	4	Community Leader -1, Woman Head of Household-1, Hawker-2
PERI URBAN						
P1	PARVATI NAGAR	NORTH	Majorly daily labor with others engaged in government sector and Other private jobs	Local Flooding	2	Community leader-1, Woman Head of Household -1
P2	GUPTANAGAR	SOUTH		Local Flooding	3	Community leader-1, Woman Head of Household -1, Hawker-1
RURAL						
R1	SHAHPUR	NORTH	Majorly Agricultural Labour and Small landholder Cultivator with few engaged in daily labour, household industry, and hawking	Occasional River Flooding	3	Sarpanch (village leader) -1, Youth Leader-1, Farmer -1
R2	RANDESAN	NORTH		Occas ional River Flooding	2	Sarpanch (village leader) -1, Farmer -1
R3	SARODA	SOUTH		River Flooding	4	Sarpanch (village leader) -1, Community Leader-1, Farmer -1, Service man-1
R4	MOTA CHHPRA	SOUTH		River Flooding	3	Sarpanch (village leader) -1, Community Leader-1, Farmer -1
R5	MAHJUDA	SOUTH		River Flooding	3	Sarpanch (village leader) -1, Youth Leader-1, Animal Husbandry-1
	TOTAL				40	Community Leader -9, Sarpanch (village leader) -5, Farmer-4,Animal Husbandry -1, Service- 1, Hawker- 7, Woman Head of Household -7, Cottage Industry Worker- 4, Youth Leader - 2,

Social capital : There is a positive trend amongst communities in urban areas where self-help groups are being formed to help each other financially to cope with the aftermath of floods. In peri urban areas, on the outskirts of urban areas, there is increased acceptance that the education will improve their accessibility to urban jobs, thereby bringing economic stability. With the migration of male population from the villages there is imbalance caused in the social structure. The underprivileged sections of the society often reside in the low lying areas in the villages which suffer maximum damage to land and houses. Often population from these sections is engaged in petty jobs and work as laborers in the agricultural fields of the land owners. Reliance on insufficient sources of income in all the three areas contributes to slow recovery even in the case of a small hazard like floods in Ahmedabad.

Economic : The financial capabilities and capacities of the people engaged in vulnerable occupations is affected by a) decline in productivity and b) loss of productive assets; such as land, animals, and stored granary (rural areas), stored goods, and submergence of workplace (urban and peri urban areas), c) loss of employment; due to loss of access to jobs, relocation of a community, damage to

agricultural fields and production, d) reduced income; due to increased availability of laborers after a flood event as result of influx of migrants from rural and peri urban areas. Overall this scenario derails the recovery of the majority of the population and pushes them into the cycle of poverty, worsened by the next hazard.

The urban rural linkages exist in more than one form. Approximately 55% communities' citizens send remittance to their home villages. This financial security which is embedded in a different spatial location than the place of residence and work, gives a huge sense of security to the rural habitants. Secondly, 60% of urban habitants said that they will go to their villages in an event of disaster for security as an urban survival strategy. Similarly, 47% rural respondents said that they would go to urban areas in the case of a disaster. 70% of urban dwellers want to own the land in their native villages to improve their economic condition. The potential hidden in these linkages needs to be understood to provide for resilient communities.



Figure 5.9 Images showing the survey being conducted by the team

5.4.3 Other common issues from the survey

Perceived potential role of stakeholders - An overwhelming 92.5% of the respondents, either blame it on the government for their poor state during floods or believe the government can take various steps to improve their occupational status and provide them livelihood. Conforming to this, 80% of the respondents fail to identify their role in reducing the risk. The role of governance cannot be undermined, but there is a need to make these communities realize that through their own initiatives, their households can be better resilient against disasters.

Existing coping strategies - The individual coping strategies during floods are limited to (i) moving to higher grounds such as school, temple, playground etc. (92.5 %) and (ii) storing food supply for the flood season (65%). Barring a few communities there is no community coping strategy against floods, as there is no proper networking of the communities. Even when the association exists in slums, they do not have technical knowledge to deal with floods. The government's way of dealing with floods is insignificant for recovery. Their role is to supply food packets to the victims during flood days, through NGOs. Such initiatives do provide the required nutrition for a certain number of days, but do not address the livelihood issues.

High priority needs to tackle the disaster – The basic understanding of resilience through economic empowerment is known to a majority of the communities. 82.5% of respondents believe that permanent jobs would provide them with the means to survive the floods. These respondents were of the opinion that with stable jobs they could take care of other basic needs like housing, food and clothing. Housing is the next chosen priority (17.5%) by the communities after employment.

The major impacts of floods in Ahmedabad on occupations were household disruption, community and neighborhood changes, reduced agricultural production and uncertain agricultural prospects, to transport and other infrastructure support. The three spatial typologies exhibit different characteristics for each of the nine aspects based on the existing conditions of employment, education, and community network, in each of these urban, peri-urban and rural areas. Table 5.3 summarizes the findings with respect to each of the parameters. The key informant study tests two facets of these nine aspects: (i) their relevance in measuring vulnerability of the occupations and (ii) their existence in this particular case. It also helps in identification of vulnerable occupations associated with each spatial area, and the parameters are tested at the field with identification of qualitative and quantitative indicators for each one of them. This provides for a detailed household

study and would also be helpful in analyzing the effects and efforts required for recovery and mitigation.

Table 5.3 Observed characteristics associated with the 9 parameters in affected Urban, Peri-urban and Rural communities in Greater Ahmedabad (N is the sample size)

S.No.	Parameters	Urban Communities (N=20)	Peri-urban Communities (N=5)	Rural Communities (N=15)
		<i>Primarily low income settlements with major occupations such as employed in cottage industries, informal jobs like hawkers, masons, construction laborers, domestic help etc.</i>	<i>Communities living on the outskirts of the urban area in primarily rural setting, with easy access to urban areas</i>	<i>Communities living in rural setting distant from the urban area, and primarily dependent on agriculture and agro-based labor. Few villagers travel to peri-urban service industries</i>
1	Loss of productive asset	Loss of workplace and goods stored for household industries	Assets like land and animals suffer a major loss	Assets like land, animals and fodder suffer major loss
2	Displacement and migration	No migration	No migration	Few cases of permanent migration; temporary migration in search of jobs after the disaster for economic recovery
3	Loss of employment	Yes, due to loss of access to the jobs. Loss of employment is due to relocation of a community from a flood prone area to a no flood area	Since the peri urban communities have marginal land holdings, the loss of employment in agro-based sector is smaller compared to rural communities	Agriculture and agro-based jobs come to standstill for a period of 30 days. Loss of transportation to the service industries located in urban and peri urban area
4	Decline in productivity	Due to loss of assets, reduction in the number of working members in a household, and psychological effects of the floods		
5	Reduced income	There is a reduction in the income in alternative jobs due to high availability of laborers, with influx from peri-urban and rural areas.	The income does not suffer much due to dependence on service sector jobs and labor opportunities in urban areas	The income suffers due to loss of jobs, assets, and working days and reduced demand of agriculture during the floods
6	Workforce participation	The marginal workers and the daily workers are the major sufferers. The workforce participation gets further reduced.	The multiple occupational opportunities available to a household avoids the reduction in working days	The agricultural laborers are losing on working days because of flooding in the agricultural fields.
7	Change in occupation	Few of the habitants get alternative jobs; mostly in the informal sector of economy	Alternative jobs based on school education are bringing in more income	Agricultural laborers migrate to urban areas to enter the informal sector of the urban areas
8	Effect on social structure	Some of the communities have started to form self help groups to help each other monetarily	Positive effect : With better understanding of the flood situation, communities have started to give more importance to education and seek for white collared jobs in the urban areas	Underprivileged sections of the community residing in low lying areas suffer most; gets dependent on the privileged class for food and shelter; male migration to cities causes imbalance in the social structure
9	Recovery time	The flood situation may be present only for 2-15 days but for the poor segment of the society it takes around 2 months to return to the same state of earning. Additionally, the period drains all the savings.		

5.5. Household Survey

This section brings the results of the household survey conducted in the same 12 locations as of key informant survey (see Figure 5.7).

5.5.1 Contents of the questionnaire

The survey questionnaire gains its robustness from the inputs and preliminary results from key informant survey. The questionnaire is constructed on the basis of the parameters of vulnerable occupations and the flow elements between urban-rural areas. It included questions on disaster experience, displacement (nature, period, and reason), occupation (main and secondary, income, and number of earners), loss to productive assets used in carrying out occupations or household industries, loss of working days and its reason, recovery period, loss of social respect (perceived social status and if there has been a change in it), the presence of other stakeholders, membership of community-based, religious or occupation-based organizations, and the coping strategies (both perceived and currently utilized). Please refer to Annexure 2 (Page xxvii) for details.

With regards to urban-rural linkages, the respondents were asked questions about what would be their strategy in case of a disaster, and also their strategy in case of unemployment. The correlation of the responses in the two different scenarios of disasters and unemployment was investigated to understand the degree of differentiation in the people's perspectives related to disasters and unemployment.

5.5.2 Scope of the study

In total, 255 households were surveyed during the months of February and March 2013, which included 105 from five urban locations (Dariyapur, Behrampur, Mangal Talawadi, Sabarmati and Ramapir no Tekro), 50 from two peri urban locations (Parvati Nagar and Gupta Nagar) and 100 from five rural areas (Shahpur, Randesan, Saroda, Mota Chhapra and Mahijda). For site details, number of respondents and characteristics refer to Table 5.4. The percentage of household surveyed, to total households at various locations range from 3.77 to 12.42%. These locations were selected on the basis of data on the flood prone areas provided by the Flood Control cell of Gujarat Government and the key informant survey elaborated in Srivastava and Shaw (2014).

The study evaluates the experiences of urban, peri-urban and rural populations post the Bhuj earthquake in year 2001. Peri-urban areas defined in this study refer to outgrowths of urban areas

with minimum agricultural activities, and predominantly urban activities. The people who live in slums and have migrated to the study locations more than 12 years before have been considered as the residents of the locations, instead of migrants, for the sake of the study.

Table 5.4 Characteristics of the study locations for household survey

	STUDY LOCATIONS	LOCATION	SURVEYED HOUSEHOLDS	OCCUPATION	HAZARD	CHARACTERISTICS and OBSERVATIONS
URBAN						
U1	DARIYAPUR	CENTRAL	20	Primarily Daily Laborer, Hawkers and enaged in Other occupations. Also comprise of Construction laborer , Government Sector, Private Sector	Local Flooding (and River Flooding)	Physical - Close to river bed in the central city, Housing - Mostly semi-pucca
U2	BEHRAMPURA	SOUTH	21		River Flooding and Local Flooding	Physical - Adjacent to river bed, Housing - Mostly Kutcha
U3	MANGAL TALAWADI	SOUTH	23		Local Flooding	Physical - Low lying area adjacent to a natural pond, Housing - Mostly Kutcha
U4	SABARMATI	NORTH	21		Local Flooding (and River Flooding)	Physical - Close to river bed, Housing - Mostly Kutcha
U5	RAMAPIR TEKRO	NORTH	20		Local Flooding	Physical - Close to ponds and natural drainage of the river, Housing - Mostly Kutcha
PERI URBAN						
P1	PARVATI NAGAR	NORTH	25	Majorly daily labor with others engaged in government sector and Other private jobs	Local Flooding	Physical - Close to river, Housing - Mostly semi-pucca and Kutcha
P2	GUPTANAGAR	SOUTH	25		Local Flooding	Physical - Poor drainage, Housing - Mostly Kutcha
RURAL						
R1	SHAHPUR	NORTH	20	Majorly Agricultural Labour and Small landholder Cultivator with few engaged in daily labour, household industry, and hawking	Occasional River Flooding	Physical - Upstream Village, River is deep and wide, Housing - Pucca with low percentage of Kutcha , Residential Areas located on high elevation traditionally distant from the banks. Agricultural lands, are also located away from the banks with natural drainage towards river. Good infrastructure with good connectivity to both Ahmedabad and Gandhinagar
R2	RANDESAN	NORTH	20		Occasional River Flooding	
R3	SARODA	SOUTH	22		River Flooding	Physical - Downstream Village, River is narrow and shallow, Housing - Mostly Kutcha, Poor connection to the urban areas, agricultural lands adjacent to the river bank. Poor public infrastructure
R4	MOTA CHHAPRA	SOUTH	18		River Flooding	
R5	MAHIJDA	SOUTH	20		River Flooding	
		Total	255			

5.5.3 Categorization of Occupations

Most of the respondents rely on daily wages, with only a small portion employed in the service sector with guaranteed income. The categories of occupations for the study have been determined

by considering three associated characteristics of skill set, income, and number of working days. The resulting five categories are given below:

- (i) Service Sector – includes government and private sector jobs
- (ii) Labor – includes construction labor and daily wage labor in urban and peri-urban areas, and agricultural labor and daily wage labor in rural areas
- (iii) Cultivator – includes small land owners who cultivate their own land
- (iv) Hawker – includes door to door small vendors
- (v) Others – For urban and peri-urban areas ‘others’ includes rag pickers, shopkeepers, private nursery owners, paper wrapping industry, cobbler, vegetable vendor, rickshaw puller. For rural areas it includes people involved in animal husbandry and shopkeepers.

5.6. Household Survey Results

The survey results from 12 sites across Greater Ahmedabad were processed and analyzed under three main headings – spatial characteristics, coping strategies and the correlation of parameters under urban/rural survival strategy. This section highlights the key findings.

5.6.1 Background of the respondents

Amongst the respondents there were female respondents who were either family member or head of the households. Albeit this is a small percentage but this group gives input from the perspective of women, especially those running the household (see Figure 5.10). Loss of respect due to impacts of floods has also been reported by the respondents as shown in Figure 5.11.

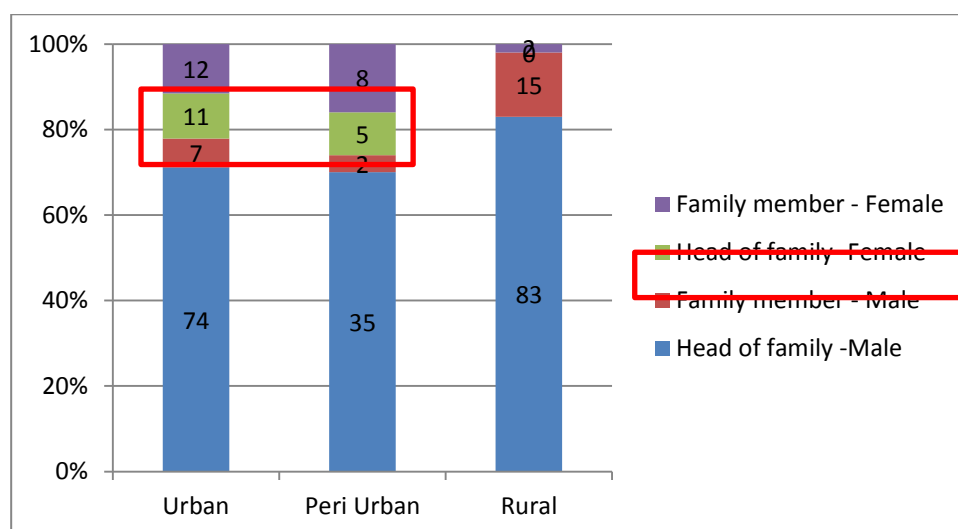


Figure 5.10 Respondents background (Urban (N=105), Peri-Urban (N=50), Rural (N=100))

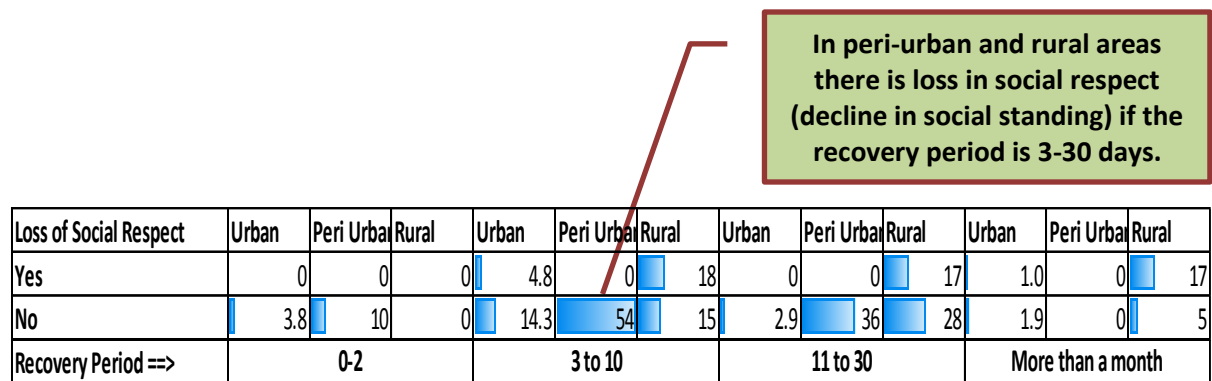


Figure 5.11 Loss of respect amongst respondents due to flood impacts

5.6.2 Findings with reference to spatial characteristics

Urban area : In urban areas, majority of the surveyed population (63%) is engaged as labor, primarily as daily wage labor and construction labor. A considerable percentage (22%) is also engaged in service sector, which includes government and private sectors (See Table 5.5). The loss of working days for these occupations due to floods is primarily distributed in the ranges of 3 to 10 days, and 11 days to a month. If the loss of working days is 3-10 days the trend shows that the days taken to recover is usually greater than 10 days. Similarly, if the loss of days is 11-30 days then recovery also takes 11 days to a month or more (See Figure 5.12). A considerable 22% of respondents change their occupation; more than two-thirds being attributed to either loss of jobs or productive assets (See Table 5.5). All the respondents were asked about their survival strategy in two cases: (a) in case of unemployment, and (b) in case of a disaster. 34% of urban respondents are willing to migrate to rural area in case of unemployment and 44% in case of a disaster (See Figure 5.13).

Change in Occupation is seen only in Urban area to extent of 22%, by laborers.

Table 5.5 Occupational Profile and change in occupation of respondents in Greater Ahmedabad

	Urban	Peri Urban	Rural
Occupation Type			
Service Sector	7	10	6
Labour	63	86	37
Cultivator	0	0	55
Hawker	8	2	1
Others	22	2	1
Change in Occupation			
Do not change	78	98	96
Change due to loss of income at previous occupation	6	2	2
Change as cannot carry out previous occupation	15	0	2
Change due to loss of transportation to jobs	1	0	0

All figures are in percentages

Peri- urban area : High percentages (86%) of respondents are employed as non-skilled daily wage labor or as construction labor (See Table 5.5). The loss of working days to the respondents is majorly between 3 to 10 days. If the loss of working days is 3-10 days the trend shows that the days taken to recover is usually greater than 10 days (See Figure 5.12). The local street flooding in these areas do not cause loss of work exceeding a month and hence does not take more than a month to recover. The change of occupation is also negligible. The peri-urban respondents' selection of the survival strategies relying on rural areas in case of unemployment and disaster is limited to 8% and 14% respectively.

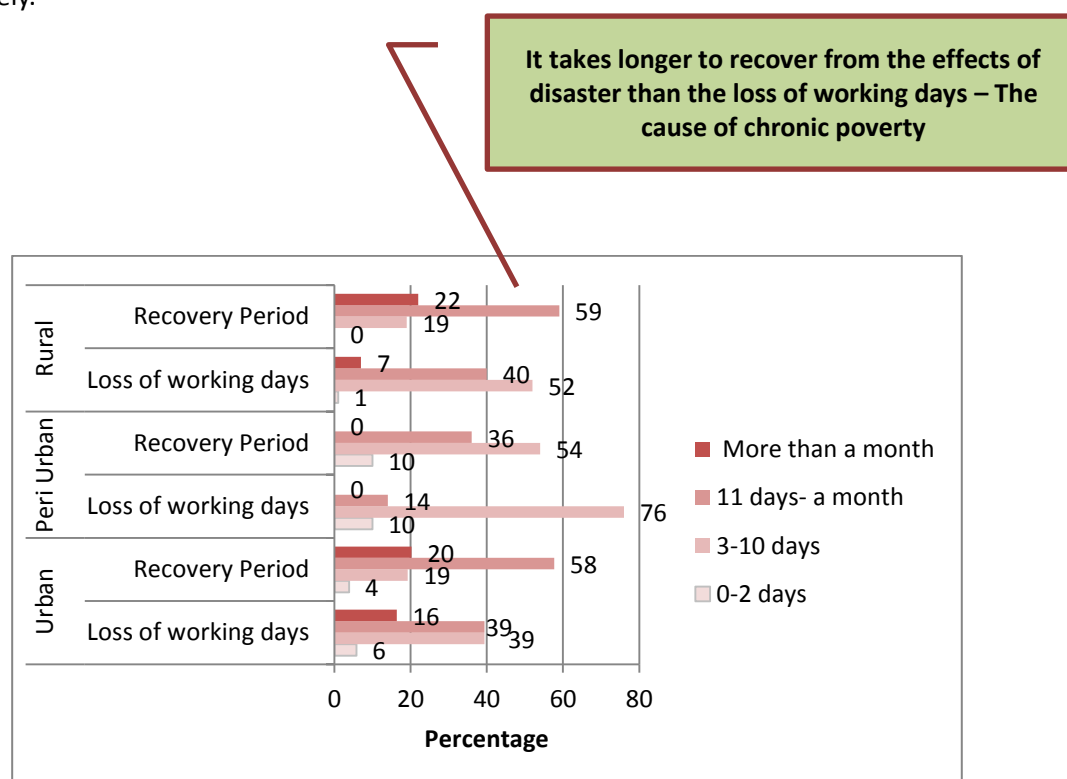


Figure 5.12 Impact of floods on urban, peri urban and rural areas in Greater Ahmedabad (Urban (N=105), Peri-Urban (N=50), Rural (N=100))

Rural area : 55% respondents are small land owners who cultivate on their own land, while 37% respondents are engaged in agricultural and related labor activities (See Table 5.5). The loss of working days is distributed mainly between 3 to 10 days and 11 days to a month. If the loss of working days is 11-30 days the trend shows that the days taken to recover is usually greater than 11 days to more than a month (See Figure 5.12). The change of occupation is negligible. In terms of rural-urban survival strategy, 40% rural respondents would choose urban survival strategy in case of unemployment and 50% in case of disaster (See Figure 5.13).

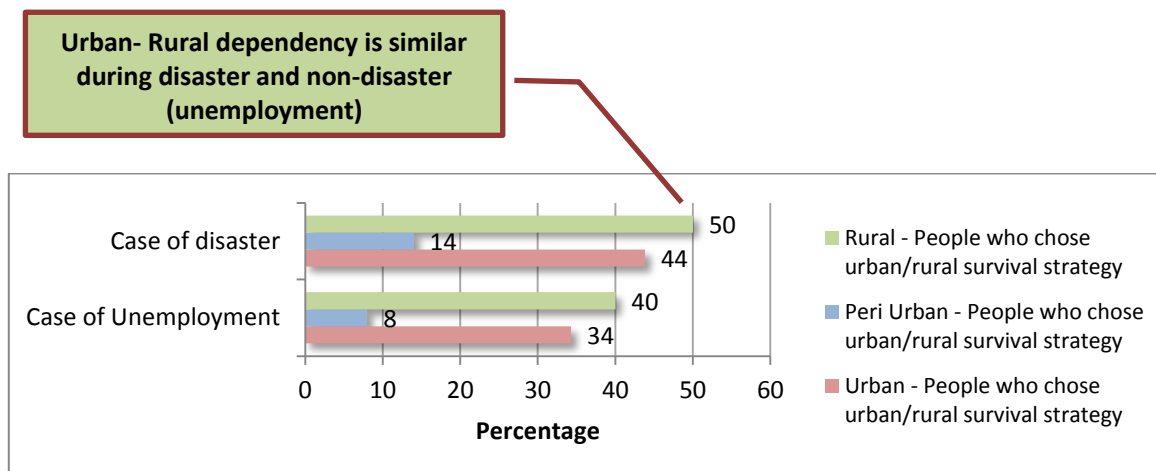


Figure 5.13 Urban / Rural Survival Strategy in case of disaster and unemployment

5.6.3 Vulnerable occupations, present Coping strategies and mechanism

Urban area:

Hawkers, Labor, and 'Others' categories showed 66.7%, 24.2% and 8.7% change in occupation respectively. Based on the above results, the Service sector can be considered least vulnerable in urban areas because of limited change in occupation, low loss in working days and lower recovery period. People engaged as hawkers seem to be most vulnerable with loss of productive asset at 22.2%, and approximately 55.6% respondents suffer a loss between 3 days to 10 days, and 33.3% suffering a loss between 11 days to a month. The recovery days for hawkers lies in 11 days to a month for 33.3% hawkers, and more than a month for 44.4% of hawkers. Other occupations in urban areas are also vulnerable as 43.5% respondents suffer a loss between 3 days to 10 days, and 34.8% suffering a loss between 11 days to a month. The recovery days for 'Others' lies in the range 11 days to a month for 73.9% people. More than 24% laborers change their occupation which is considered as one of the coping strategy.

Peri- urban area:

Here, labor occupations are the most vulnerable, with 81% suffering loss of working days in the range of 3 to 10 days and recovery period for 60.5% in the range of 3 to 10 days, and rest 39.5% in the range of 11 days to a month. Other occupations also suffer without security.

Rural area:

Rural area sees higher loss in social respect with all occupations reporting high percentage due to continued effect of floods - Service Sector (51.2%), Labour (46.2%), Cultivator (63.2%), Hawker

(44.4%) and 'Other' occupations (60.0%). Both labor and cultivator occupations are related to the land and these suffer the major damage during the effects of floods; hence most vulnerable occupations. These are agricultural sector and agro-related occupations. Laborers have 65.4% loss of working days in range of 3 to 10 days, while 26.9% suffer loss of working days from 11 days to a month. The cultivators suffer a loss of 47.4% in range of 3 to 10 days, while another 47.4% suffer loss of working days from 11 days to a month. The recovery for these two occupations also lie more than 50% in the range of 11 days to a month. Here as well, service sector is least vulnerable.

Government is the most reliable stakeholder in the times of disaster (See Figure 5.14). The reliance of urban, peri-urban and rural population on government is 42.6%, 32.0% and 90.0% respectively. Around 68% peri-urban respondents approach no one in particular for help. People's reliance on community is scarce and is found only in urban area (8%) where the people with similar occupational background live together. There is no evidence of presence of community based organizations based on religious, occupational or any other common characteristics. In the rural areas, individuals help each other during the floods, but there is lack of a community plan. The survey establishes the importance of employment opportunities in the post disaster scenario. The results also establish that employment is the priority sector in all the three spatial domains of urban, peri-urban and rural areas; the respondents believe that better employment opportunities can reduce the impact of the floods (See Figure 5.15).

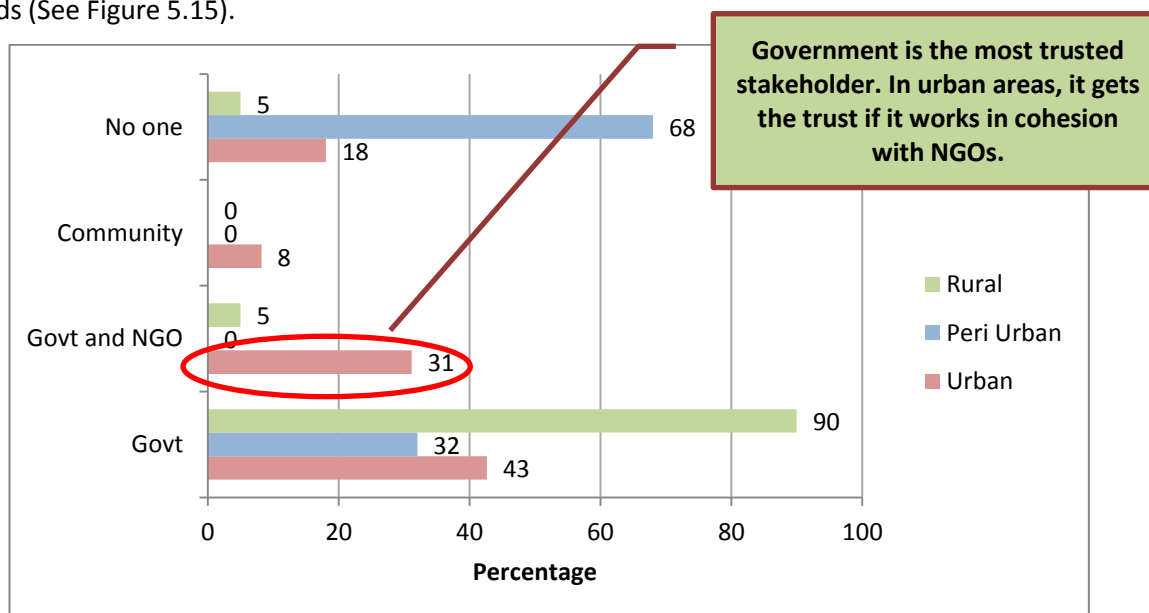


Figure 5.14 Most reliable stakeholders during the floods in Greater Ahmedabad (Urban (N=105), Peri-Urban (N=50), Rural (N=100))

Respondents could chose more than one option

The study finds evidence for three types of flow elements between urban, peri-urban and rural areas, namely; people, finance, and social interactions (See Figure 5.16). Majority of the population (80% urban, 50% peri-urban and 84% rural) visit the urban/ native rural areas, and hence are in constant touch with the family members. 37% urban respondents have their family in rural areas, while 46% of peri-urban respondents have their family in nearby rural areas. Amongst rural respondents only 6% have their family in urban areas of Greater Ahmedabad. A small percentage of these family members send remuneration or transact financially for reasons such as education, and living expenses. Approximately 50% of urban and peri-urban respondents own assets in villages, such as land and house. Only 9% of rural respondents own houses or land in urban areas.

Employment is perceived as the best strategy to reduce the impacts of floods. When asked further most of these respondents expressed hope for entrepreneurial opportunities and SHGs

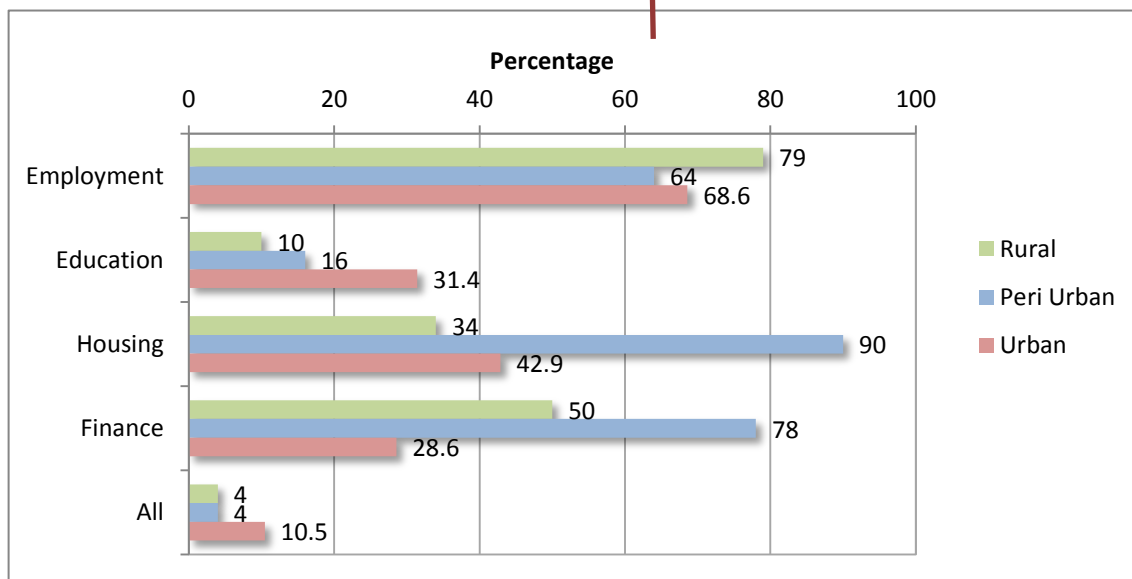


Figure 5.15 Priority sectors to reduce the impact of floods in Greater Ahmedabad (Urban (N=105), Peri-Urban (N=50), Rural (N=100))

Respondents could chose more than one option

There is urban-rural dependency in terms of flow of people and finance; and social interactions. Correlation analysis also proves that people having assets in other spatial area have more chances of relying on that area.

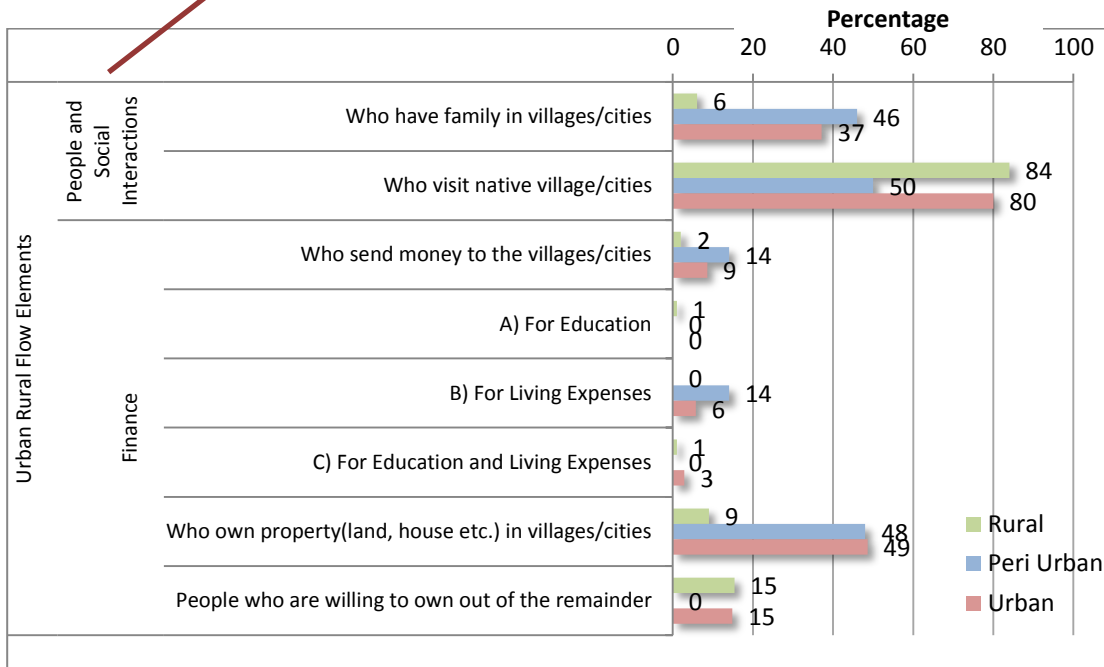


Figure 5.16 Urban Rural Linkage Flow Elements in urban, peri urban and rural area (Urban (N=105), Peri-Urban (N=50), Rural (N=100))

5.6.4 Correlation Findings

In urban areas, the choice of rural survival strategy in case of unemployment (RSSU) is correlated to asset ownership in villages (0.382 (sig. 0.000)), family residing in rural areas (0.333 (sig. 0.001)), and the households experiencing loss in social respect (0.272 (sig. 0.005)). The choice of rural survival strategy in case of disaster (RSSD) is moderately correlated to asset ownership in villages (0.486 (sig. 0.000)) and also correlated to family members residing in rural areas (0.374 (sig. 0.000)). The RSSU is highly correlated to RSSD at 0.737 (sig. 0.000) (See Table 5.6).

In peri-urban areas, the RSSU is correlated to loss of working days (11 days to a month) at 0.306 (sig. 0.031), and to asset ownership in villages at 0.307 (sig. 0.030). RSSU is also correlated to the household who have family residing in the rural area at 0.319 (sig. 0.024). The RSSD is moderately correlated at 0.420 (sig. 0.002) to asset ownership in villages, and to households with family living in

Table 5.6 Correlation Results for urban, peri-urban and rural respondents

				Urban		Peri urban		Rural	
S.No.	Parameters			Rural Survival Strategy in case of unemployment RSSU	Rural Survival Strategy in case of disaster RSSD	Rural Survival Strategy in case of unemployment RSSU	Rural Survival Strategy in case of disaster RSSD	Urban Survival Strategy in case of unemployment USSU	Urban Survival Strategy in case of disaster USSD
1	Household Annual Earnings	<20000	Pearson Correlation	-.039	-.075	-.042	-.058	.235*	.160
			Sig. (2-tailed)	.693	.444	.771	.691	.019	.112
		20001-40000	Pearson Correlation	-.042	-.030	-.075	-.102	.057	.084
			Sig. (2-tailed)	.668	.759	.607	.481	.572	.406
		40001-70000	Pearson Correlation	.051	.084	-.079	-.197	-.221*	-.068
			Sig. (2-tailed)	.603	.392	.586	.170	.027	.504
		70001-90000	Pearson Correlation	-.010	-.058	-.020	.005	.125	.076
			Sig. (2-tailed)	.919	.560	.892	.972	.216	.450
		90000-180000	Pearson Correlation	-.032	-.005	.180	.313*	-.187	-.229*
			Sig. (2-tailed)	.745	.959	.212	.027	.062	.022
		> 180000	Pearson Correlation	.136	.111	-.042	-.058	.100	.035
			Sig. (2-tailed)	.167	.259	.771	.691	.323	.730
2	Loss of Working days	0 to 2 days	Pearson Correlation	.168	.196*	-.098	-.134	.123	.101
			Sig. (2-tailed)	.087	.045	.497	.352	.222	.320
		3 to 10 days	Pearson Correlation	-.249*	-.274**	-.180	-.043	.335**	.200*
			Sig. (2-tailed)	.010	.005	.212	.766	.001	.046
		11 days to a month	Pearson Correlation	.162	.159	.306*	.169	-.333**	-.245*
			Sig. (2-tailed)	.098	.105	.031	.239	.001	.014
		Greater than a month	Pearson Correlation	.009	.029	-	-	-.064	.039
			Sig. (2-tailed)	.925	.771			.527	.699
3	Loss in social respect	Pearson Correlation	.272**	.127	-	-	.253*	.120	
		Sig. (2-tailed)	.005	.195			.011	.234	
4	No of visit to rural areas in a year (Once a month)	Pearson Correlation	-.071	-.087	-.075	.383**	.380**	.405**	
		Sig. (2-tailed)	.473	.380	.607	.006	.000	.000	
5	Asset ownership in villages	Pearson Correlation	.382**	.486**	.307*	.420**	.384**	.313**	
		Sig. (2-tailed)	.000	.000	.030	.002	.000	.002	
6	Change in occupation	Pearson Correlation	.006	-.004	-.042	.354*	-.063	.000	
		Sig. (2-tailed)	.955	.971	.771	.012	.537	1.000	
7	Family residing in rural areas	Pearson Correlation	.333**	.374**	.319*	.437**	-.034	-.084	
		Sig. (2-tailed)	.001	.000	.024	.002	.734	.405	
8	Rural/Urban Survival Strategy in case of unemployment	Pearson Correlation	1	.737**	1	.731**	1	.816**	
		Sig. (2-tailed)		.000		.000		.000	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

rural areas at 0.437 (sig. 0.002). It is also correlated to change in occupation at 0.354 (sig. 0.012), once a month visit to urban area in a year, with the value of 0.383 (sig. 0.006) and household annual earnings between 90000 INR to 180000 INR at 0.313 (sig. 0.027). The RSSU is highly correlated to RSSD at 0.731 (sig. 0.000). In rural areas, the urban survival strategy in case of unemployment (USSU), is positively correlated to asset ownership in villages (0.384 (sig. 0.000)), once a month visit to urban area in a year, with the value of 0.380 (sig. 0.000), loss of working days (3 to 10 days) (0.335 (sig. (0.001))), loss in social respect (0.253 (sig. 0.011)), and household earnings less than 20000 INR (0.235 (sig. 0.019)). The urban survival strategy in case of disaster (USSD) is similarly correlated to once a month visit to urban area in a year 0.405 (sig. 0.000), asset ownership in villages (0.313 (sig. 0.002)) and loss of working days (3 to 10 days) (0.200 (sig. (0.046))). The USSU is highly correlated to USSD at 0.816 (sig. 0.000).

5.7. Summary

This section discusses the results obtained in the previous section, and how these results are relevant for post disaster recovery process (see Figure 5.17). The smaller natural hazard events, such as in Ahmedabad, have the potential of seriously affecting the welfare of the household or community in question, but are not considered as disasters as their impact is not collectively significant in the bigger picture. Nevertheless, the cumulative effects of high-frequency smaller hazards over a longer period might have an appreciable effect at aggregate levels, like changes in the behavior of economic factors because of the perceived risks. The recurring nature of hazards every two years does not allow the communities to recover, countermining their resilience. Therefore, it is important to account for and analyze these events and their impacts through the methodological framework discussed in this study. The calculation of indirect economic loss to the population becomes incomprehensible, yet identification of the spheres of loss would be beneficial.

The correlation analyses give useful insight into the factors that are playing a role in shaping up people's willingness to rely on other spatial areas. The mutual dependence is mostly governed by the presence of family members, asset ownerships in the other spatial area, and whether the population is visiting other spatial areas for any reason. Other factors which determine the financial security of a household, such as household income, loss of working days, and change in occupation, also have a bearing on the people's perception.

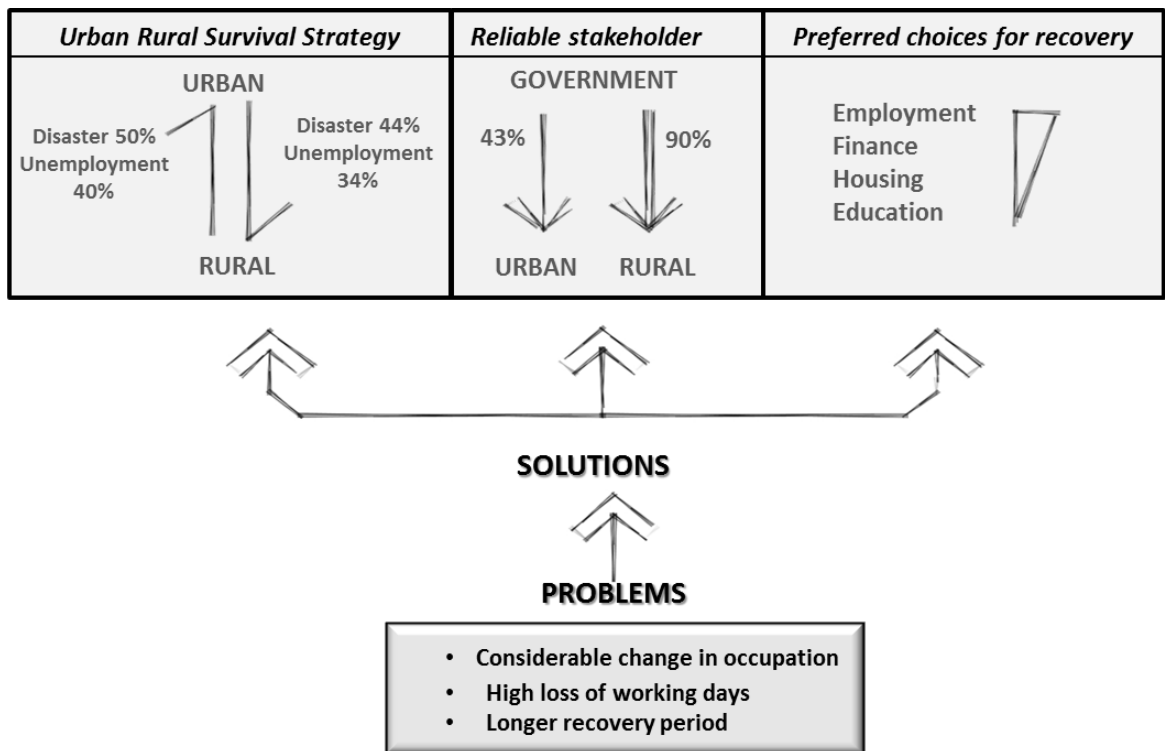


Figure 5.17 Summary of results for Ahmedabad case

This chapter identifies the vulnerable occupations and their spatial characteristics. Applying a combination of descriptive and explanatory statistical analyses of quantitative data the chapter concludes that there is insignificant help from within the communities or community based organizations for economic recovery of the affected population. This trait does not allow the communities to utilize the inherent potential in building their resilience based on their own coping strategies. Also, a low income household perceives an event of disaster and situation of unemployment similarly. The government should have the same perception of managing the post disaster recovery and provision of employment. This would help to devise policies addressing both the issues together, with an aim to gradually strengthen the resilience at the macro level.

The reliance of rural population on the urban areas post disaster or hazard has been traditionally observed in the developing countries. This study adds that the urban population also relies on their assets and social network in the rural areas in case of both unemployment and disasters. This fact provides an opportunity to administer the urban-rural flow elements to the advantage of the low income population. Managing the flow of people, and money; and utilizing the social linkages of the population from the urban and rural areas, would exploit the inter dependencies of these spatial areas for faster disaster recovery. For example, urban and rural areas share natural resources for

their survival and it would be prudent to avoid their degradation which is a threat to the livelihood and recovery.

The ensuing chapter 6 presents a similar study taking the case of Jamnagar's coastal salinity problem.

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Chapter 6

Vulnerable Occupations for Coastal Salinity in Jamnagar

This chapter presents the overview of the salinity problem in western India and the associated issues. It takes up the case study of Jamnagar district in the state of Gujarat in India, which has been plagued by coastal salinity problems for more than 50 years. To minimize the damage due to salinity, both the urban and rural areas have to maintain a mutually benefitting symbiotic relationship. Focusing on this relationship, the chapter tries to identify the links between the slow-onset disaster and the components of local livelihood. It also presents the findings of a household survey in the form of coping strategies adopted by both urban and rural communities and individuals. The chapter ultimately underlines the importance of urban-rural linkage in the wake of increased vulnerability. The chapter also tries to answer whether the long term disaster have a role to play in determining the recuperating capacity of the residents in terms of vulnerability of occupation they are engaged in.

6.1. Jamnagar and Climate-related hazards

The state of Gujarat is blessed with coast measuring 1600 kilometers, the longest coastline of the country. Out of twenty five districts in the state 13 districts have coastline on the western boundary of the state. The coastline of Gujarat is characterized by rich ground water and mineral deposits of limestone, bauxite and lignite. These advantages have resulted in development of ports, industries, pockets of irrigated agriculture in past few decades. The coastal plain on an average is about 30 km in width and has an average height of above 76 m above mean sea level; at some places rising up to 150 m. Jamnagar is a district in the region of Saurashtra with similar topographical characteristics. The entire coastal region adjoining Saurashtra and Kutch is a multi-disasters zone prone to recurring droughts, cyclones and earthquake. The droughts are regular phenomenon which has led to increased dependence on limited ground water resources causing over exploitation of valuable natural resource. Also, the frequent droughts coupled with the ingress of salinity are turning huge tracts of land along the Gujarat Coastline infertile and forcing the inhabitants to migrate.

Gujarat coast receives low rainfall, ranging from 400 mm to 800 mm annually, which is unevenly distributed across the coast. The coast has deep geological formations with salt laden winds of high velocity blowing from the sea. The topography of Saurashtra resembles an inverted saucer, with the

area being drained by number of South- Western flowing rivers. Mud flats and marshy lands are common near the estuaries of the rivers. Geo-morphologically, the coastal tracts of Gujarat exhibit vast diversity in terms of landforms and terrain characteristics, attributed to various onshore and offshore processes. The entire coast line on Saurashtra and Kutch receive water from numerous rivers that travels a distance less than 200 Km. The salinity ingress in the region was first reported in the 1960s. Since then salinity ingress progressed at an average rate of half a Km/year. The salinity ingress was recorded at a distance of 4 Km. from sea coast in 1977 and has reached up to 10-12 Km. at present.

6.1.1. Jamnagar

Jamnagar is a western district in the state of Gujarat (see Figure 6.1). Jamnagar city is the Headquarter of Jamnagar district in Gujarat. It is situated on the confluence of rivers Nagmati & Rangmati, on north latitude $22^{\circ} 28'$ and East longitude $70^{\circ} 07'$. There are six talukas (sub districts) in Jamnagar district (see Figure 6.2). The study is limited to the talukas of Jamnagar and Jodiya. Jamnagar today is an important industrial center because of it has having two-mega refinery project as Reliance and Essar. It is also developed as a brass city. It has well developed civic infrastructure in the form of intra city transport and water supply Ranjit Sagar built during Jam rule, supplies water for the city. According to the 2011 census it had a population of 2,159,130. Its population growth rate over the decade 2001-2011 was 13.38%. Jamnagar exhibits the characteristics of Saurashtra region referred earlier. Other specific characteristics of the district which are related to salinity are as follows:

- Average rainfall varies from 475 mm to 600mm
- Geological formations of different types of limestone, laterite with variation in thickness
- Rich aquifer thickness in limestone
- Most of the drainage flows towards gulf
- Presence of a protected forest area designated as Marine National Park
- Industrial development – salt, bauxite mining, cement, fisheries and lately oil refinery
- Prone to multi-disasters such as droughts, cyclones, earthquakes and salinity.
- Multi-source based livelihood

The case of Jamnagar differs from Ahmedabad's case in some regards in terms of Urban-rural flow

elements (see Figure 6.3). The longer and continued effect period of salinity causes a significant portion of population to migrate outside from villages of Jamnagar to other urban centers in Gujarat state. Also, the flow of raw materials is higher from rural areas to urban areas. Many traditional industries based in rural areas also provide finished products to the urban areas. The coastal salinity causes shortage of drinking water in the rural areas and hence there is dependency of rural areas without water on those which have some. The social interactions to negate the effects of the hazards are absolutely missing in the urban areas while rural areas have their interactions going with external support of NGOs. The flow of governance in the form of policies (land-development), resource management and administration is predominantly in the direction of urban to rural areas.

6.1.2. Coastal salinity

Salinity is the presence of soluble salts in or on soils, or in waters. High levels of soluble salts may results in reduced plant productivity or the elimination of vegetation (QDPI 1987). Salinity is a phenomena contributed both by natural reasons and human activities. It characteristically undergoes huge variation in magnitude and impact over a long duration. Salinity has still not been accepted as a disaster, even though its scale has been on a rise with increased number of people getting affected. The primary reason for such perception is that it is a 'creeping disaster' (Spennemenn 2003), and its effects are seen only over a long term. In fact, with the depletion of resources and deterioration of livelihood base, the impact becomes stronger by passage of time. The long term chronic disaster has affected a large proportion of population, both urban and rural, and had huge bearings on their daily lives.

The salinity ingress in Gujarat is the slow onset phenomena and does not include the shock-induced salinity. Along the state's coastline it is increasing at a massive rate of 0.5 kilometer per year. Salinity has affected over 1.8 million households in the state, 85% of population dependent on groundwater. The estimated impact of salinity due to sea water ingress can be gauged by the fact that it has affected approximately 1200 to 1500 villages in eight coastal districts in Saurashtra & Kutch regions of the state, which amounts to 1.06 million Ha of land along 1,125 Km. coastline. It is well understood that the salinity and water logging plays a crucial role in the decline of agriculture productivity, income and employment in irrigated agriculture (Joshi and Agnihotri 1984; Joshi and Jha 1992; Nayak 2002).

The reasons for coastal salinity can be enumerated as follows:



Figure 6.1 Location of Jamnagar district in Gujarat state

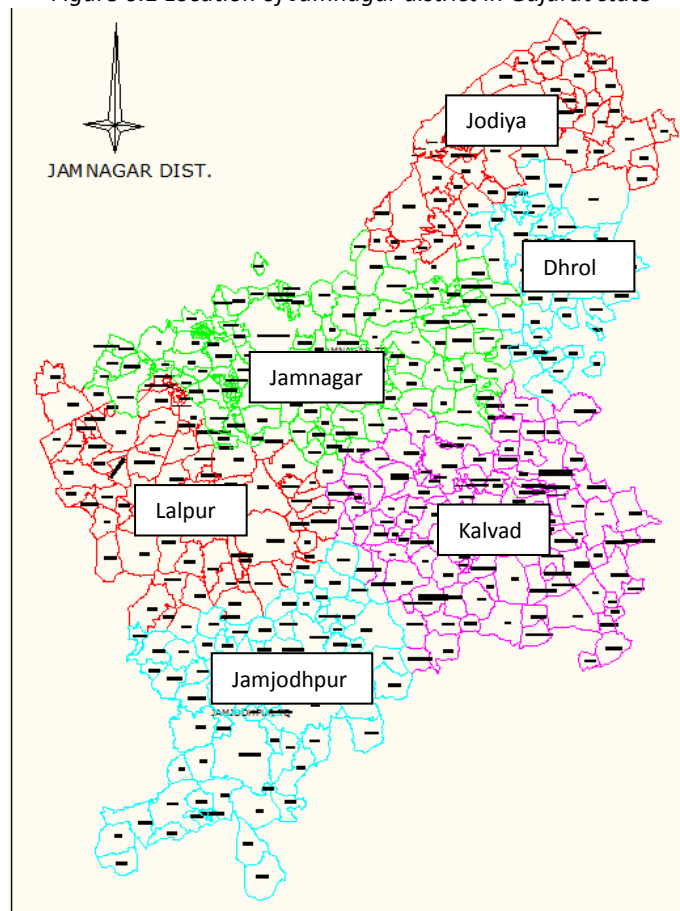


Figure 6.2 Taluka (sub-districts) in the district of Jamnagar

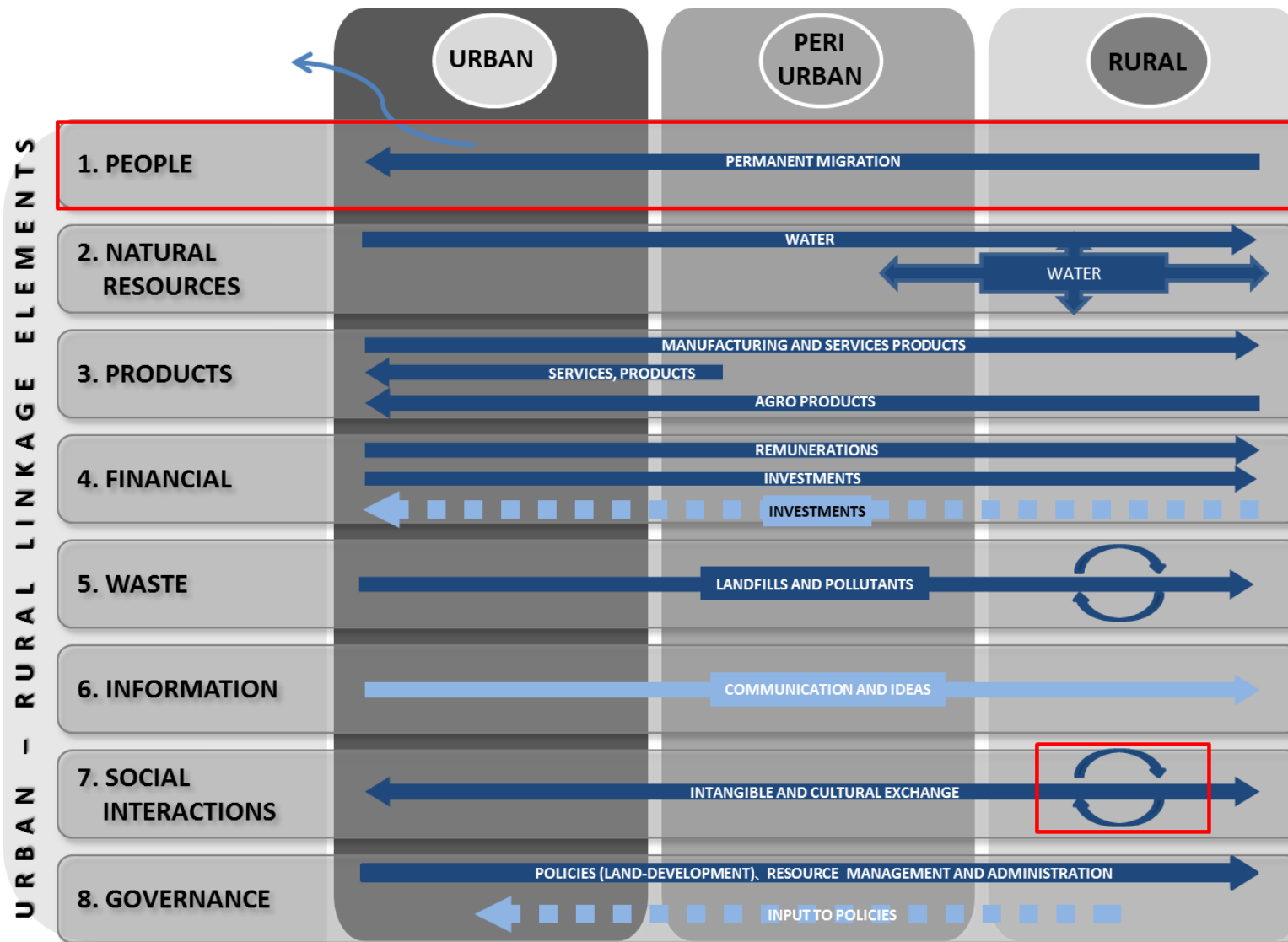


Figure 6.3 Urban-Rural Flow Elements in Coastal Salinity in Jamnagar

- Change in rainfall pattern (see Figure 6.4 and Table 6.1),
- Continuation of water intensive cropping,
- Increase in Ground water draft for agriculture use after electrification around 1970,
- Use of conventional flow method for irrigation,
- Lack of proper disposal of industrial effluent,
- Percolation of sea water stored for various industrial operations,
- Bauxite and laterite mining,
- Transportation of salt from salt pan increase soil salinity (see Figure 6.5), and
- Lack of maintenance of existing structures for sea water intrusion

Table 6.1 Rainfall pattern in Jamnagar

	Average Rainfall (1991-2000)	1998	1999	2000	2001	2002	2003
Jamnagar	480.6	787.2	310.6	395.7	734.6	327.3	749.2

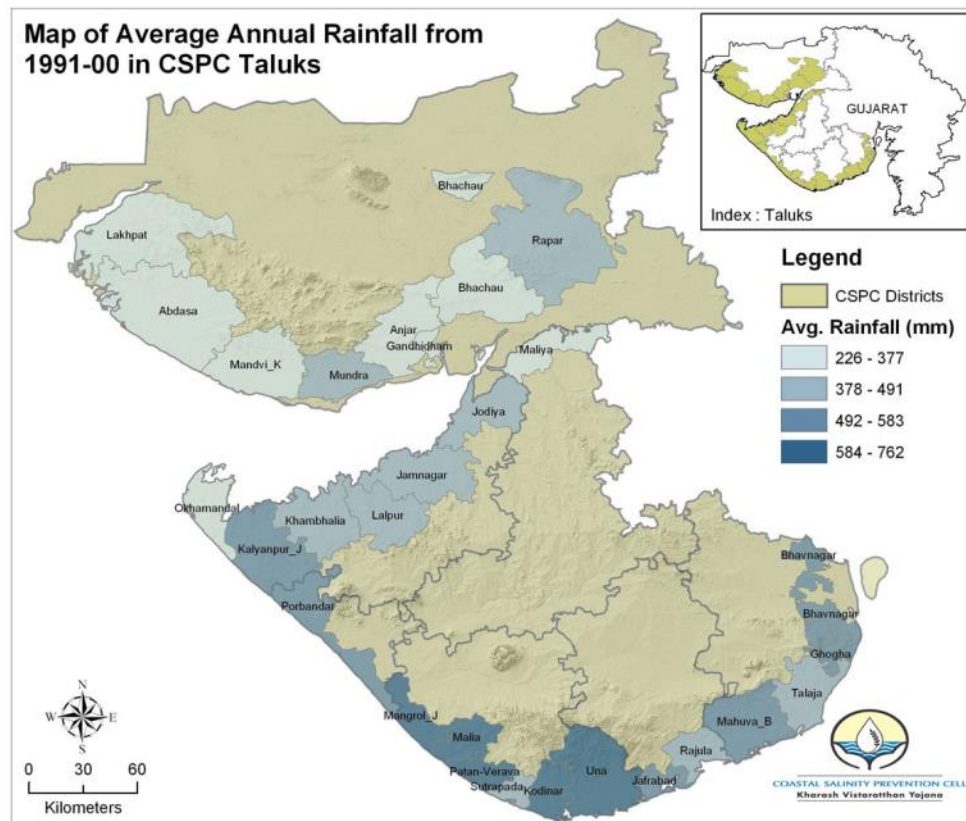


Figure 6.4 Average Rainfall from 1991-2000 in CSPC Study Talukas (Source : CSPC 2008)

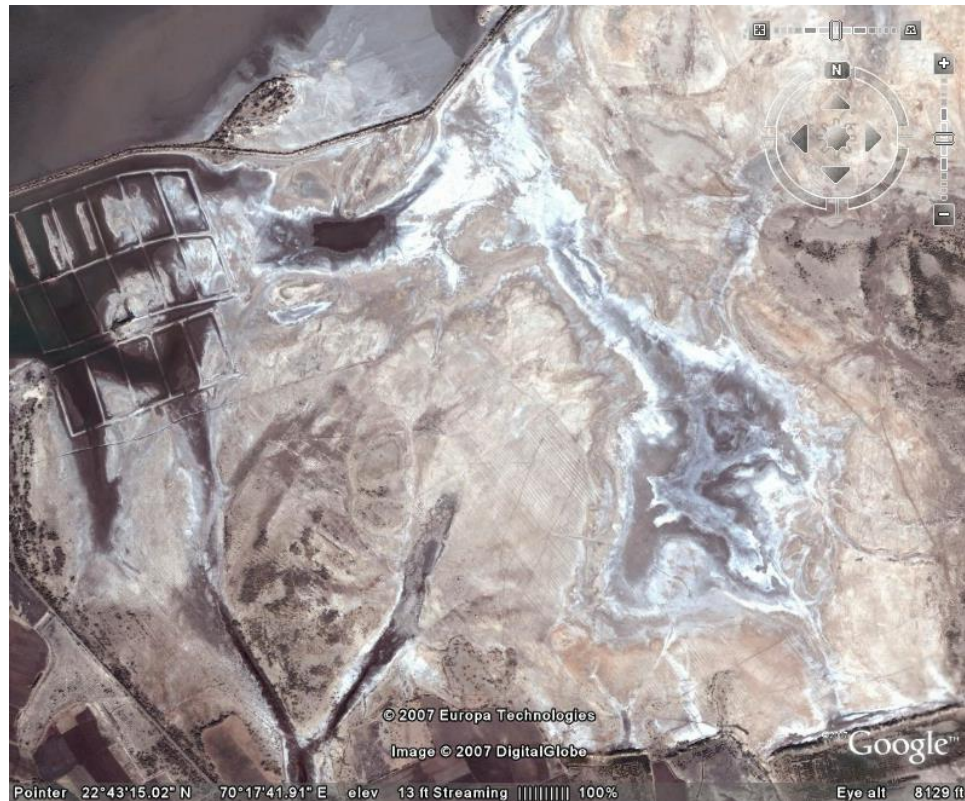


Figure 6.5 Jodiya- Impact of salt pan as seen through a Google satellite image

Salinity impacts on health, habitat, livelihood (occupations)

The salinity impacts the communities and individuals in more ways than one; namely socio economic characteristics, employment opportunities, drinking water and health, land and water resources and occupations like agriculture, laborers and rural industries. While evaluating the impacts of the salinity problem, one should consider the intensity and impacts at the local as well as regional level and how the local population is trying to deal with these problems. The most crucial determinant for salinity impact is the impact on the livelihood and therefore needs thorough study. Additionally, the impact of the policies of the government on the population can also be evaluated. In the case of Jamnagar, the high intensity of industrial and agriculture activity mainly dependent on ground water resources has its negative fallout in terms of rapid salinity ingress. This has adverse impact on the lives and livelihoods of coastal communities leading to large scale out-migration from coastal communities, particularly of poor and marginalized population. The other impacts include the deterioration of sand quality and the rain water run off gets saline causing the deterioration of the fresh water resources. The population also suffers from water-borne diseases such as formation of

kidney stones, and fluorosis. The occupations related to rural industries, agriculture, fisheries, and animal husbandry can be considered as the vulnerable occupations in the rural areas. Similarly, in the urban area, the occupations based in service industries may not be directly impacted due to salinity but the urban population might be affected, owing to numerous linkages existing between the urban and rural area, and therefore between the urban and rural population. Another dimension to these impacts is of spatial nature. The problem originates from the rural area but the impacts are felt in the urban domain as well. For example, the addition of migrant population to the urban area due to salinity would cause pressure on the urban infrastructure.

Salinity and livelihood: temporal and spatial scales

The agricultural output is effected by exposure to both micro and macro environmental factors. Stress may be caused due to abiotic factors like high temperature, cold, drought, salinity, or the biotic factors like viruses, insects, nematodes, bacteria, fungi etc. At a given point of time, plant may have to face even a combination of more than one of above mentioned factor. However, amongst these stresses, salinity has emerged as one of the most serious factors limiting productivity of agricultural crops as well as claiming a substantial farmable area. The loss of farmable land due to salinization is in direct conflict with the burgeoning population posing a major challenge for maintaining food supplies.

Extent of salinity in Jamnagar

The villages affected by salinity are at a distance in radius of 0 to 30 Km. Salinity is found both in soil and water. The soil salinity has increased rapidly in most villages during the last 15 years. However, it is a slow phenomenon which affects the coastal area and its habitants at a slow but consistent pace, over the last 40 years. As of year 2008, 445,000 people (71,000 households) were affected in Jamnagar coastal villages (CSPC 2009). The total geographical area affected is approximately 445000 ha (50% is fully saline, 20% is partially saline and 30% is probable saline area). At *taluka* (an administrative division of a district in India) level, the villages were designated on the basis of Total Dissolved Solids (TDS) level in water samples collected by Public Health Department (PHD) during 2004, as shown in Figure 6.6 and Table 6.2. These villages are divided into three categories as below:

1. Saline villages- having TDS more than 2000 ppm.
2. Partial saline villages-having TDS less than 2000 ppm, but greater than 1000 ppm,
3. Prone to salinity villages-having TDS less than 1000 ppm.

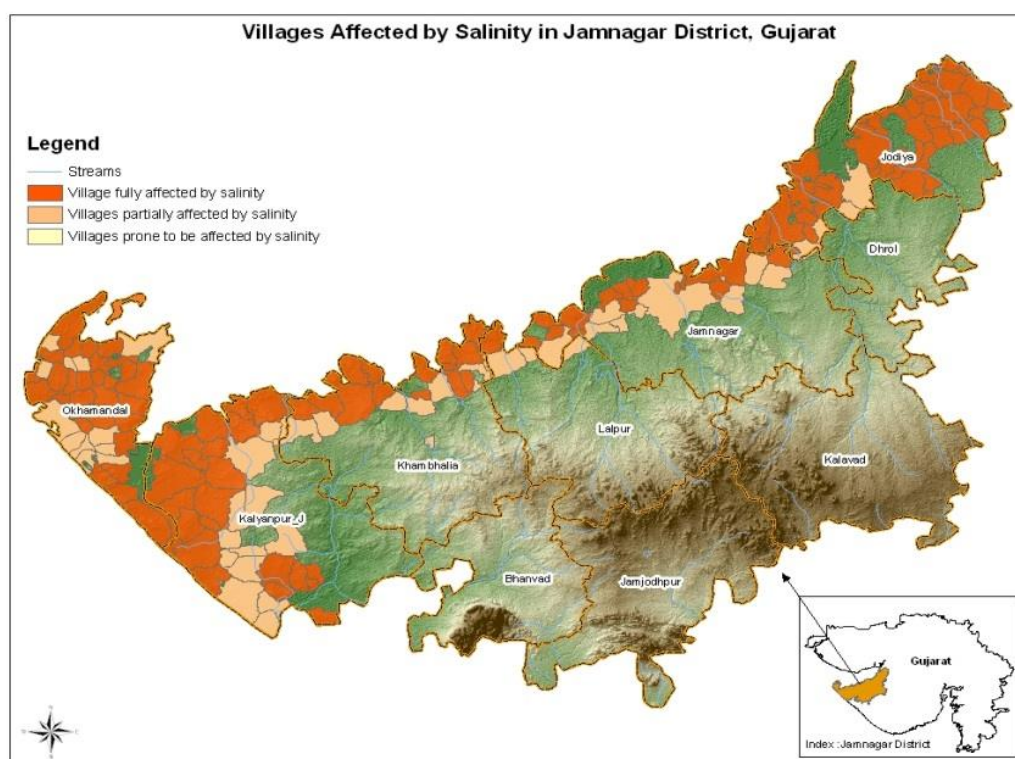


Figure 6.6 Villages affected by salinity in Jamnagar and Dwarka districts, Source : CSPC 2009)

Table 6.2 Number of salinity ingresses villages in Jamnagar

Taluka	Salinity category			
	Fully saline	Partial saline	Probable	Total
Jamnagar	15	10	34	59
Jodiya	37	4	0	41
Kalyanpar	22	12	7	41
Khambhaliya	18	8	15	41
Lalpur	1	3	18	22
Okha mandal	34	12	0	46
Total	127	49	74	250

6.2. Occupational Profile of Jamnagar Urban and Rural Area

The main occupations in Jamnagar district in farm sector are: small and marginal farmers, pockets of fishing community around Okha, Harshad, Jodiya, and agriculture laborers whose percentage is highest. The non – farm sector includes skilled and unskilled jobs around industrial development in

Jamnagar, Khambhalia and Okha, and tourism jobs based in Okha. Figure 6.6 shows the distribution of people engaged in major occupations across the various talukas in the district. Most of the villagers derive their livelihood from the farming activities and the agriculture based labour. A disruption in these activities would not only affect the lives of the rural population but also the population living in urban areas, as most of the families in urban area are linked with the rural population through the linkages in the form of remittances, food supply, information or social interactions.

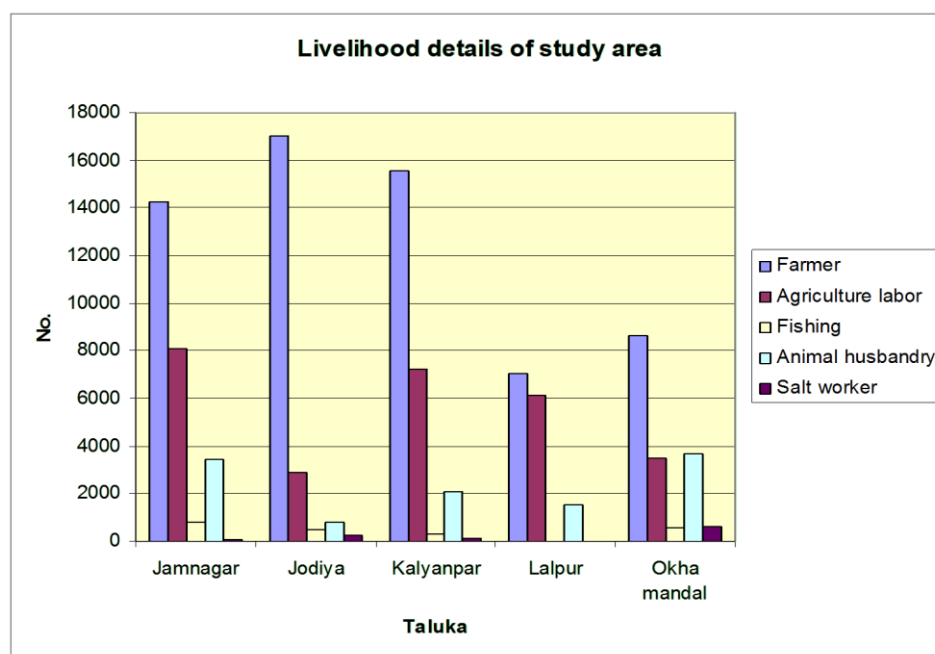


Figure 6.7 Livelihood components in different Talukas in Jamnagar district (2009)

6.3. Methodology for analyses: Exploring vulnerability of occupations

The qualitative and quantitative information was collected through recording secondary information as well as information surveyed through respondents from respective villages. The responses at village level were recorded in a pre-defined questionnaire seeking information regarding village demography, livelihood, infrastructure and institutions. The secondary information collected was from the primary sources like villagers, records of village and taluka Panchayats and village institutions like dairy co-operatives, NGOs, and other co-operative structures.

Apart from recorded information, the survey also aimed at collection of information on affected peoples' perception and history of salinity in villages, trends of major sectors like agriculture, animal

husbandry, fisheries, and drinking water. The survey process was carried out in two phases where in the first phase the village information was collected by the village level field investigators by personal visits to the concerned villages and interaction with various stakeholders. On the completion of the collection of the village wise quantitative and qualitative information in each taluka, a taluka level consultation was carried out across the study talukas. The village level qualitative and quantitative information gathered through the village survey, taluka/cluster meetings, interviews with concerned stakeholders and case studies, was analyzed at taluka level and consolidated at district level to understand the type of salinity, area and population affected by salinity, changes taking place due to salinity in agriculture, animal husbandry and fisheries, variation in above with respect to distance from the coast line, and the peoples initiatives and its success.

6.3.1 Framework of the study

The framework of the study at Jamnagar remains the same in the case of Ahmedabad as explained in the previous chapter, with contextual adjustments for the case of coastal salinity, as shown in Figure 6.8. It addresses both the approaches of Urban-rural flow elements and parameters for Vulnerable Occupations. In contrast to Ahmedabad, there are no peri-urban study locations as the peri-urban areas are not prominent in characteristics.

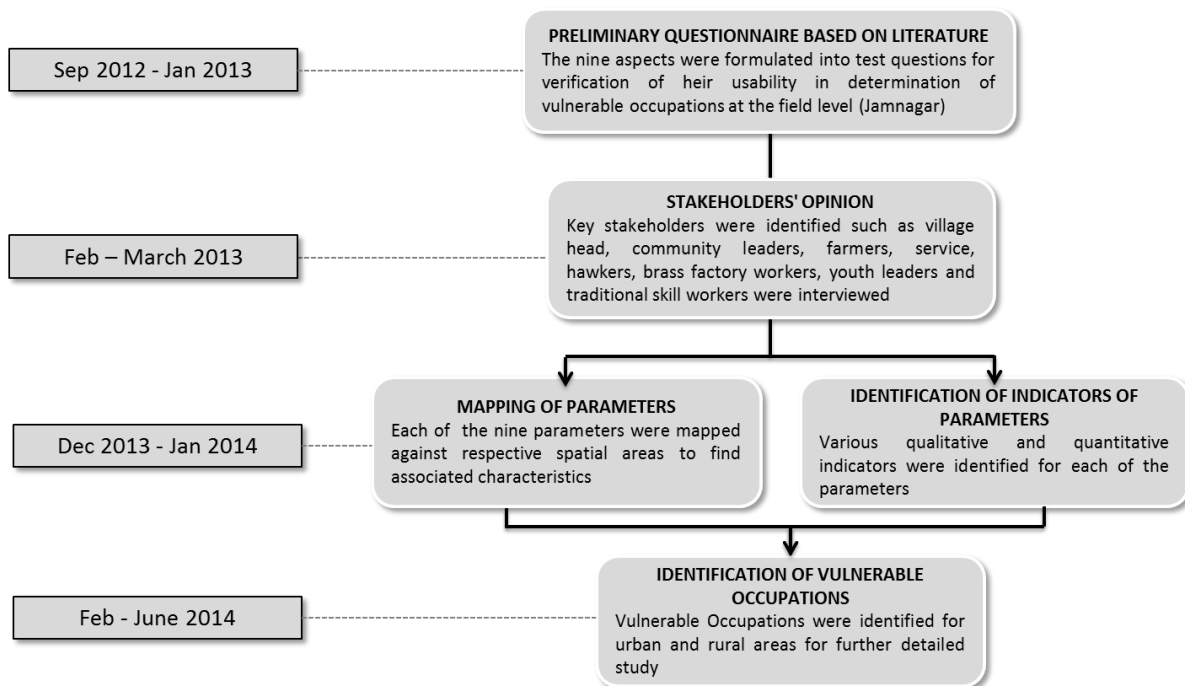


Figure 6.8 Research methodology of the study at Jamnagar

6.4. Key Informant Survey and Results

The objective of the key informant survey was to examine the relationship between the spatial characteristics and their community resilience. The respondents included the head of the villages (*Sarpanch*) and slums in urban Jamnagar, the elderly, the community representative/s, NGO workers in villages, female heads of the households, brass factory workers, traditional skill workers and fishermen.

The key informant survey was performed with the help of Rural development department of Government of Gujarat. It included responses from the 9 sites listed in Table 6.3. These areas were selected on the basis of data on the salinity prone areas provided by Coastal Salinity Prevention Cell (CSPC) of Gujarat Government. It included questions based on the background, salinity experience, migration or displacement, occupation and alternative livelihood activities, the impact on the assets (human, natural, physical, social, and financial capital). It also included perception on urban-rural linkages and potential role of stakeholders. The answers were open-end type which enabled to collect unbiased information without prompting any answers. Please refer to Annexure 4 (Page xxxiii) for details.



Figure 6.9 Images showing some of the villages in the study area (R3 and R4)

Table 6.3 Respondents' details for Key Informant Survey

CODE	STUDY LOCATIONS	TALUKA	No. of RESPONDENTS	RESPONDENTS
URBAN				
U1	RAJIV NAGAR	JAMNAGAR CITY	5	Community representatives of the slums, the elderly, NGO workers, female heads of the households, brass factory workers, traditional skill workers
U2	JOGNI NAGAR		4	
U3	MAYURNAGAR		4	
U4	PANA KHAN		3	
			16	
RURAL				
R1	DHUNVAV	JAMNAGAR	4	Head of the villages (Sarpanch), the elderly, the community representatives, NGO workers in villages,traditional skill workers and fishermen
R2	SACHANA	JAMNAGAR	5	
R3	KHIRI	JODIYA	3	
R4	BALACHADI	JODIYA	5	
R5	HADIYANA	JODIYA	5	
			22	
		Total	38	

6.4.1 Study Area



Figure 6.10 Study area locations

The rural study locations were selected from the saline villages shown earlier in the Figure 6.6 and identified by Coastal Salinity Prevention Cell (CSPC) based on the criteria discussed earlier. Figure 6.9 shows the images of some of the study villages showing key informant surveys being conducted. Figure 6.10 shows the map locations of villages R1 to R5, located along the coast of Arabian sea and urban locations, U1 to U4. The urban study locations were identified based on the slum and low-income settlement locations provided by Jamnagar Municipal Corporation (JMC) and Jamnagar Area Development Authority (JADA). Four out of 52 such locations were identified for detailed study.

6.4.2 Results of the Key Informant Survey

Migration : In both the spatial locations; urban and rural, migration is a major issue. The urban population is eager to move to other urban centers of Gujarat for better quality of life, while the rural population has its eyes on Jamnagar city to revive their income, affected by salinity in their villages. The rural population migrates temporarily to urban areas in search of jobs during the months they do not get any alternative income. With the dearth of non-agriculture based jobs in rural areas, the rural population has to rely on urban areas for better opportunities. The trend is gaining prominence in scale and the period of the year during which the male population is relying on urban opportunities to earn. This causes a shift in the local economy and its workforce distribution.

Social capital : Unlike Ahmedabad, there is no positive aspect amongst urban communities. The communities are well dispersed and not knit by a common occupation. Even though, a majority of urban population is engaged in daily wage labor, they compete instead of assisting each other. In rural areas self-help groups are being formed to help each other financially to cope with the salinity. The urban population believes that the education will improve their accessibility to urban jobs, thereby bringing economic stability which would serve better for the next generation. Also, with the migration of male population from the villages there is imbalance caused in the social structure. With the continued effects of salinity there is slow recovery of low-income population in both urban and rural areas.

Economic : Similar to Ahmedabad, the financial capabilities and capacities of the people engaged in vulnerable occupations in rural areas is affected by a) decline in productivity (due to direct effects of salinity) and b) loss of productive assets; such as land, and animals (due to loss in fodder and drinking water) in rural areas c) loss of employment; due to loss of access to farm jobs, and

relocation of families to urban areas, d) reduced income; due to increased availability of laborers in rural areas for reduced amount of work. Overall this scenario derails the recovery of the majority of the population and pushes them into the cycle of poverty, worsened by the next hazard. The impacts of coastal salinity on various sectors are shown in Table 6.4.

Table 6.4 Impacts of Coastal salinity on various sectors

Rural Industries	Decline in productivity in pottery, weaving and tanning businesses	Vulnerable Occupations
Agriculture	Shift from farm to non-farm sector, decline of agricultural diversity (e.g. groundnut being replaced by cotton), decrease in the number of agricultural laborers, horticulture crops are fighting for survival, intensification of agriculture	
Fisheries	Fishing communities are affected as there is lack of drinking water	
Animal Husbandry	Reduction due to shortage of fodder and grasslands	
Land and Water Resources	Deterioration of Soil quality, Rain water run-off gets saline	
Drinking Water	Salinity ingress within potable water sources	
Health	Improper sanitation facilities, water borne diseases like kidney stones, Fluorosis etc.	
Socio-economic	Lifestyle, economic erosion and Migration	

6.5. Household Survey

The survey results from 9 sites across Jamnagar city and the coastal villages (listed in Table 6.5) were processed and analyzed under three main headings – spatial characteristics, coping strategies and the inter-relations of parameters under urban/rural survival strategy (see Figure 6.11 for images from the household survey). This section highlights the key findings.

6.5.1 Contents of the questionnaire

The household survey questionnaire consisted of parameters of vulnerable occupations and the urban-rural flow elements, converted into the questions, much on the lines of household questionnaire for Ahmedabad case. It accounted for the specific issues and solutions pertaining to coastal salinity in the options for the questions. It includes parameters of vulnerable occupations and the flow elements between urban-rural areas. It also included questions on salinity experience, displacement (nature, period, and reason), occupation (main and secondary, income, and number of earners), loss to productive assets used in carrying out occupations or household industries, loss of working days and its reason, recovery period, loss of social respect (perceived social status and if there has been a change in it), the presence of other stakeholders, membership of community-

based, religious or occupation-based organizations, and the coping strategies (both perceived and currently utilized). Please refer to Annexure 5 and 6 (Page xxxvii) for details.



Figure 6.11 Images showing key informant and household surveys being conducted

6.5.2 Scope of the study

In total, 283 households were surveyed during the months of December 2013 and January 2014, which included 148 from four urban locations (Rajivnagar, Jogininagar, Mayurnagar, and Pana Khan), and 135 from five rural areas (Dhunvav, Sachana, Khiri, Balachadi, and Hadiyana). For site details, number of respondents and characteristics refer to Table 6.5, and refer to Figure 6.9 for the images showing surveys being conducted. The percentage of household surveyed, to total households at various locations range from 5.24 to 9.40%. These locations were selected on the basis of data on

the extent of salinity provided by the Coastal Salinity Prevention Cell (CSPC) and the key informant survey elaborated earlier in section 6.4. The people who live in slums and have migrated to the study locations more than 12 years before have been considered as the residents of the locations instead of migrants for the sake of the study. All the urban respondents belong to this category and hence present a perspective from rural population settled in urban areas.

6.5.3 Categorization of Occupations

Most of the respondents rely on daily wages, with only a small portion employed in the service sector with guaranteed income. The categories of occupations for the study have been determined by considering three associated characteristics of skill set, income, and number of working days. The resulting five categories are given below:

- (i) Service Sector – includes government and private sector jobs
- (ii) Labor – includes construction labor and daily wage labor in urban areas, and agricultural labor and daily wage labor in rural areas
- (iii) Cultivator – includes small land owners who cultivate their own land
- (iv) Fisheries – includes fishing communities settled in the coastal villages
- (v) Others – For urban areas ‘others’ includes rag pickers, shopkeepers, private nursery owners, paper wrapping industry, cobbler, vegetable vendor, rickshaw puller. For rural areas it includes people involved in animal husbandry and shopkeepers.

6.6. Household Survey Results

The survey results from 9 sites across Jamnagar and Jodiya taluka were processed and analyzed under three main headings – spatial characteristics; and coping strategies and mechanism. This section highlights the key findings.

6.6.1 Background of the respondents

Amongst the respondents there were female respondents who were either family member or head of the households. Albeit this is a small percentage but this group gives input from the perspective of women, especially those running the household (see Figure 6.12 and 6.13). As Figure 6.14 and 6.15 shows the impact on family income is highest, which might be due to impact on agricultural sector impacting agro-based labors. In rural areas, drinking water, family income and land are the most impacted entities while in urban areas family income and land are most impacted.

Table 6.5 Jamnagar Urban and Rural Study Area Characteristics

CODE	STUDY LOCATIONS	TALUKA	SURVEYED HOUSEHOLDS	OCCUPATION	CHARACTERISTICS and OBSERVATIONS
URBAN					
U1	RAJIV NAGAR	JAMNAGAR CITY	38	Primarily Daily Laborer, Brass Factory Worker, Hawkers and engaged in Other occupations.	Physical - On the outskirts of the core city, Housing - Mostly semi-pucca and Kutch, <i>Easily accessible from the Southern villages in Jamnagar district</i>
U2	JOGNINAGAR		38		
U3	MAYURNAGAR		35		
U4	PANA KHAN		37		
			148		
RURAL					
R1	DHUNVAV	JAMNAGAR	31	Majorly Agricultural Labour, Fishermen and Small landholder Cultivator with few engaged in daily labour, salt pan workers, household industry, and as hawkers	Physical - Close to sea, Prone to High salinity Housing - Pucca, Semi-pucca and Kutch in equal proportions, Good connectivity to Jamnagar city
R2	SACHANA	JAMNAGAR	29		
R3	KHIRI	JODIYA	20		
R4	BALACHADI	JODIYA	25		
R5	HADIYANA	JODIYA	30		
			135		
		Total	283		

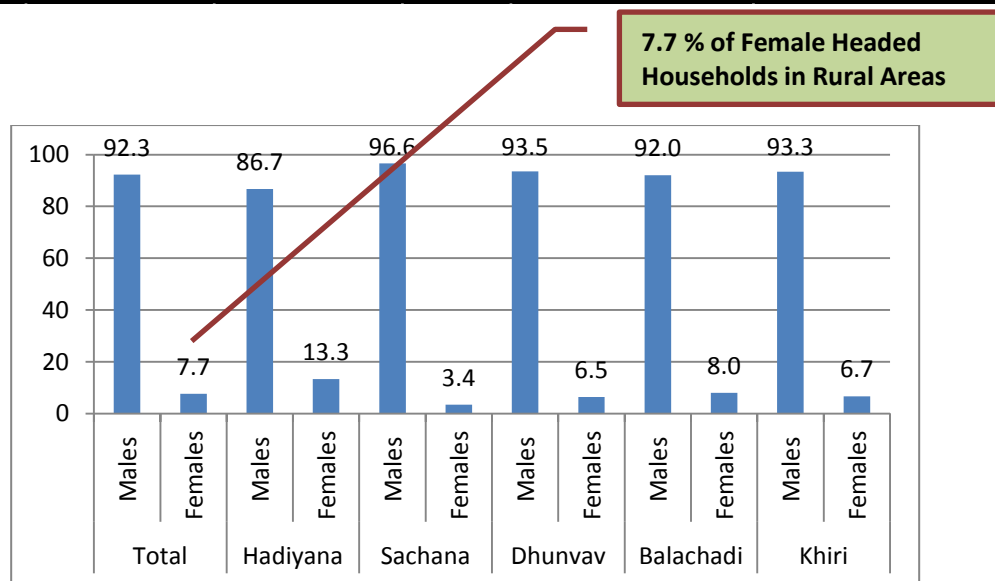


Figure 6.12 Profile of Rural Respondents (N=135)

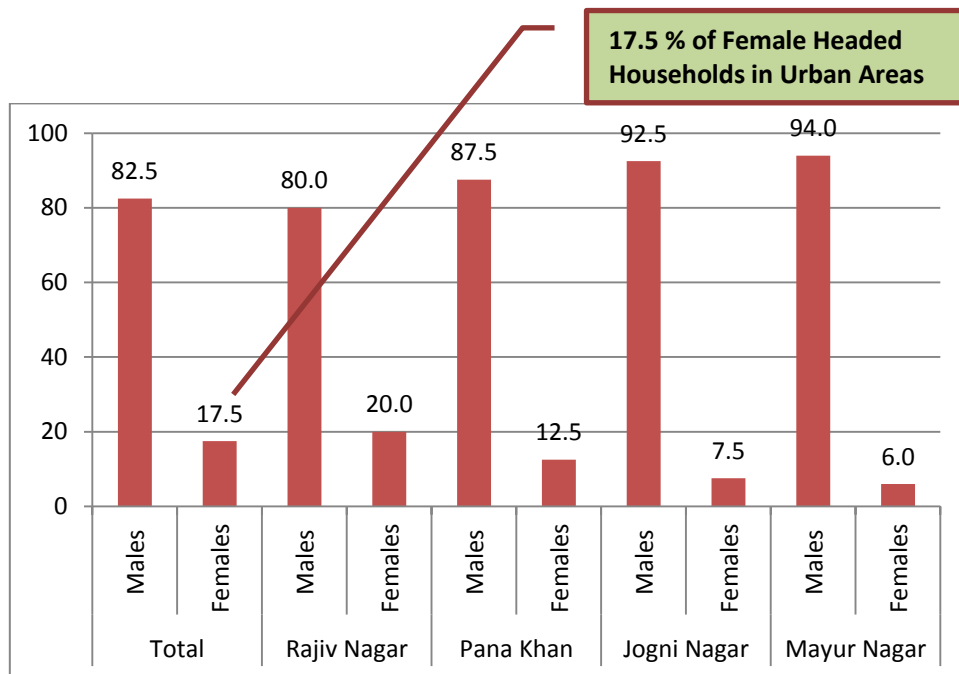


Figure 6.13 Profile of Urban Respondents(N=148)

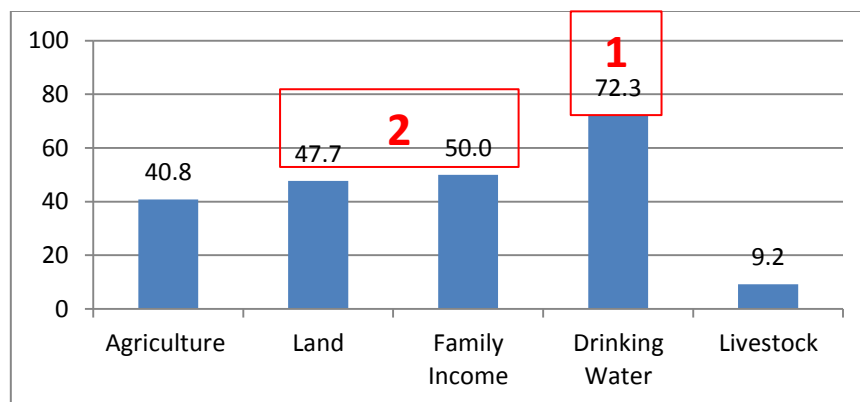


Figure 6.14 Impacts due to salinity in rural areas (N=135)

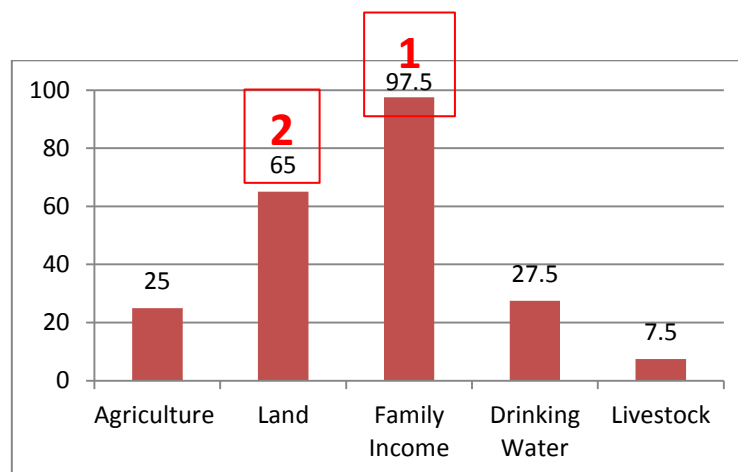


Figure 6.15 Impacts due to salinity in urban areas (N=148)

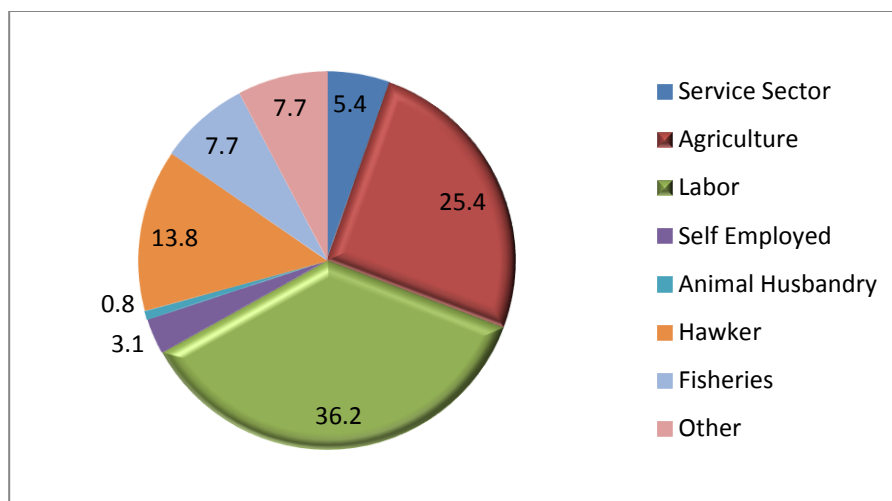


Figure 6.16 Major occupations in rural areas (N=135)

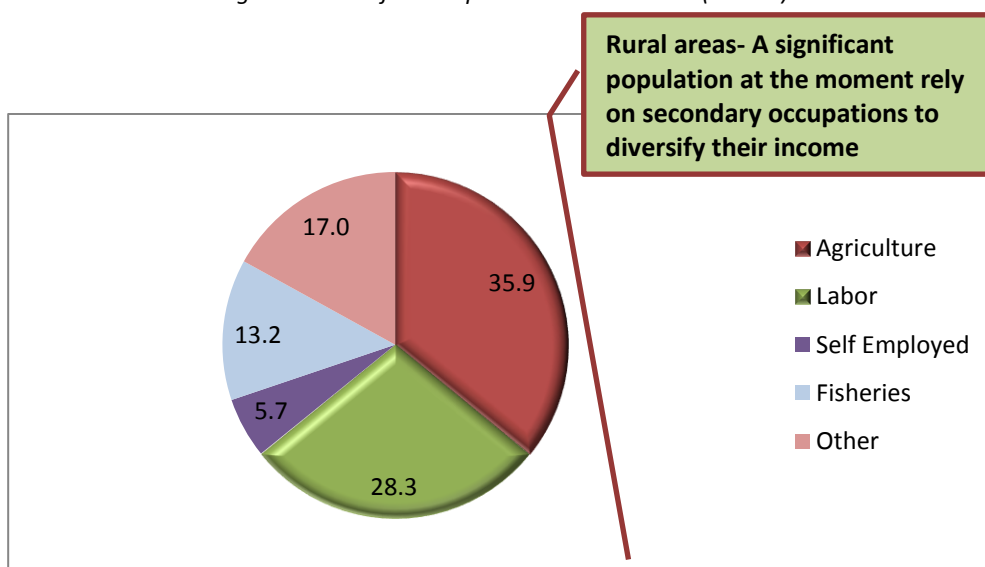


Figure 6.17 Secondary occupations in rural areas for 81.5% of the respondents (N=110)

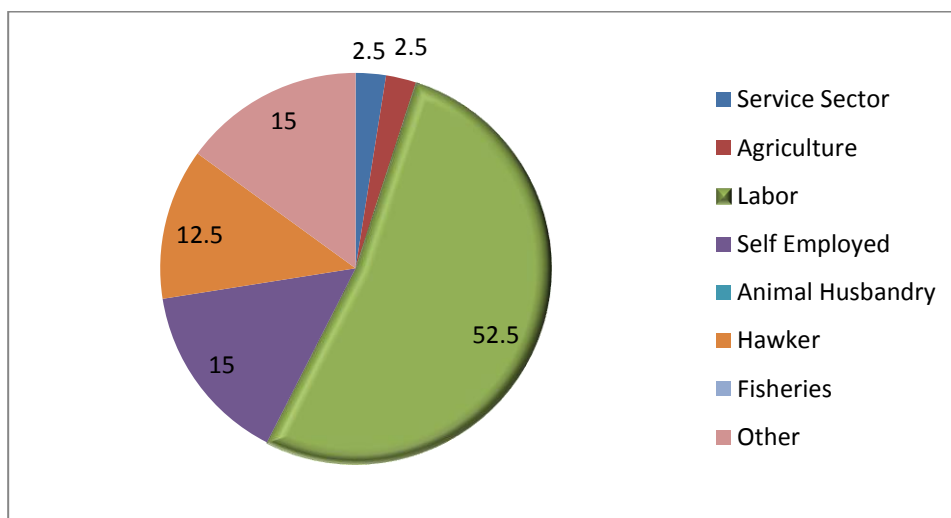


Figure 6.18 Major occupations in urban areas (N=148)

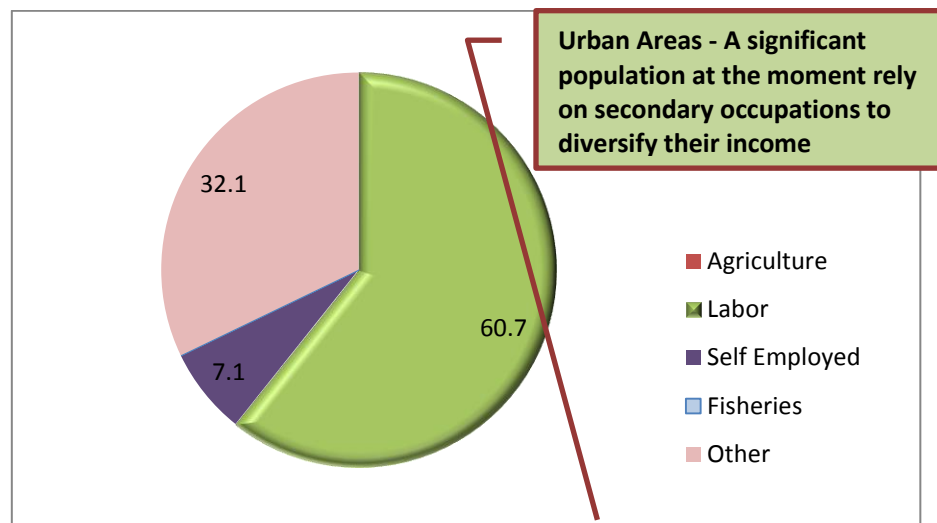


Figure 6.19 Secondary occupations in rural areas for 70% of the respondents (N=103)

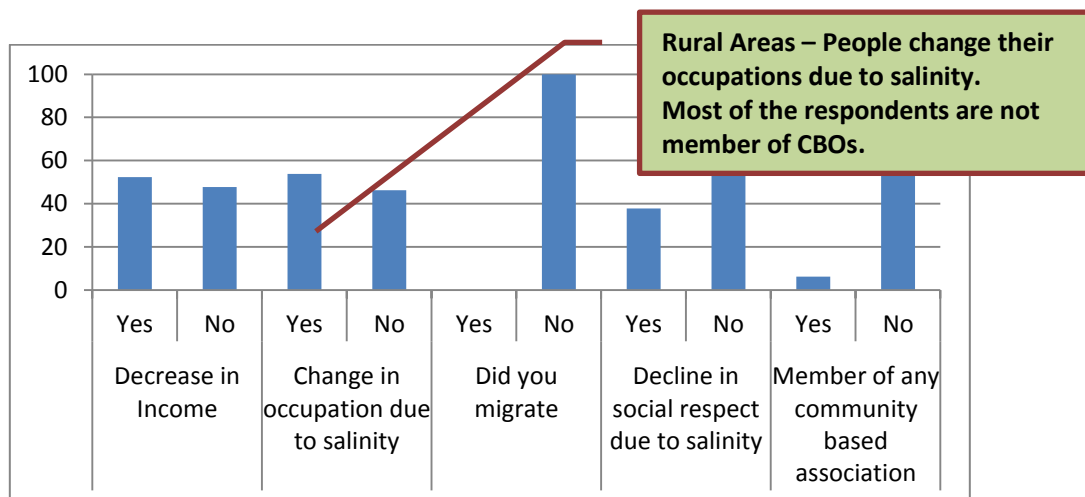


Figure 6.20 Impacts due to salinity in rural areas (N=135)

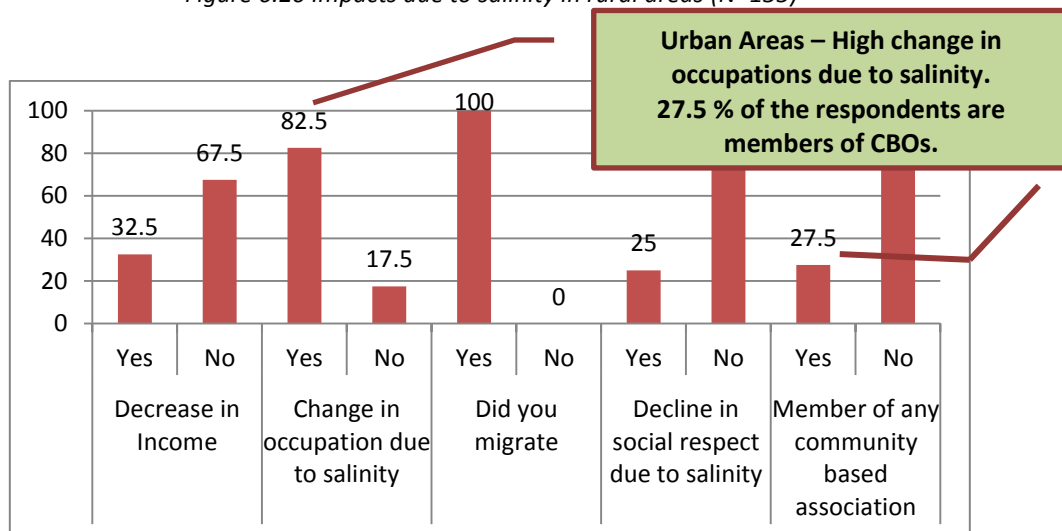


Figure 6.21 Impacts due to salinity in urban areas (N=148)

6.6.2 Findings with reference to spatial characteristics

Majority of the population is based on agriculture and allied labor, and it is the most impacted sector due to salinity, primarily in rural areas.

Urban area : In urban areas, majority of the surveyed population (77%) is engaged as labor, primarily as daily wage labor and construction labor. A considerable percentage (18%) is also engaged in brass factory work, a traditional work in urban areas of Jamnagar. The loss of working days for these occupations due to salinity is primarily distributed in the ranges of 9 months to a year (36%) and more than a year (35%) (See Figure 6.22). A considerable 43% of respondents change their occupation; more than two-thirds being attributed to either loss of jobs due to influx of rural working population. All the respondents were asked about their survival strategy in two cases: (a) in case of unemployment, and (b) in case of a disaster. Only 14% of urban respondents are willing to migrate to rural area in case of unemployment and 19% in case of a disaster (See Figure 6.24).

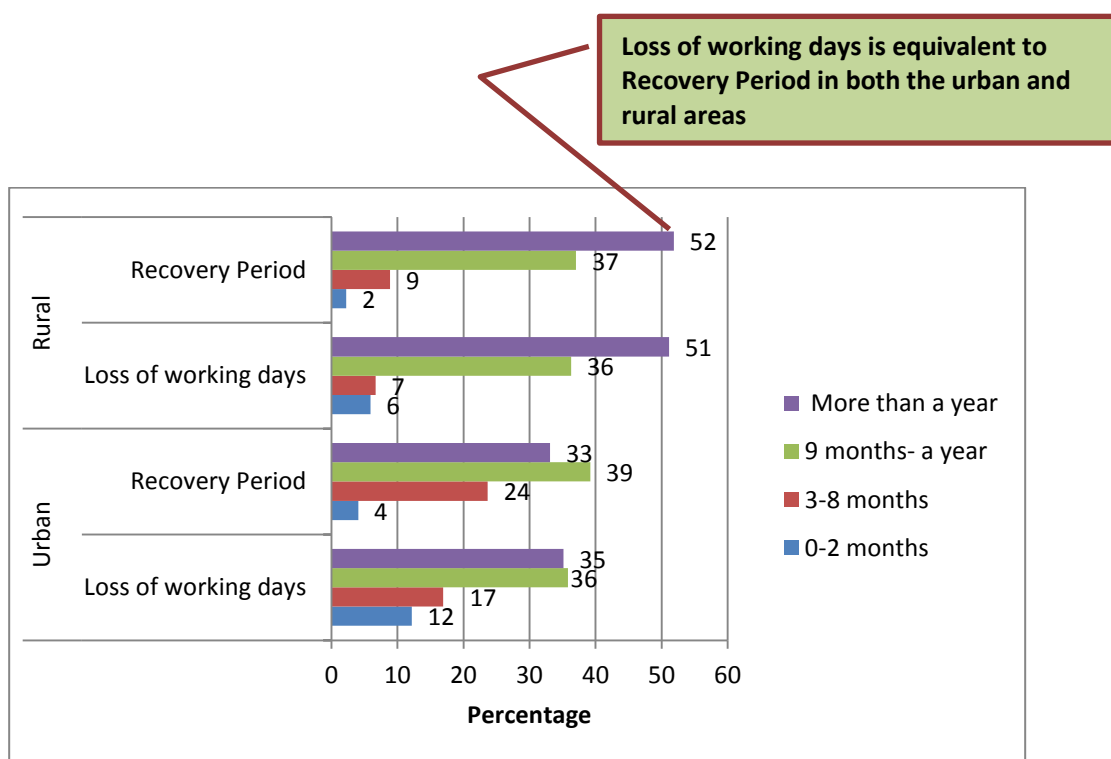


Figure 6.22 Loss of Working days and recovery period for respondents (Urban (N=148), Rural (N=135))

Rural area : 25% respondents are small land owners who cultivate on their own land, 37% respondents are engaged in agricultural and related labor activities, approximately 14% are earning

through hawking activities and 7.7% are engaged in fishing activities (See Figure 6.16 and 6.17). A considerable 37% of households are engaged in secondary occupations where agriculture and agriculture labor are the prominent ones. The loss of working days is distributed mainly between 9 months to a year (36%) and more than a year (51%) (See Figure 6.22). The change of occupation is negligible here. In terms of rural-urban survival strategy, 69% rural respondents would choose urban survival strategy in case of unemployment and 77% in case of disaster (See Figure 6.24 and 6.25).

6.6.3 Present Coping strategies and mechanism

Non-government Organizations are the most reliable stakeholder to minimize the effects of salinity, closely followed by Government. The reliance of urban and rural population on NGOs is 41% and 64% respectively. For government it is 37% and 46% for rural and urban areas respectively. The respondents could choose more than one option for this question. Around 52% respondents approach no one in particular for to bail them out. People's reliance on community is scarce and is found only in rural areas (8%) where the people are coming together to run Self-help Groups. The survey also establishes the importance of employment opportunities in the eyes of the respondents in the wake of adverse impacts of salinity. The respondents believe that better employment opportunities, especially entrepreneurial opportunities, can reduce the impact of the salinity on their household income (see Figure 6.26). The preferred coping strategies to minimize the impact of salinity for rural population also includes insurance for agricultural products (40.7%), depend on government employment schemes (39.3%), water management (31.1%) and plantation for Salinity control (23.7%) (See Figure 6.27).

Majority of the rural population (more than 90%) visit the urban areas, for various purposes (see Figure 6.28, 6.29 and 6.30). The reasons include employment, government work and; banking and health reasons. Only 26% of urban respondents have their family or relatives in rural areas (see Figure 6.28). A small percentage of these family members send remuneration or transact financially for reasons such as education, and living expenses. 18% rural households employ population from urban areas for their agriculture practices. There is considerable dependency of rural population on urban areas for various products and food as these urban centres serve as markets for all the rural areas.

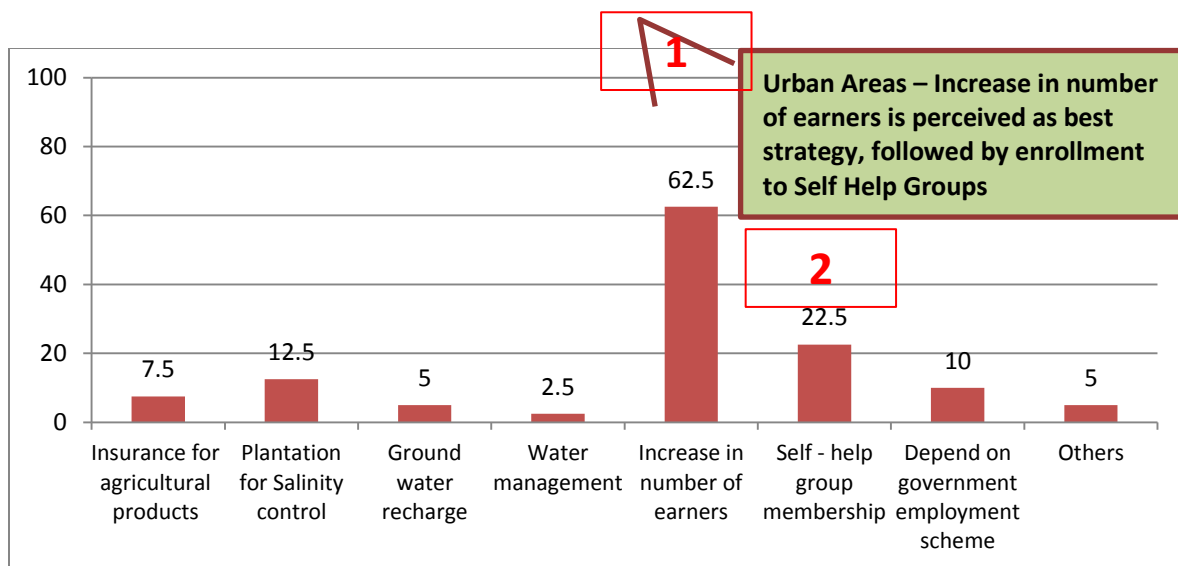


Figure 6.23 Coping strategies for urban respondents (as percentage) (N=148)

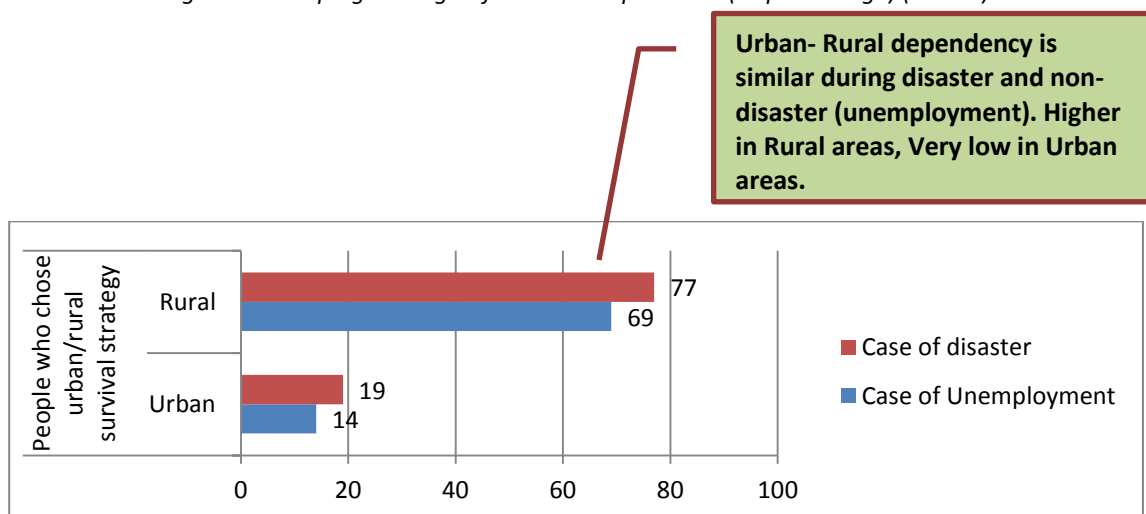


Figure 6.24 Coping strategies for urban and rural respondents in cases of unemployment and disaster (as percentage) (Urban (N=148), Rural (N=135))

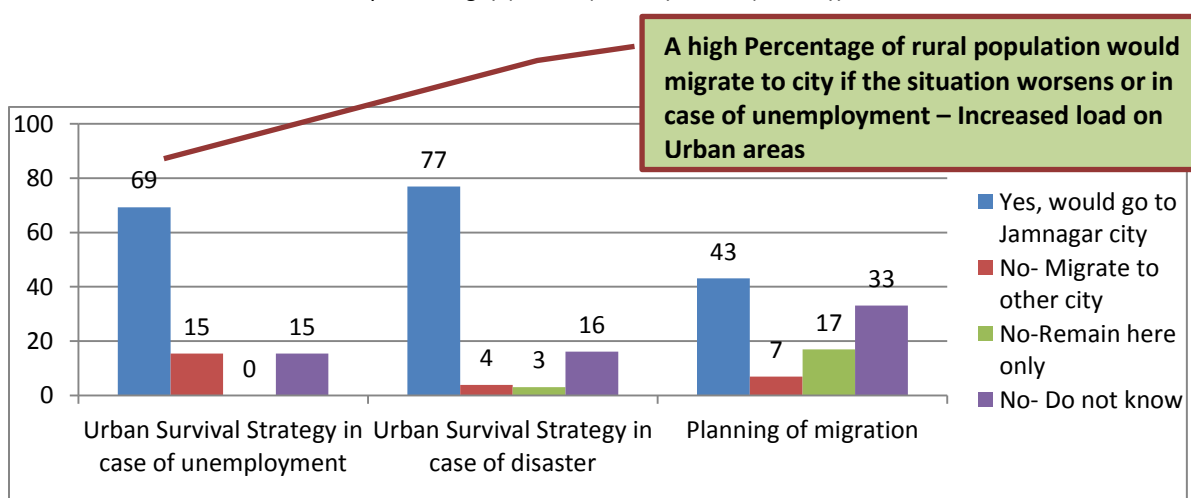


Figure 6.25 Urban Survival Strategy in case of unemployment and disaster for rural areas (N=135)

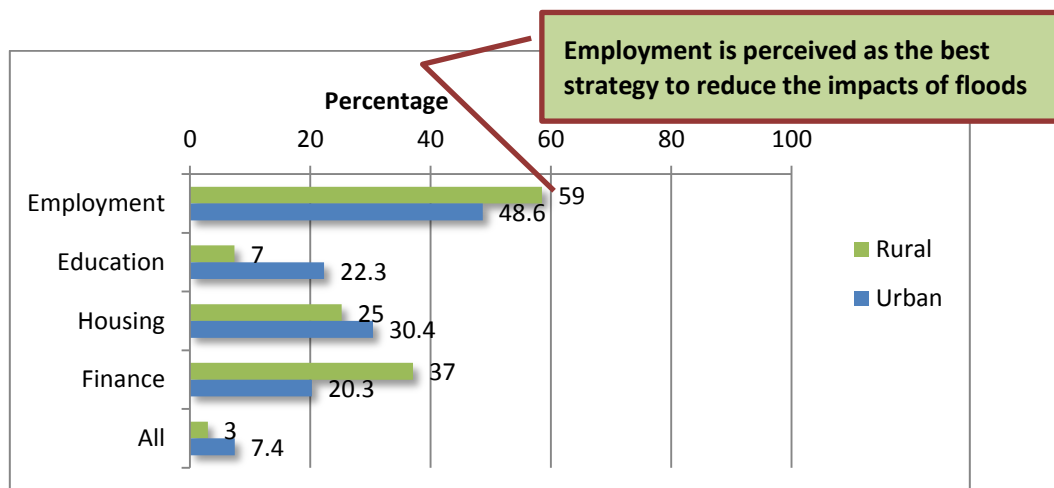


Figure 6.26 Priority sectors to reduce the impact of salinity in Jamnagar district (Urban (N=148), Rural (N=135))

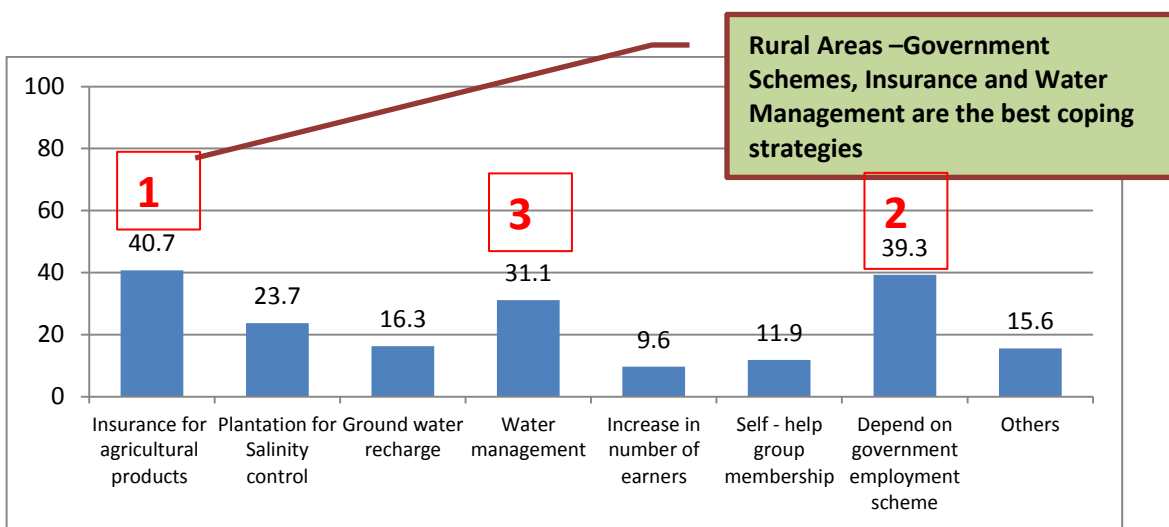


Figure 6.27 Coping strategies for rural respondents (as percentage) (N=135)

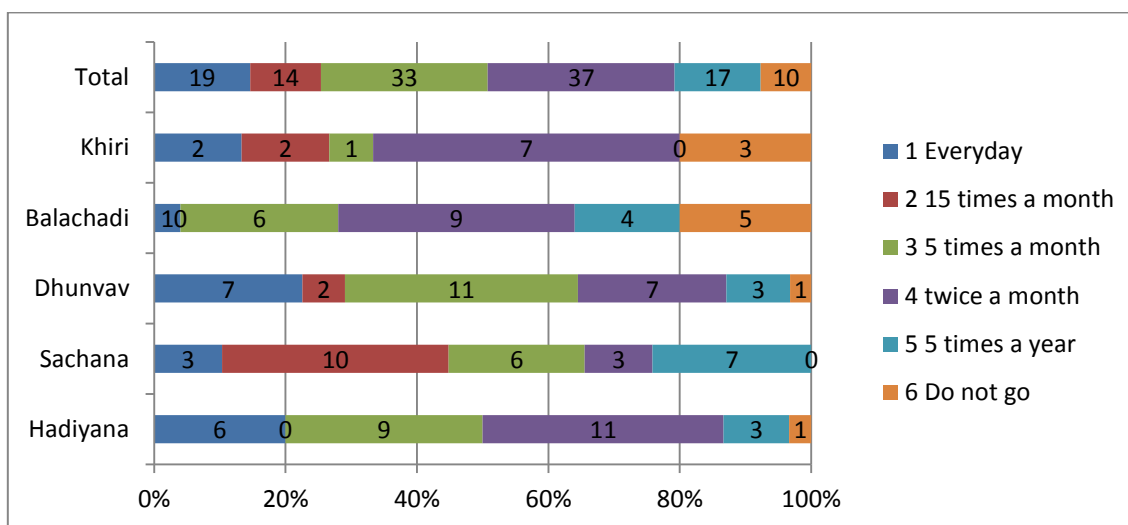


Figure 6.28 Frequency of visit to urban areas from rural locations (N=135)

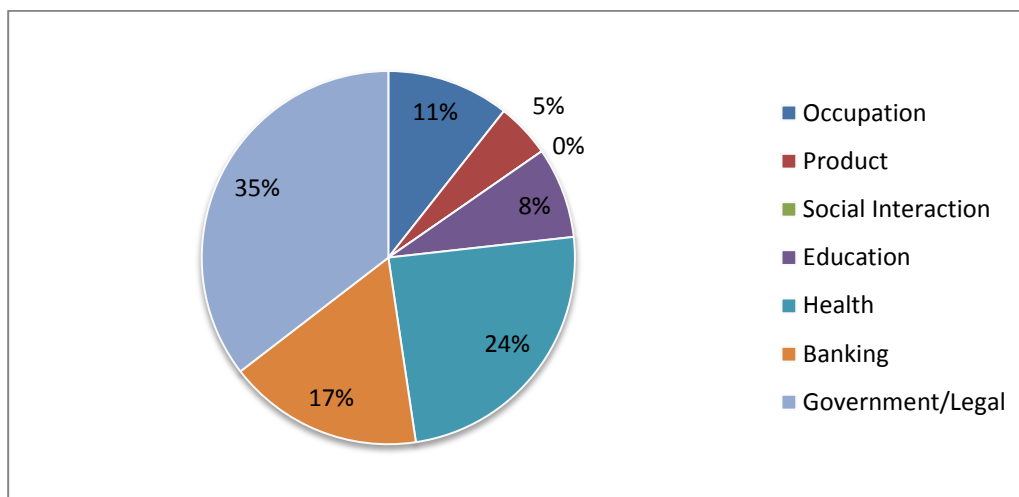


Figure 6.29 Purpose of visit (N=135)

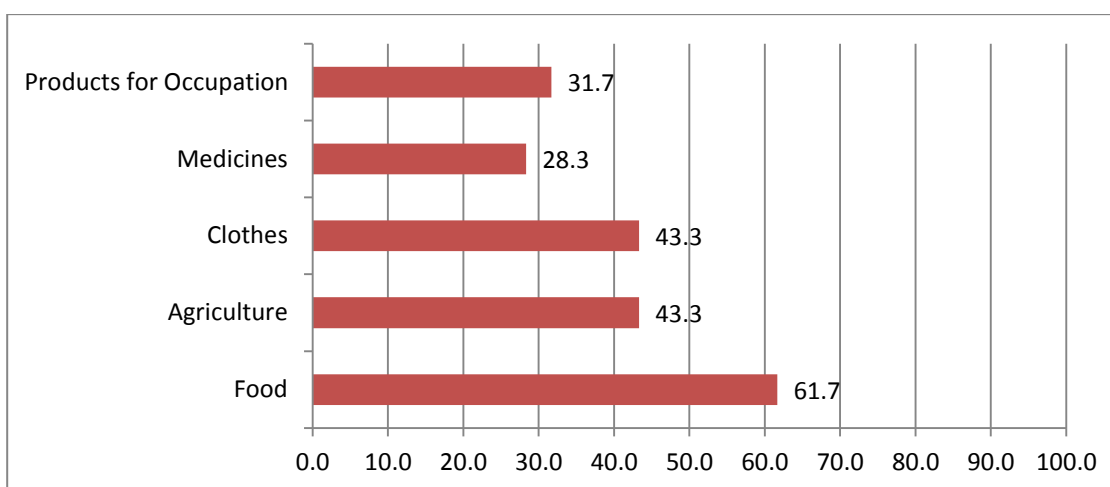


Figure 6.30 Products from Urban areas (N=135)

6.7. Discussion

Salinity is a complex disaster related to a lot of factors directly and indirectly. The authors stress on its relation to livelihood and try to enumerate the occupations which have become vulnerable. The vulnerability gives rise to a set of other problems as well such as migration and environmental degradation. Salinity is a slow disaster and its impact on vulnerable occupations is slow but detrimental to the prosperity of the habitants, in the long run. For example, the loss of lands to the farmers may change their occupations and force them into an occupation of which they have little knowledge. Similarly, the landless laborers may have to work for reduced number of days and may be propelled into chronic poverty.

Salinity is assumed to be predominantly a rural problem, but the stakeholders should refrain from

this perspective as this 'rural problem' gives rise to urban problems such as increased pressure on urban areas through increased migration to urban areas from the affected rural areas, or a disturbance to the social structure of the urban and rural area both. The authors believe that due to the close knit social structure in villages based on the caste system, their community resistant model has a better chance of being successful than in the urban area of Jamnagar. However, this needs to be verified by in depth study of the implemented projects.

The solutions for occupational resilience lie in curbing the core issue of salinity first. Since salinity is complex in nature, it requires a multi-sectoral approach. The approach should be weighted in the favour of community solutions rather than individual solutions. Having said that, the solutions adopted by community or implemented at the community level has a wider acceptance amongst the individuals like after seeing a roof rain water harvesting project implemented in the primary school of a village, the villagers adopted the same methodology to save water for drinking purpose during the dry days, at the household level. Additionally, the strategies must take into account the urban rural linkages so that regional development can be achieved, instead of pocket development.

The majority of the urban population does not rely on rural areas both in case of unemployment and disaster. The rural population, however, consider to rely on urban areas in a considerable way – 77% in case of disaster and 69% in case of unemployment. This stems from the fact that people perceive dependency on urban areas as one of the strategy to survive the impact of salinity. This often comes as a temporary strategy.

In addition, it can also be added that the long term disaster determines the recuperating capacity of the residents, but this capacity is better in occupations with a better income such as large land owner farmers, or big businessmen or rural industries. However, the populations engaged in the occupations which have become vulnerable to salinity with low income have found it hard to recuperate and are thereby migrating to newer occupations and newer locations.

6.8. Summary

The impact of salinity ingress is seen on socio-economic domain and environment, leading to deterioration of occupations dependent on natural resources. This is leading to reduction in productivity of the land, animals and human-beings and constrains availability of drinking water causing health problems all along the coast. Considering the magnanimous scale of the impact of

salinity on a large segment of population, the authors strongly advocate that salinity be considered as a disaster instead of just a slow degrading phenomenon. This approach of identifying vulnerable occupations and targeting occupational resilience can be taken forward. This would prioritize the vulnerable occupations for each village and the strategies for that village can be developed based on case basis.

Chapter 5 presented the results from the case of floods in Greater Ahmedabad and Chapter 6 presented the results from the case of coastal salinity in Jamnagar. The next chapter discusses the results from both the cases and explores the potential in occupation-based risk reduction.

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Chapter 7

Occupational resilience across Urban-Rural Domain for Risk Reduction

The chapter discusses the results from the case studies in the previous chapters 5 and 6, and explores their implications in risk reduction. This chapter also explores the role occupation-based risk reduction approaches can play in climate-related hazards in Gujarat, India. It highlights the importance of identifying the impacts of vulnerable occupations and working towards the occupational resilience of the region.

7.1. Introduction

In the last two decades, many approaches have been adopted to achieve risk reduction for the population residing in developing countries. For example, promoting community-based disaster preparedness, enhancing risk communication, awareness generation and education programs, mainstreaming livelihood, multi-hazard preparedness and mitigation plans; which lead to creation of social and human capital amongst many other approaches have been explored. Risk reduction can either be a standalone activity or integrated with other programmes such as micro-finance, promoting agricultural diversity, food security, livelihood programmes or capacity building. This study is built on the notion that the group of vulnerable occupations be addressed as a separate category which would allow realistic hazard impact assessment on the occupations and consequently on the lives of the people, particularly for the low income population in developing countries. These occupations can serve as a vehicle for faster recovery; else there would be an addition of unemployed population with every hazard. The overall resilience of the community can be achieved through occupational resilience.

So far, risk reduction has largely focused on the capacity of affected communities to recover with little or no external assistance. IFRC (2004) stresses that there is need for stronger emphasis on approaches to risk reduction and humanitarian and development work that put resilience, rather than just need or vulnerability, at the nucleus of the debate. Occupation-based Risk Reduction (OBRR) emphasizes on both the determination of vulnerability, as well as, achieving occupational resilience for reducing overall risk. The vulnerable occupations help in the identification of priority sectors requiring government intervention to alleviate poverty and enhance regional growth. The

concept of occupational resilience works with the objectives of providing occupational opportunities with stable income, rebuilding of assets which have been lost to a hazard, limiting migration, minimizing recovery time and uplifting the social status of the victims (Srivastava and Shaw 2014 (1)). The policies and programmes targeted towards occupational resilience would allow the upliftment of the lower income segments of societies without requirement of focused strategies for recovery. This would not only quicken the recovery process but also make the communities better equipped to tackle the hazards. Strengthening of local economics would make the region resilient to the effects of hazards, especially the recurring ones, as communities would be able to devise their own coping strategies over a period of time.

7.2. Research process

Firstly, the parameters for identifying vulnerable occupations have been developed and applied in the two cases. The identified parameters are; loss of productive asset, displacement, loss of employment, decline in productivity, reduced income, workforce participation, change in occupation, effect on social structure and recovery time. These were put to test through a series of questions in the household survey in the two cases of floods (Ahmedabad) and salinity (Jamnagar).

Second, flow elements for identifying Urban-Rural linkages were established, based on the regional analysis. These flow elements are people, natural resources, product, financial, waste, information, social interactions and governance. These elements provide an understanding of the continuum of the relationship rather than divide the two geographic areas (urban and rural) as per their characteristics. The aim of such a framework is to provide an insight into the social transformation associated with the urban and rural areas, which would enable the decision makers to mould, if not control, the future growth benefitting both the spatial domains.

Thirdly, the application of above mentioned urban-rural flow elements to the two cases of Ahmedabad and Jamnagar to ascertain the specific characteristics of these spatial areas (urban and rural) during the times of the said hazards. Both, key informant survey and household survey, explore these flow elements through the interaction with the communities suffering from these hazards.

Fourth, the comparative evaluation of vulnerable occupations has been performed by analyzing statistical data from the household surveys at both the locations. Both the cases stress that the

occupations in primary sector get affected the most by these climate-related hazards.

Fifth, identifying issues with Occupation-based Risk Reduction and determining the challenges associated with pursuing this methodology. Occupation-based Risk Reduction has huge potential in serving as a recovery tool. This stage, with the consultation of the stakeholders, namely, government departments, NGOs, and the affected communities, tries to identify the bottlenecks and hurdles in realizing the full potential of such a risk reduction approach. The complete research process is shown in Figure 7.1.

**Research
Process**

*1. Development and utilization of **parameters for identifying vulnerable occupations***

*2. **Establishing flow elements** for identifying Urban-Rural linkages*

*3. **Application of urban-rural flow elements** to the two cases of Ahmedabad and Jamnagar*

*4. **Comparative evaluation** of vulnerable occupations*

*5. Identification of **Issues and Challenges** with Occupation-based Risk Reduction*

Figure 7.1 Research Process

7.3. Key Findings

The findings of the studies are categorized under four main categories discussed below:

7.3.1 Vulnerable Occupations

Ahmedabad : In the case of floods in Ahmedabad (flood as fast-onset hazard) the parameters related to vulnerable occupations denotes that most of the occupations take a long time to recover from the effects of the hazards, which in itself is a cause of chronic poverty. Ahmedabad floods have temporary yet persistent effect on the occupations, through their reoccurrences. In the urban area the ‘recovery time’ parameter is most affected, while in rural areas the ‘decline in productivity’ shows the most significant results.

The surveyed urban areas have mostly occupation-based communities. The common need for sustaining with the present occupations strengthens the resilience of these communities with similar occupational background. As Marschke (2005) puts forward that, common pool resource-based activities are important livelihood strategies for subsistence and economic purposes in her case study of Cambodia. On the other hand, the resilience of the rural area can be strengthened by the potential of multiple occupations in a single household; a strategy for risk mitigation (Turner et al. 2003) or a coping/survival strategy (Reardon et al. 2001), and is visible in some of the cases interviewed. This provides better economic security for the survival of rural livelihoods, as established by Ellis (2000) and; Allison and Ellis (2001) in their studies on developing countries. However, as observed, there is a dearth of non-farm opportunities, limiting the households from reaching to their full potential.

Jamnagar : The results denote towards a major loss to primary sector occupations in rural areas, while in urban areas the indirect effect is the addition of jobless population. To cope with such a scenario the population chooses rural-urban survival strategies of migration.

The displacement of working population is one parameter related to vulnerable occupations, affected most due to salinity. The occupations categorized as daily wage labor are the most vulnerable occupations in urban Jamnagar, while in rural areas agriculture, fisheries and agro-based occupations are the worst sufferers. Self Help Groups (SHGs), engaging women, have the potential in diversifying household incomes. Most of such SHGs are agro-based or related to animal husbandry. In urban areas the parameter affected the most is 'workforce participation' and in rural areas it is 'decline in productivity'.

7.3.2 Urban-rural flow elements

The relationships between the urban and rural area are undergoing transmutation (Bah et al. 2003), and influencing not only those living in cities but also those who are directly or indirectly reliant on urban prosperity. In the case of floods in Greater Ahmedabad, there is one-way dependency of urban areas on peri-urban and rural areas in terms of natural resources and waste. Rural population on the other hand depends on the urban areas for employment, information, products and governance. There are traces of social interactions between the urban, peri-urban and rural communities. Also, the social interactions are high within communities which are bounded by similar occupational backgrounds. The villages also exhibit strong social interactions in some cases.

The case of coastal salinity in Jamnagar differs from Ahmedabad's case in some regards in terms of flow elements. The longer and continued effect period of salinity causes a significant portion of population to migrate outside from villages of Jamnagar to other urban centers in Gujarat state. Many traditional industries based in rural areas also provide finished products to the urban areas. The coastal salinity causes shortage of drinking water in the rural areas and hence there is dependency of rural areas without water on those areas with access to water. The social interactions to negate the effects of the hazards are absolutely missing in the urban areas while rural areas have social interactions strengthened by external support of NGOs. The flow of governance in the form of policies (land-development), resource management and administration is predominantly in the direction of urban to rural areas.

Urban-rural survival strategies

Ahmedabad : Urban respondents have strong linkages with rural areas in terms of elements of people, transportation, finance and resources, while rural respondents have strong linkages in terms of transportation, to access the markets in urban areas. One-third of urban population would rely on rural areas and around two-fifth of rural population would rely on urban areas, in cases of unemployment or disaster. The rural population's dependency on urban areas is significantly higher than urban population's dependency on rural areas. An event of disaster is a bigger reason to make respondents choose urban/rural survival strategy than unemployment.

Jamnagar : In event of extreme cases of hazard or unemployment, more than 70% of rural population would depend on urban areas for their survival. In urban areas, the dependence population on rural areas is negligible. There are few respondents who are ready to return to their villages if suitable non-farm opportunities are provided as a long term solution. Urban areas serve as markets, health center, educational center and the place for legal and government related work.

7.3.3 Coping Strategies

Ahmedabad : The people engaged in vulnerable occupations take longer time to resume their pre-flood earning capacity. This is one of the causes of persistence of poverty amongst this segment of the population. They are also bound to change their occupations. This is observed in urban areas where even during and after hazards there is availability of alternative occupations. This also draws the rural and peri-urban population towards the urban centers. The results show three aspects of coping strategies to minimize the loss of working days and recovery time. Firstly, there is willingness

to rely on other spatial areas in case of disaster and unemployment. Secondly, the urban population change their occupations (78%) during floods for better income, better employment opportunities or as they cannot continue in their earlier occupations. Similarly rural population also changes their occupations during the floods (96%).

Jamnagar : The rural population considers urban areas as the source of income. This denotes the spatial dependence where male working population temporarily migrates to urban areas in search of daily wage labor work. In some cases of low-income population, the whole families move to urban areas to provide more hands in earning 'urban income', which is usually higher than the wage they get in rural areas. Here, as well, the majority of the population feels that provision of employment opportunities, by encouragement of entrepreneurial activities (55%). For example, household industries, Out of these some expect financial assistance (32.5%) while other ask for skills training (22.5%). This would allow them to be based within their villages and cope with the limited earnings due to salinity ingress.

7.3.4 Role of non-traditional stakeholders

In both the case studies, there is also dearth of community based (religious, occupation based) organizations in these study locations, thereby limiting their resilience. The lack of institutions is contributing to the lack of social cohesion and economic resilience. In Jamnagar, things look better with the presence of a consortium of NGOs, private sector and the government departments in the form of Coastal Salinity Prevention Cell (CSPC) which have been active in creating awareness about salinity and providing for alternative livelihoods. The role of non-traditional stakeholders such as Non-government organizations (NGOs) and Community Based Organizations (CBOs) needs to be acknowledged and utilized by both the government and the community. The cooperatives like Sehkari Dughd Samiti (milk cooperatives) and self-help groups already exist in Gujarat state. These encourage the local entrepreneurs and women. This advantage can be utilized to bring communities together for 'economic resilience' (Cannon 1994).

The factors of vulnerable occupations, urban-rural flow elements, coping strategies and the role of non-traditional stakeholders are inter-related to each other. Figure 7.2 demonstrates these interrelationships. As found in this study, the vulnerable occupations are impacted by the urban-rural flow elements and these flow elements may determine the vulnerability of the occupations. The coping strategies are targeting both vulnerable occupations and urban-rural flow elements.

Additionally, the perceptive solutions identified by the respondents in the two cases also have occupational solutions (such as entrepreneurship) and spatial solutions (such as urban-rural survival strategies). In this context, the non-traditional stakeholders have the role of minimizing the vulnerability of occupations by utilizing urban-rural flow elements and enhancing the existing and perceived coping strategies.

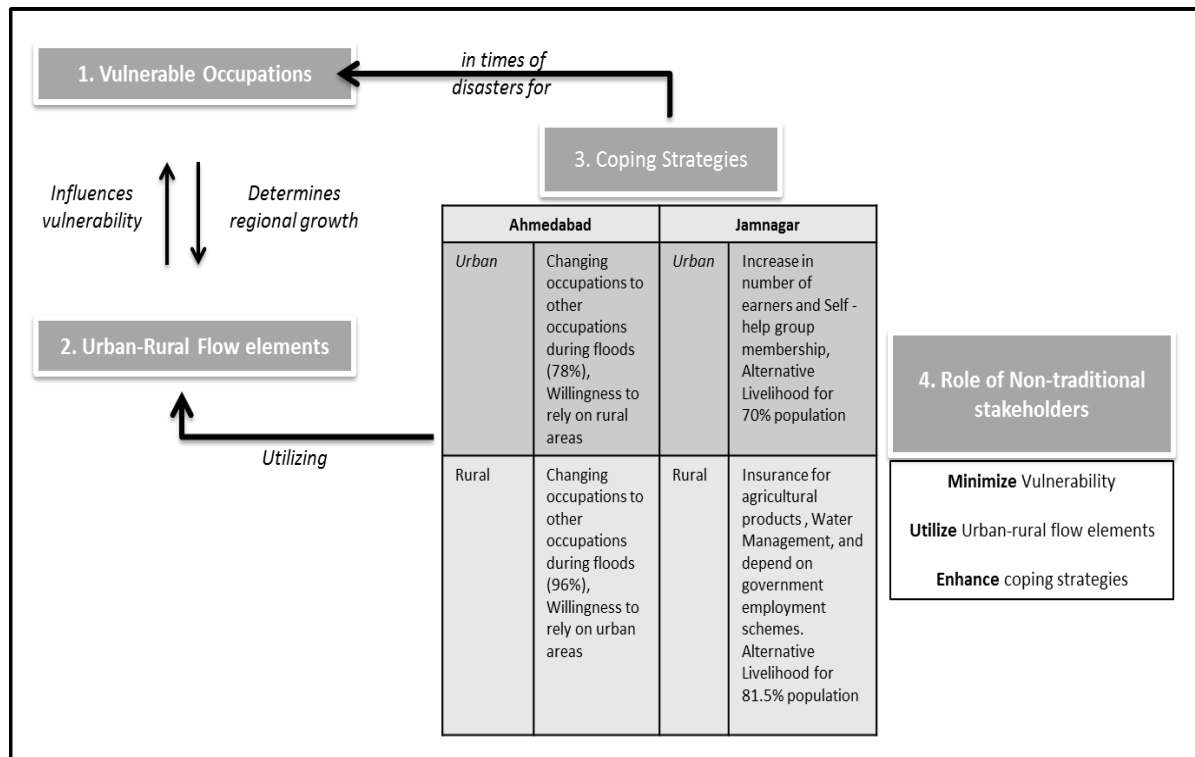


Figure 7.2 The interrelationships of the findings

7.4. Discussion on Findings

7.4.1 Ahmedabad

The population in Greater Ahmedabad is dispersed in various geographic locations, has distinct exposure to floods and varied disadvantageous social conditions. These factors contribute to differential vulnerabilities as stated by Cutter (1996) and Cutter, Boruff and Shirley (2003). Similarly, the resilience is also determined by the inherent characteristics of the spatial areas and the occupations practiced within those spatial areas.

Looking into the finer details of the three coping strategies mentioned above, it has been observed that traditionally rural population tends to depend on urban area (Chambers and Conway 1992;

Reuveny 2007) especially in the wake of a disaster in rural areas (Tao Yang and Zhou 1999; Paul 2005). Even in this study, the rural population is willing to rely on urban areas in an event of unemployment and a disaster. In addition, interestingly, the urban population is also willing to depend on rural areas in the two circumstances, which is seldom observed, as was observed by Lesetedi (2003). Majority of the population visit the urban or their native rural areas, and hence are in constant touch with the family members. Also, job opportunities in urban area attract peri-urban and rural population during or after the hazard. This gives them an opportunity to avail the benefits of the employment schemes, and other disaster recovery programmes in areas other than their place of residence.

The high correlation between the urban and rural survival strategy in the cases of unemployment and disaster further proves that for the low income population the concepts of disaster and unemployment are interchangeably used and dealt. It is reflected in the communities' basic understanding of resilience through economic empowerment. The respondents were of the opinion that with stable jobs they could take care of other basic needs like housing, food and clothing. Housing is the next chosen priority by the communities after employment.

Approximately, 30% of the population living in urban areas in low and medium income countries lives in informal settlements or overcrowded and deteriorating tenements (Dodman et al. 2013). The housing condition can be associated with the vulnerability of the population as most of the population residing in such conditions is dependent on vulnerable occupations. The results in the study show that the houses in the villages in downstream section of river Sabarmati are in poor condition. This can be attributed to lack of build-back capacity of the population which has been experiencing floods at regular intervals. This population is primarily based on agriculture and allied activities and adverse impact to the earning opportunities is reflected in the housing condition.

Education is another factor which has implications on the occupation, and consequently on the recovery process. In urban areas there is acceptance of education as a key tool for revival, however, in peri-urban and rural areas; education is significantly missing as a priority. This may reflect lack of awareness of the value of education in the long run. In Mahijda, one of the study locations, it was observed that with improved education of the younger generation the village is able to cope with floods, financially. This is achieved as the educated young population is looking for skilled and semi-skilled jobs in the urban areas which are providing them better income.

7.4.2 Jamnagar

Salinity is a complex hazard related to a lot of factors directly and indirectly. It is a slow hazard and its impact on vulnerable occupations is slow but detrimental to the prosperity of the habitants, in the long run (Joshi and Agnihothri 1984; Joshi and Jha 1992; Nayak 2002). Salinity is assumed to be predominantly a rural problem, but the stakeholders should refrain from this perspective as this 'rural problem' gives rise to urban problems such as increased pressure on urban areas through increased migration to urban areas from the affected rural areas, or a disturbance to the social structure of the urban and rural area both. It is believed that due to the close knit social structure in villages based on the caste system, their community resistant model has a better chance of being successful than in the urban area of Jamnagar.

The long term hazard determines the recuperating capacity of the residents, but this capacity is better in occupations with a better income such as farmers who are large land owners, or big businessmen or rural industries. However, the populations engaged in the occupations which have become vulnerable to salinity with low income have found it hard to recuperate and are thereby migrating to newer occupations and newer locations. The vulnerability of the occupations gives rise to a set of other problems as well such as migration and environmental degradation. Few of the coping strategies for coastal salinity includes insurance for agricultural products (40.7%), depend on government employment schemes (39.3%), water management (31.1%) and plantation for Salinity control (23.7%). An overwhelming 81.5% population tries to earn through alternative occupations. However these opportunities are limited to agriculture and agro-based labor. Only 7% respondents rely on self-employment as an alternative. This gives an opportunity to provide opportunities in non-farm sector so that the population can have better choice in times of falling income.

The results are suggestive in the direction of two strategies for enhanced risk reduction of vulnerable occupations. First, the population has been enthusiastically looking towards entrepreneurial opportunities, as evident by the high percentage of people asking for them as a coping strategy. Second, there has been creation of urban markets for 'rural products' in urban areas, which would cater to non-farm produce and traditional household industries.

7.4.3 Comparative evaluation of the two cases

The two cases have certain commonalities and differences in their findings. Some of the commonalities are: Urban population's dependency on rural population is higher than rural

population's dependency on urban areas. The government is the most trusted stakeholder and other non-traditional stakeholders exist lesser in number. The study suggests that the temporal aspect of disasters affect the vulnerability of occupations. For rural areas 'decline in productivity' is most significantly affected parameter for the case of both fast and slow-onset disasters. There are certain differences as well in the results. While fast-onset disaster shows the higher perceived dependency of urban population on rural areas, the slow-onset disaster shows higher dependency of rural population on urban areas. The occupational resilience in these cases can be achieved through policy revisions (enriching existing employment schemes to take into account climate-related disasters), and reassigning roles for non-traditional stakeholders in Gujarat's context (such as Self-help Groups, Women Associations, Occupational associations, and slum associations) to include disaster preparedness and disaster recovery in their activities.

Table 7.1 illustrates the challenges faced and the potential with respect to the four headings of vulnerable occupations, urban-rural flow elements, coping strategies and the role of non-traditional stakeholders. In case of Ahmedabad, the presence of few cases of occupation-based communities and a few cases of households with multi-occupations acts as successful cases and have the potential of being replicated. Also, urban areas by their economic diversity offer a lot of opportunities for economic diversification. However, this is lacking in Jamnagar as it is a smaller scale city and has limited alternative options. Both the cases are plagued by the absence of large number of community-based organizations. However, there is a ray of hope with the presence of a consortium of NGOs, private sector and Government departments working for the livelihood promotion in salinity affected Jamnagar. Two-way dependency of urban and rural areas in a number of flow elements in both the cases also gives opportunity to the stakeholders to intervene.

7.5. Status of Occupation-based Risk Reduction in Gujarat

The state government in Gujarat has framed policies to achieve poverty eradication, employment generation and basic services for poor. Additionally, after the hazards the state government is responsible for the recovery of the most vulnerable through public assistances and dole. However, this has only been partially beneficial. The objectives of risk reduction can be achieved if policy makers start providing employment opportunities pre and post hazards. As the results of this

Table 7.1 Potential and challenges in Ahmedabad and Jamnagar

S. No.		Ahmedabad		Jamnagar	
		<i>Challenges</i>	<i>Potential</i>	<i>Challenges</i>	<i>Potential</i>
1	Vulnerable Occupations	<i>Urban</i> – Reduce loss of working days <i>Rural</i> – Dearth of Non-farm opportunities	<i>Urban</i> – Occupation-based Communities <i>Rural</i> – Multi-occupation based households	Limit displacement of population, Increase workforce participation in urban areas and arrest decline in productivity in rural areas	Self-help Groups encouraging entrepreneurial activities; Traditional skills and occupations
2	Urban-Rural Flow elements	Urban biased policies	Two-way dependency	Scarcity of urban markets for rural products	Two-way dependency
3	Coping Strategies	Rural – Alternative occupations not available	<i>Urban</i> – Alternative occupations available; other spatial area seen as a potential survival strategy	<i>Urban</i> – Alternative occupations not available	Other spatial area seen as a potential survival strategy
4	Role of Non-traditional stakeholders	Absence of community-based organizations	Government initiatives under Mission Mangalam program for providing livelihood opportunities	Absence of community-based organizations	Consortium of NGOs+ Private Sector+ Government Departments

research have suggested, the solution lies in providing non-farm alternative livelihoods to the rural population and restoration of assets to urban population. Also, the gender profiling of the vulnerable occupations would achieve gender parity in developing countries. The post-hazard jobs would provide women with better access to social, political and economic resources.

It is also identified that although there can be a variety of strategies for recovery, targeting vulnerable occupations would strengthen the socio-economic base to allow for speedier recovery.

The recovery process should be used as an opportunity to rebuild and revive the economy at the grass root level. In the pre hazard phase, livelihood recovery strategies which encompass spatial dimensions will enhance the occupational resilience.

Due to the lack of traditional and non-traditional stakeholders active in these communities, the communities identify the government as the trusted stakeholder. The Government has the potential to implement certain policies which will make the occupations resilient. However, most of the evaluated policies do not address hazard issues, nothing in particular to recover from a hazard using the employment offered or facilitated by the government.

Both national and state governments already have various poverty reduction, employment generation, and basic services programmes in operation, such as Prime Minister's Employment Generation Programme (PMEGP), Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Food for Work Programme, Sampoorna Grameen Rozgar Yojana, Swarna Jayanti Gram Swarozgar Yojana (SYGSY), and Swarnajayanti Shahari Rozgar Yojana (SJSRY). MGNREGA have been successful in providing employment to more than 50000 households in Ahmedabad district in 2009-10 (GOI 2010). Unfortunately, these programmes do not include recovery. These are positive endeavors but all the positive work done by such schemes in a year can be undone by one flood by draining of resources of the affected population. There is huge potential to start post hazard employment schemes based on the local market conditions, and the skill set of the vulnerable population as an additional measure. The argument is that the planning at the district level would ensure better resilience and would strengthen the communities, against hazards.

7.5.1 Review of Mission Mangalam Program by Government of Gujarat

The Government of Gujarat's initiatives with regard to Micro enterprises include launch of the state livelihood mission known as 'Mission Mangalam' in 2010. It is an integrated poverty alleviation approach in a demand-driven convergence mode. Under Mission Mangalam, the State aims to create livelihoods for about a million people, in the rural sectors, through self-employment. It aims to channelize the critical mass of resources and mitigate poverty by creating a single platform for stakeholders. The approach is to integrate *Sakhi Mandals* (self-help groups (SHGs)) or Producer Groups (PGs) or Service Groups into the corporate value chain.

The convergence of developmental activities is taken care of by the Gujarat Livelihoods Promotion

Company (GLPC), a PPP (Public-Private-Partnership) company registered under the Companies Act 1956. The GLPC collaborates with large industries, banks, professional institutions, skill-development agencies, industry associations, to facilitate finance, skills and market information to SHGs. The statistic from Mission Mangalam speaks volume about the upliftment it has brought about during the last four years. It has around 0.24 million operational Sakhi Mandals covering more than 2.9 million rural households. The bank savings of these Sakhi Mandals have reached the mark of INR 400 crores (approx. 88.5 million USD). This has empowered the Sakhi Mandals to undertake economic activities in the form of micro-enterprises, as the average fund availability has increased now to INR 62,500 per Sakhi Mandal as compared to just INR 18,000 prior to the launch of Mission Mangalam. Around 58,000 Sakhi Mandals have been graduated to micro enterprise activities providing livelihood to more than 0.6 million rural households.

Mission Mangalam not only advocates community groups but also gives prominence to individual efficiency programmes such as training programmes for the rural youth in association with non-governmental organizations (NGOs), polytechnic training institutes, and national development banks. It mainly focuses on rural entrepreneurship and skill development with a view to generate employment and income in rural areas and building an entrepreneurial culture. This would again facilitate credit flow and provision of linkages for small, cottage and village industries, handicrafts and other rural crafts and service sector in the decentralized sector in the rural areas.

However, Mission Mangalam can play bigger role in risk reduction by including provisions for hazard affected population in the state. This would give preference to the vulnerable occupations to the respective hazards. It can provide micro-credits for entrepreneurial ventures suitable for that particular region and also play a role in providing markets for such new initiatives.

7.5.2 Challenges for making occupations resilient to climate-related hazards

There are various hurdles in making the vulnerable occupations resilient against climate-related hazards, as perceived in both the cases of Ahmedabad and Jamnagar. These findings are a result of the discussion of the stakeholder workshop. These can be enumerated as:

Stakeholders' Awareness

There is very less presence of 'other' stakeholders in these two cases, both in urban and rural areas. There is need for other stakeholders such as NGOs, CBOs (especially occupation-based) and private

sector to identify their roles in larger goal of occupational resilience. Such coordinated actions would also be beneficial in poverty reduction objectives. Resilient communities can handle surprises (Levin 1999), are able to learn from disturbance and stress, and find opportunities for renewal.

Lack of Government's policies

As discussed earlier the existing government policies, particularly employment policies, do not address the important climate-related hazards and the population thus affected.

Lack of vulnerability data

Often government and other decision makers are crippled in their decision making by lack of data available with regards to vulnerable occupations. The data at such level is scarce to find and need special assignments of vulnerability assessments.

Inadequate Vulnerability assessments

The main objective of vulnerability assessment is to identify the weak links in the present scenario and guide the adaptation strategies of both individuals and institutions. There is lack of such assessments by the local authorities. These occupations demand enhanced attention from the policy makers, so these occupations once identified can attain occupational resilience.

Poor recovery plans

There is a dearth of recovery plans for smaller hazards like floods in Ahmedabad or long-term hazards which do not have catastrophic effects to show. It is necessary that potential hazard risks are determined and risk management approaches taken into account while designing recovery plans or other socio-economic development plans.

Poverty reduction as means to reduce disaster would imply that governments would incorporate disaster risk reduction into the plans and policies that emanate from their departments of national planning, treasury, and state/provincial planning arms and would monitor the „level of mainstreaming“ by incorporating relevant indicators. This would mean poverty reduction, rural development; infrastructure development, and physical planning documents, policy paper and implementation strategies would have considered disaster risk reduction in the many of them not take into consideration environmental and ecological aspects. Basically these plans should be „disaster proof“; incorporating risk reduction has an essential building block that forms the foundation of the plan/ policy. Plans should seek to minimize risk – economically, socially and

geographically- and importantly not create conditions for further risk.

If the vulnerability of occupations is kept as the core problem, the study shows that the five parameters of change in occupation, reduced income workforce participation, recovery time and effect on social structure are affected most. The other four parameters of loss of productive assets, decline in productivity, displacement, and loss of employment are impacted less in comparison. Figure 7.3 enlists the identified causes at the bottom of the figure, which have simultaneous and overlapping impacts. They cannot be isolated from each other, and jointly contribute to the vulnerability of occupations.

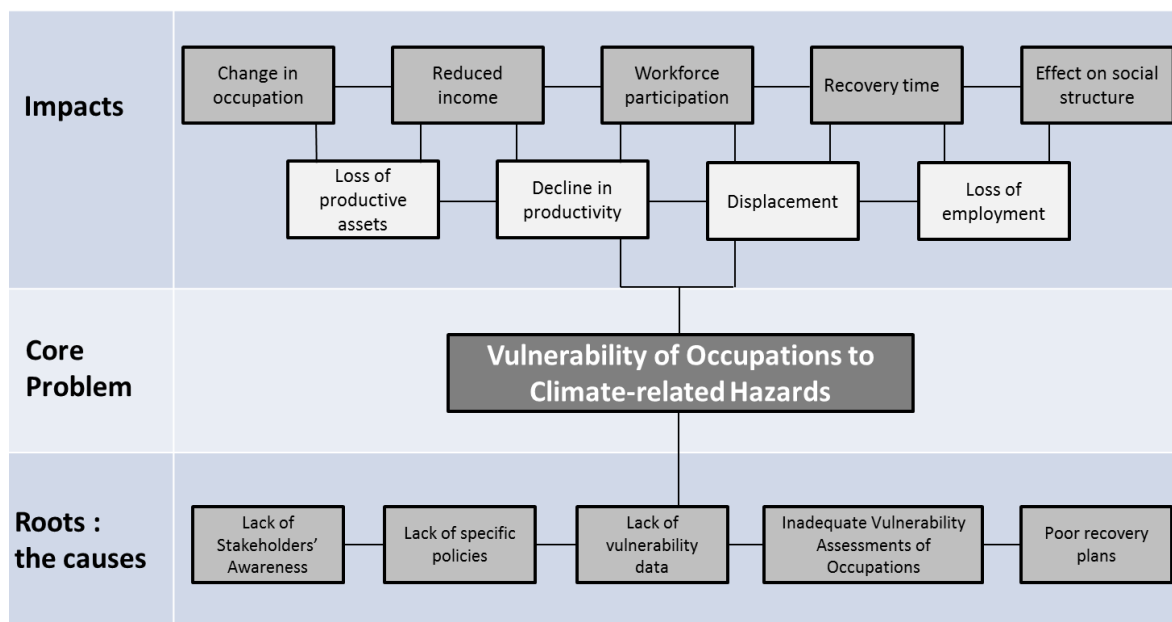


Figure 7.3 Impact and causes for vulnerability of occupations to Climate-related Hazards

7.6. Occupation-based Risk Reduction and its potential

The following section discusses the issues raised by various stakeholders in Focused Group Discussions and workshops. It also considers the various inputs given by the professionals working in this region. The strategies for occupational resilience must consider the livelihood and gender issues together. This can be used as an opportunity to redefine and re-negotiate the traditional gender roles and target greater mutual respect between men and women as well as individual empowerment. This requires that the baseline data for vulnerable occupations must be gender-aggregated so that income generating opportunities for both men and women can be developed. Additionally, the recovery process should also target the unemployed population prior to hazard.

Hazards should be used as an opportunity to rebuild and revive the economy. In total four objectives of Occupation-based risk reduction have been identified as identifying vulnerability, mitigating adverse economic impacts, reducing poverty and targeting social stability and equity. These objectives are inter-related and would function together to achieve the overall goal of occupation-based risk reduction.

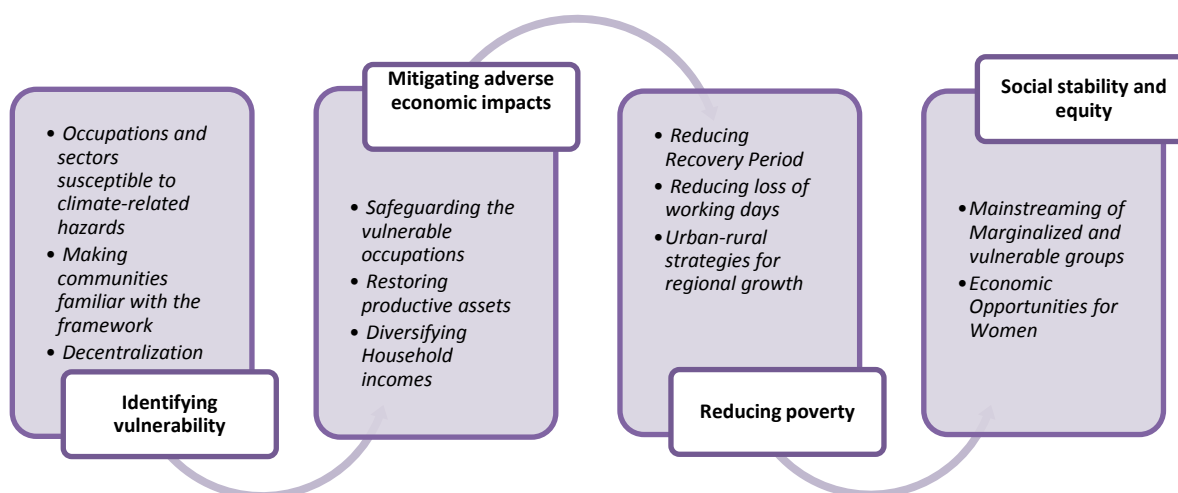


Figure 7.4 Identified Objectives of Occupation-based Risk Reduction

7.6.1 Role of non-traditional stakeholders

Occupation-based Risk Reduction can involve all the non-traditional stakeholders which have not been a part of risk reduction processes until now. As seen from the result, there is a significant number of respondents who rely on community groups, for their survival. A large number of occupational groups both in urban and rural areas exist. In urban areas, there are many slums, and low-income settlements that have groups formed to maximize their outputs and benefits by following a single occupation. These groups can be utilized. Similarly in rural areas, there are agricultural and livestock based groups (producer groups) which work in unison. Their role would address the following but would not be limited to:

1. **Minimize Vulnerability** – Vulnerability assessments of occupations through the methodology discussed earlier in Chapter 2. The assessment would be first step towards minimizing

vulnerability. The government departments can address the issues of a particular affected group through concentrated efforts.

2. **Utilize** Urban-rural flow elements – Here again, the producer groups can utilize the strengths of their urban-rural linkages to their benefit. The most common form is establishing urban markets for rural products. One might argue that the urban markets would be automatically created following the principle of supply and demand, i.e. if there is need for rural products in urban areas. However, it needs to be considered that there is huge demand of rural traditional products outside these urban centers. These urban markets in Ahmedabad or Jamnagar would act as confluence of national and global demand and rural supply. Moreover, the creation of urban markets would also protect the traditional skill sets which are facing an extension because of the impacts of the hazards. The emphasis of the government is usually in provision of alternative jobs without consideration of erstwhile skills of the victim. Creation of such markets would keep the micro-enterprises based on traditional skills active in a disaster scenario, as the demand would not be impacted. These urban markets can follow an existing system of creation of *haats* (traditional markets) in major urban centres. Mission Mangalam is also utilizing the same system.
3. **Enhance** coping strategies – Based on the learning from other groups the affected groups can emulate the coping strategies followed by other groups in other regions.

As discussed earlier, the population in both the cases asks for better financial independence through the development of skills and availing of entrepreneurial opportunities. These can be provided through the engagement of the private sector (Srivastava and Shaw 2014 (2)). The micro-enterprises have a role to play in risk reduction through poverty reduction. This potential is discussed in the following section.

7.6.2 The potential role of micro enterprises in risk reduction

In Gujarat, micro-enterprises have the potential to achieve risk reduction through concentrated efforts of government and private sector (Srivastava and Shaw 2014 (2)). Micro enterprises add value to a state's economy by creating jobs, enhancing income, strengthening purchasing power, lowering costs and adding business convenience (Munoz 2010). The role of micro enterprise in risk reduction in developing countries, based on literature study, can be enumerated as discussed in the following

sections:

Reducing vulnerability through Micro Enterprises (MEs)

The World Development Report 2000/2001 (World Bank 2001) argues that the "effects of natural disasters (are) an important dimension of poverty. Low-income families typically live on marginal land, in the informal sector and have few, if any, resources with which to protect themselves." The calculation of indirect economic loss to the population becomes incomprehensible, yet identification of the spheres of loss would help prepare for reduced loss in the event of the next disaster. The parameters developed by Srivastava and Shaw (2014 (1)) to identify vulnerable occupations in a climate-related hazard scenario in Gujarat (as explained in Chapter 2), can be contextualized to find the comparative vulnerability of micro enterprises under various groups of activities. This would allow the government to identify the priority group of micro enterprises which needs interventions. Through the study of impact on the said parameters the vulnerability traits can also be identified. Once such groups of activities are identified, the population affiliated with such enterprises can also be distinguished, together with the structural causes of vulnerability.

Mitigating adverse economic impacts

A strong entrepreneurial foundation might act as "a mitigating buffer to reduce a community's vulnerability to disasters" (Galbraith and Stiles 2006); especially one which is embedded in the social fabric of the community. MEs are said to have such strong entrepreneurial foundation. The evidence points to both short-and long-term negative economic impacts from disasters but the entrepreneurial tendency within an affected community have the potential of mitigating some of these structural economic impacts. This is important as Sassen (2001) categorically states that a growing marginal economy further widens the gap between rich and poor and increases occupational vulnerability.

Reducing poverty

Local MEs play an important role in economic and social recovery after a natural disaster. They contribute significantly to economic growth. The sector is one of the most important vehicles through which low-income people can avoid poverty and in some cases escape from it. These micro enterprises can be especially useful for regions suffering from slow-onset disasters as policies that encourage small business development may offer an effective intervention strategy.

Social stability and equity

Mainstreaming of Marginalized and vulnerable groups

Entrepreneurial solutions may assist to mitigate some of the apparent unevenness of natural disasters on certain socio-economic groups of people, especially in the Indian case where there are diverse communities with varying vulnerabilities. The age old differences can be bridged through such enterprises. This is especially true in a post-disaster scenario.

Economic Opportunities for Women

Women are the primary stakeholders and the owners of micro-enterprises, as seen in various cases. Women-owned businesses make up one of the fastest growing sections of micro enterprise sector. The social equity can be achieved through women empowerment and diversification of household income reaching the women of the households (Also see Box 7.1). As also evident from past case studies, an increased income in the hands of women is invested in health, education and housing for their families, thereby creating reliable social safety nets for their families and communities. In year 2006-07 the percentage of women enterprises against total units in Gujarat was just 10.18 (ISED 2013). Furthermore, women's access to loans and insurance are limited as land ownership is very low, despite the fact that the proportion of women taking part in agricultural labour is very high. As a result there is a lack of safety nets which makes it harder for women to adapt to climate change and its negative impacts.

Box 7.1 – Social Equity and Economic Empowerment through engaging female extension workers helping women in rural areas

“To overcome the problem of insufficient advice for women, on improved practices in agriculture and in other fields, projects in some countries have trained female extension workers to reach women in rural areas. In projects in 1989 in Yemen, 1992 in Cameroon, 2000 in Mali, 2001 in Tunisia and 2002 in China, female extension workers gave advice on animal husbandry and orchard management. They also developed creative materials and methods for accessing hard to reach audiences, through drama and farmer competitions as well as using the mass media. In the 1992 Cameroon project, subsequent follow-up research indicated that around 40% of women improved their nutritional knowledge, and 20% improved their nutritional practices.”

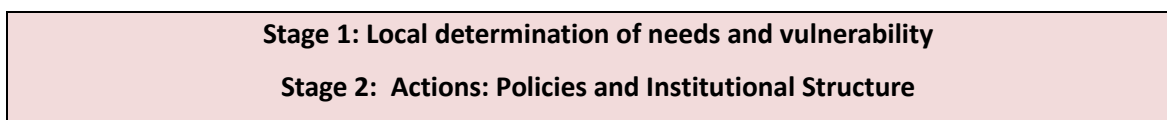
Source: Parker (2006)

Business continuity

Like any other private sector entity, MEs need to adapt their business strategies to remain viable or sustain the business competition. This adaptation demands for innovative adaptive measures, not only from micro enterprises but also from small, medium and large private sector operators. In this world of globalization, these are dependent on each other and swift recovery of one would surely ensure the faster recovery of others. Hence, there is a need for interlinked enterprises of various magnitude and scales where the collective cushion would be able to bear the brunt of the hazards.

7.7. Applicability of Occupation-based Risk Reduction framework

This research aims at the final goal of climate resilient occupations. This can be achieved through policy revisions and reassigning the roles for non-traditional stakeholders. The framework has two major stages:



As shown in the conceptual framework in Figure 7.5, this would require starting with the comparative vulnerability assessments with the objectives of poverty reduction, policy revisions for capacity building, determining urban-rural flow elements for that region and devising adaptation-led strategy. This would involve drafting of employment policies by the state government at the top level and implementation and coordination by various stakeholders at the medium level so that the benefits can percolate to the micro level, especially to the population engaged in low-income occupations. Table 7.2 enumerates the agencies which can include the OBRR in their various phases and guidelines, namely, Gujarat State Disaster Management Authority (GSDMA), Gujarat Livelihood Promotion Company (GLPC) and Labor and Employment Department. These would include vulnerability assessment and preliminary and detailed damage assessments, integration of urban and rural producer and service groups, elevating small Self Help Groups to Micro-enterprises with the help of private sector, and sustenance of skills, safeguarding them from extinction.

The characteristics of the vulnerable occupations are more or less similar all over India. This is due to the similar conditions of formal and informal sector, urban and rural linkages, and climate-related hazards. Second tier (such as Ahmedabad) and third tier cities (such as Jamnagar) are undergoing a development phase. There are various urban-rural conflicts, as well as linkages, owing to urban

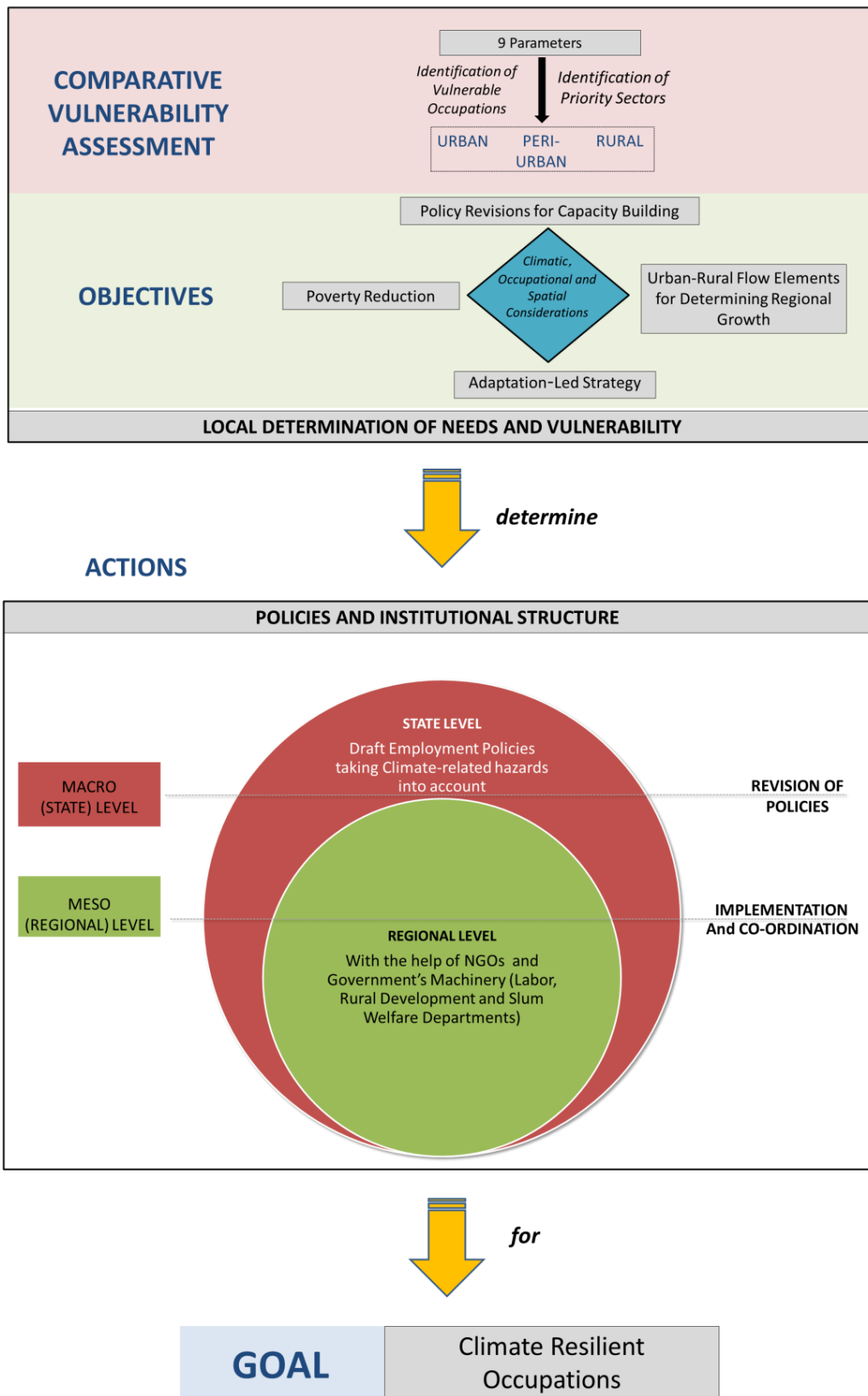


Figure 7.5 Conceptual Framework for Occupation-based Risk Reduction

Table 7.2 Where OBRR can play a role in state policies

Agency			Item	Where OBRR can play a role
Gujarat Management (GSDMA)	State Disaster Authority	Objectives		<i>to mitigate the losses on account of disasters as a strategy for long terms disaster preparedness. To undertake research regarding causes for losses on account of natural disaster and to suggest remedial measures</i>
			Pre-disaster Phase	Vulnerability: Assessment of degree of vulnerability of any given structure/ people / region to the impact of the hazard.
			Disaster/ Impact Phase	Preliminary damage assessment - Finalizing relief payouts and packages and Post-relief assessment.
			Post-Disaster Phase	Detailed damage assessment
Gujarat Promotion (GLPC)	Livelihood Company	Mission Mangalam		Integration of Producer and Service Groups spread over Urban and rural areas
				Self Help Groups can be formulated to link these Groups Establishment of Micro-enterprises for making occupations resilient through participation of Private Sector
Labor and Department	Employment	Director Industrial Safety and Health		Sustenance of skills vulnerable to hazards

expansion into rural lands. Therefore, the framework for achieving climate resilient occupations, especially the low-income ones, as shown in Figure 7.5, can be applied in a number of Indian regional systems.

However, it needs contextual adjustments in both the stages mentioned above. In ‘Local determination of needs and vulnerability’ there needs to be contextualization of variables of nine parameters of vulnerable occupations, and the urban-rural flow elements which are relevant in that particular regional system as laid out in this research. The climate-related hazards would also determine the vulnerability assessment. In Stage 2, ‘Actions: Policies and Institutional Structure’, the extent of local stakeholders (both traditional and non-traditional) active in the urban and rural areas

should be identified. It also requires the examination of employment policies of that particular state and the entry points that can be explored to link employment and climate-related vulnerability. Additionally, at a global scale, inclusion of climatic risks in the design and implementation of national and international development initiatives can promote equity and development that is more sustainable and that reduces vulnerability to climate change (IPCC 2001).

The Hyogo Framework for Action has brought attention, discussion, resources, and commitment to disaster risk reduction and to finding opportunities to address it. The overall objectives of the OBRR resonates with the Hyogo Framework for Action (HFA) (2005-2015) objectives under Priority area 4, **Reduce the underlying risk factors** : *‘(j) Promote diversified income options for populations in high-risk areas to reduce their vulnerability to hazards, and ensure that their income and assets are not undermined by development policy and processes that increase their vulnerability to disasters.’* Therefore, OBRR is applicable in other developing countries with similar problems of occupations, aggravated by climate-related hazards.

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Chapter 8

Conclusion

The conclusion chapter stresses on the key findings of the research study and draws key ideas for future research on vulnerable occupations and urban-rural linkages.

There has been limited adaptation to climate-related hazards but rarely has this adaptation been taken within the broader social and development context (Adger et al. 2007, Dodman and Satterthwaite 2008, Satterthwaite et al. 2007). There is an urgent need to increase the scope of adaptation as IPCC (2014) states with “very high confidence” that “impacts from recent climate-related extremes, such as heat waves, droughts, floods, cyclones, and wildfires, reveal significant vulnerability and exposure of some ecosystems and many human systems to current climate variability” and a drastic increase in such events. The study explores compares and analyzes two climate-related hazards, namely: floods and coastal salinity in Greater Ahmedabad and Jamnagar respectively.

The study started with objectives laid in Chapter 1, and in the process gained an understanding of the regional transformative processes with reference to climate-related hazards. Urban-rural flow elements impacted by such hazards were identified and enlisted. In both the cases of floods and salinity, vulnerable occupations were identified and compared. Based on the results, key points regarding the occupation-based risk reduction strategy at the regional level were suggested, with an aim to make the vulnerable occupations more resilient to the effects of climate-related hazards.

8.1. Conclusion

The study quantified the effects of hazard and vulnerability of occupations associated with floods and coastal salinity through detailed spatial risk profiling for both the cases. The following section discusses the key conclusions which were derived from the research conducted in two diverse climate-related hazards of floods in Ahmedabad (fast-onset hazard) and coastal salinity in Jamnagar (slow-onset hazard).

1. *Nine **parameters of vulnerable occupations** in climate-related hazards have been established based on literature survey and key informant surveys in case study areas, which are: loss of*

*productive assets, displacement and migration, loss of employment, decline in productivity, reduced income, workforce participation, change in occupation, effect on social structure, and recovery time. These parameters have been found useful **for comparative analysis of occupations** in climate related hazards in urban and rural areas.*

The parameters derive their strength from the fact that they have been put to test in two diverse cases of climate-related hazards. Also, the input from various stakeholders through key informant surveys, which includes government officers, academicians, non-government organizations, and the representatives of affected communities, imparts robustness to the framework. The parameters can be used to determine the impact of hazards on the people engaged at the micro economic level. This evaluation is simplistic in nature, hence can be done by the affected communities as well, to monitor their recovery after the hazard. It also empowers government agencies to shortlist the priority sectors and identify the vulnerable occupations which need utmost attention.

2. *The eight **urban-rural flow elements** have been identified and established for Ahmedabad and Jamnagar based on the literature survey and key informant survey, which are: people, natural resources, products, financial transactions, waste, information, social interactions and governance. The flow of ‘people’, ‘natural resources’, and ‘social interactions’ are most sensitive to both the cases of floods and salinity.*

All urban areas are surrounded by rural areas and hence their interrelationships are of paramount importance for molding the regional growth. Gujarat is seeing fast urbanization of its cities and the development authorities need to interpret the linkages through an understanding of the flow elements. This becomes all the more important as the flow of elements behave differently when the region is suffering a climate-related hazard. Disaster management can be enhanced on the basis of flow trends in a region from urban to rural area and vice versa.

3. *In the case of floods in Ahmedabad (fast-onset hazard) in **urban area**, the ‘**recovery time**’ parameter is the most affected, while in **rural areas** the ‘**decline in productivity**’ shows the most significant results. Urban population’s dependency on rural population is higher than rural population’s dependency on urban areas. The government is the most trusted stakeholder and other non-traditional stakeholders exist lesser in number.*

As stated earlier, the longevity of the recovery time for the households from a hazard is the reason

for chronic poverty. Decline in productivity also inhibits the non-farm occupations to become less popular as the coping strategy. The recurring floods in Ahmedabad have the potential to affect other parameters of vulnerable occupations. For example, since 'recovery time' is the most affected parameter in urban areas, the local authority can work on speeding the recovery and focus on recovery phase of that hazard through asset creation, replacement of non-useful productive assets and livelihood promotion. Here, since the hazard is not of catastrophic scale, there is a lack of awareness on the part of government and other stakeholders in catering to the demands of the effects of the flood every year.

4. *In the case of salinity in Jamnagar (slow-onset hazard) in urban areas the parameter affected the most is 'workforce participation' and in rural areas it is 'decline in productivity'. The rural population's dependency on urban areas is significantly higher than urban population's dependency on rural areas. Non-Governmental Organizations (NGOs) are the most trusted stakeholders followed by the government with the existence of a significant number of Self-help Groups (SHGs).*

Jamnagar's case of the slow-onset hazard of coastal salinity stresses on the loss of working days for the urban population. This can be caused by the increased number of influx of migrant population from rural areas into the urban areas. This causes a surplus of labor and therefore decreases the number of working days. The longevity of slow-onset hazard plays an important role in determining the vulnerable occupations and their characteristics. The presence and active participation of NGOs in livelihood promotion has caused better awareness about issues related to occupations. This case exhibit close coordination of government departments, NGOs, private sector and local communities, which has proved successful in understanding and addressing the issues related to occupations, in recent times.

5. *The study suggests that **the temporal aspect of disasters affect the vulnerability of occupations**. For rural areas 'decline in productivity' is the most significantly affected parameter for the case of both fast and slow-onset disasters. While fast-onset disaster shows higher dependency of urban population on rural areas, the slow-onset disaster shows higher dependency of rural population on urban areas.*

The temporal aspect, i.e. the length of a particular hazard, has an additional influence on the

vulnerability of the occupations. In the case of slow-onset long term hazard, people have come to terms with the hazard and have started to adapt to it, with their coping strategies. At the same time, the loss caused due to these long duration hazard is being aggregated by each passing year, compelling the population to take drastic measures. While in a fast-onset hazard the affected population resorts to temporary solutions; from migration to change in occupations.

6. *The occupational resilience in these cases can be achieved through **policy revisions** (enriching existing employment schemes to take into account climate-related hazards), and **reassigning roles for non-traditional stakeholders** in Gujarat's context to include preparedness and recovery from hazards in their activities.*

Existing employment policies in Gujarat are moving in the right direction to provide better earning opportunities. However, these policies need to expand to include provisions for occupations getting affected by climate-related hazards. This would ensure that the affected population comes to same level of earning as before the hazard as early as possible, and are ready to face the next hazard better prepared. The non-traditional stakeholders such as Non-governmental Organizations, Self-help Groups, Women Associations, Occupational associations, and slum associations, have to play an active role in the enhancement of occupational resilience through coordinated efforts, with the help of government.

8.2. Further Research Scope

The study explores a great deal of scope in its evaluation if the two cases. To robustly build on the initial results gathered by this study, this research can be expanded to include more case studies of climate-related hazards. The study has a future research scope under the following heads:

1. **Policy Scope for employment schemes** - This study evaluates the employment schemes run by the national and state governments and the potential they have in providing for the climate-related hazards. A separate study can be carried out evaluating the employment schemes in detail and their potential roles in risk reduction, targeting large scale disasters as well. Suggestions to widen the policy scope specific to the employment schemes would strengthen the risk reduction initiatives.
2. **Urban-rural linkages** – This study evaluates the impact of floods and salinity on the urban-rural linkages in the two regions of Ahmedabad and Jamnagar. The impact of climate-related

hazards on urban-rural linkages can be explored in more cases where urban-rural systems are impacted by the hazards. This would define the development priorities and the bias the local administration needs to have to balance the impacts of development and limit the effects of hazards.

- 3. Vulnerable Occupations** - The methodology adopted in this study comparatively evaluates vulnerability of the occupations. Specific strategies for the most vulnerable occupations in the cases of floods and coastal salinity can be worked out as a detailed research. These strategies can be adopted by the local administration to enhance the resilience of the occupations in both the cases of recurring (floods) and continuing (salinity) hazards. This would also allow prioritizing the sectors in which the Self-Help Groups can be encouraged for maximum benefits to the ailing communities.
- 4. Implementation at community level** – The implementation of the policies requires coordination of various stakeholders, and more importantly an action plan at the grass root level. Further research can be conducted for these cases; and other cases, to determine the strategy for implementation of OBRR utilizing the input provided by the community and the results of study on the vulnerable occupations.

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ANNEXURE 1- KEY INFORMANT SURVEY (AHMEDABAD)



Date ____ July 2012, Nitin Srivastava

Questionnaire No. : URL/KI/ADI/.....

In-depth key informants' Interview for identifying vulnerable occupations with reference to urban rural linkages in Ahmedabad, Gujarat, India

Introduction Key Components: • Thank you • Your name • Purpose • Confidentiality • Duration • How interview will be conducted • Opportunity for Questions	I want to thank you for taking the time to meet with me today. My name is Nitin Srivastava. I would like to talk to you about your community's experiences in recent past regarding disasters and the affected livelihood with special reference to occupations. Specifically, how the local people cope up with disasters. The interview should take less than 25 minutes. Although I will be taking some notes during the session, yet I can't possibly write fast enough to get it all down. Therefore I will be recording the session because I don't want to miss any of your comments. All responses will be kept confidential. This means that your interview responses will only be shared with research team members of Graduate School of Global Environmental Studies, Kyoto University, Japan. We will ensure that any information we include in our report does not identify you as the respondent. Remember, you don't have to talk about anything you don't want to and you may end the interview at any time. Are there any questions about what I have just explained? Are you willing to participate in this interview? Interviewee : _____ Location : _____ Age : _____ Gender: <u>M/ F</u> Education : _____ Designation : _____ Witness(if any) _____
1. BACKGROUND Can you tell me something about your community/neighborhood? Background Age Composition (no. of households, ethnicity etc.) Approximate population	Answer:

Questions

2. PAST DISASTER EXPERIENCE (after 2001 Gujarat earthquake) 2.1 When did your community experience last disaster? (year) 2.2 Details of disaster (type, e.g. for flood- depth, time period (no. of days)) 2.3 What were the damages to the community in that disaster?	Answer: ☐Deaths ☐Injuries ☐ Damage to housing ☐ Damage to livestock ☐ Loss of connection with other parts/villages ☐ Damage to crops ☐ Damage to public infrastructure ☐ If other (please specify _____)															
3. MIGRATION/DISPLACEMENT 3.1 Did you/your community migrate due to disaster and its effects? 3.2 What were the reasons for migration? (Tick one or more) 3.3 Is this migration permanent/temporary/periodic/seasonal? (Tick one or more)	Answer: 1. Yes ☐ 2. No ☐ ☐ Find employment ☐ Better employment ☐ Loss of assets ☐ Decline in productivity ☐ If other (please specify _____) ☐ Permanent ☐ Temporary ☐ Periodic ☐ Seasonal															
4. OCCUPATION AND ALTERNATIVE LIVELIHOOD ACTIVITIES <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 35%;"></th> <th style="width: 35%;">At present place of stay</th> <th style="width: 30%;">At previous place of stay</th> </tr> </thead> <tbody> <tr> <td>4.1 What are the most important livelihood activities in the community and when these take place in a year?</td> <td></td> <td></td> </tr> <tr> <td>4.2 What was the overall impact of the disaster on livelihood activities in the community?</td> <td colspan="2"></td> </tr> <tr> <td>4.3 What were the immediate responses of the community people with regards to occupation?</td> <td colspan="2"></td> </tr> <tr> <td>4.4 What are the livelihood alternatives for the community during and immediately after the disaster?</td> <td colspan="2"> During : Immediately after : </td> </tr> </tbody> </table>			At present place of stay	At previous place of stay	4.1 What are the most important livelihood activities in the community and when these take place in a year?			4.2 What was the overall impact of the disaster on livelihood activities in the community?			4.3 What were the immediate responses of the community people with regards to occupation?			4.4 What are the livelihood alternatives for the community during and immediately after the disaster?	During : Immediately after :	
	At present place of stay	At previous place of stay														
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4.4 What are the livelihood alternatives for the community during and immediately after the disaster?	During : Immediately after :															

4.5 Any other aspect of occupation change?		
5. ASSETS		
What amongst the following does your community have access to?	At present place of stay	At previous place of stay (if applicable)
5.1 Human Capital (<i>labour power, health and nutritional status, skills etc.</i>)		
5.2 Natural capital (<i>access to natural resources, land , water, wildlife, forest etc.</i>)		
5.3 a. Social capital (<i>social trust, norms and networks, kin networks and group membership</i>) b. Is there community based association active at the present place? c. Whom do you approach for assistance during the time of disaster/floods? d. Do you find current community as strongly linked? If migrated, e. Have you lost contact with earlier community?	1. Yes ☐ 2. No ☐ ☐ Government ☐ NGO ☐ Our own community ☐ None ☐ Others _____ 1. Yes ☐ 2. No ☐ 1. Yes ☐ 2. No ☐	
5.4 Physical capital (<i>houses, vehicles, equipment, livestock, physical reproducible goods</i>)		
5.5 a. Financial capital (<i>monetary resources, savings, jewellery, income, net access to credit and insurance</i>) b. What kind of insurance of the following does the community avail?	☐ life insurance ☐ medical insurance ☐ insurance for house ☐ insurance for machinery/tools ☐ accidental insurance ☐ Other _____	

6. POTENTIAL ROLE OF STAKEHOLDERS What do you think is potential role of each of the following in economic recovery of the people : a. Individual b. Community c. Government	
7. What according to you are the high priority needs for the community to be prepared against next disaster?	
8. URBAN RURAL LINKAGES 8.1. How often do you visit your native village in a year? 8.2. How many family members are there in the village/urban area? 8.3. Remuneration 1. Do you send remuneration to the village? 2. If yes, for what reason? 8.4. Urban survival strategy 1. In case of unemployment, would you go to your village for security? 2. In case of disaster, would you go to your village for safety? 3. Do you plan to return permanently? 8.5. Land accessibility : 1. Do you own land in village? 2. Do you want to own land in village?	1.Yes ☐ 2. No ☐ 1. Fund for education ☐ 2.Living expenses ☐ 3. Agriculture investment ☐ 4.Medical Insurance ☐ 1.Yes ☐ 2. No ☐ 1.Yes ☐ 2. No ☐ 1.Yes ☐ 2. No ☐ 1.Yes ☐ 2. No ☐ 1.Yes ☐ 2. No ☐
9. Any other additional information	

ANNEXURE 2- HOUSEHOLD SURVEY (AHMEDABAD) (ENGLISH)



Date _____ 2013, Nitin Srivastava

Questionnaire No. : URL/HH/ADI/.....

Questionnaire Survey for identifying vulnerable occupations with reference to urban rural linkages in Ahmedabad, India

The study is conducted by

International Environment and Disaster Management (IEDM) Laboratory,

Graduate School of Global Environment Studies (GSGES), Kyoto University, Japan and CEPT University, Ahmedabad, India

The objective of this questionnaire is to identify the vulnerable occupations with reference to urban and rural floods in Ahmedabad. The finding from this questionnaire will contribute in ascertaining the crucial elements in urban rural linkages during the time of disaster. The results will help formulate strategies for both urban and rural vulnerable poor communities to lessen the socio-economic impact of the disasters and also recover from their impacts. The expected beneficiaries of this result will be the local community, Community Based Organizations (CBOs), Ahmedabad Local Government, and Non-Government Organizations (NGOs). All the information collected will be strictly used for the academic purpose.

Please tick the appropriate option (v), wherever applicable.

BASIC INFORMATION			
Name of the respondent :		Age:	Gender :M /F
Village _____ (Gram Panchayat)/Ward _____ (MahanagarPalika/Nagar Palika/Nagar Panchayat) (Please circle one)			
Household Size :		Urban/Rural/Peri-urban (Please circle one)	
Role in the family :	Head ☐	Family Member ☐	
Type of dwelling :	Kachcha ☐	Semi-pucca ☐	Pucca ☐

DISASTER EXPERIENCE					
Past occurrence of flood in the last 12 years (since Gujarat earthquake) (mention years):					
Frequency of floods	More than once per year ☐	Once per year ☐	Once every 5 years ☐	Less than 5 years ☐	No floods ☐
Type of floods	River flooding ☐	Local Street flooding ☐		Both ☐	
Deaths to members, if any (specify no.)					
Injuries to members, if any (specify no.)					
Any damage to? dwelling place/house/shops(Please circle)					
Extent of damage :	1.Complete collapse ☐	2. Partial collapse ☐	3. Minor damage ☐	No damage ☐	Year :
	1.Complete collapse ☐	2. Partial collapse ☐	3. Minor damage ☐	No damage ☐	Year :

QUESTIONNAIRE			
1. Did you migrate to the present location?	1. Yes ☐ 2. No ☐	When ? _____	
2. If 'Yes' to 1, 2.1 Where did you migrate from, to the present location?	1. From nearby village within AUDA ☐	2. within Gujarat, outside AUDA ☐	
	3. From other Indian states _____ (name)		
2.2 What was the reason for migration?	1. Find Employment ☐	2. Better Employment ☐	
(Multiple choice possible)	3. Disaster at original place ☐	4. Other _____	

2.3 What is the nature of this migration?	1. Temporary	☐	2. Permanent	☐
	3. Uncertain	☐		
2.4. Is there a contact with the earlier community?	1. Yes	☐	2. No	☐

	AT PRESENT LOCATION				AT EARLIER LOCATION (if migrated)			
3. Occupation	1. Agriculture laborer	☐	2. Government sector	☐	1. Agriculture laborer	☐	2. Government sector	☐
	3. Household industry	☐	4. Construction laborer	☐	3. Household industry	☐	4. Construction laborer	☐
	5. Hawker	☐	6. Cultivator	☐	5. Hawker	☐	6. Cultivator	☐
	7. Other _____				7. Other _____			
4. Household Annual earnings (in INR)	1. 0-20000	☐	2. 20001-40000	☐	1. 0-20000	☐	2. 20001-40000	☐
	3. 40001-70000	☐	4. 70001-90000	☐	3. 40001-70000	☐	4. 70001-90000	☐
	5. 90001-180000	☐	6. More than 180000	☐	5. 90001-180000	☐	6. More than 180000	☐
5. No. of earners in the family?								
6. Earning from principal earner?								
7. If answer to 5 is 3 (household industry), then the earning of the industry is/was :	1. Low (<25 %)	☐	2. Medium (25-50 %)	☐	1. Low (<25 %)	☐	2. Medium (25-50%)	☐
	3. High (>50 %)	☐			3. High (>50%)	☐		

	AT PRESENT LOCATION		AT EARLIER LOCATION (if migrated)	
8. Did you lose any productive asset (such as machinery, tools, work place) in floods, related to the household industry?	1. Yes 2. No	☐ ☐	1. Yes 2. No	☐ ☐
9. During the extreme rain season, do you lose working days in your job	1. Yes 2. No	☐ ☐	1. Yes 2. No	☐ ☐
9.1 If yes, then how many days?	1. 0-2 days	☐	1. 0-2 days	☐
	2. 3-10 days	☐	2. 3-10 days	☐
	3. 11 days – a month	☐	3. 11 days - a month	☐
	4. More than a month	☐	4. More than a month	☐
10. Do you change your occupation during the disaster time?	1. Yes, _____ (no. of times) 2. No	☐ ☐	1. Yes, _____ (no. of times) 2. No	☐ ☐
10.1 If yes, for what reason?	1. Loss of income at previous occupation	☐	1. Loss of income at previous occupation	☐
	2. Cannot carry out the previous occupation at all	☐	2. Cannot carry out the previous occupation at all	☐
	3. Loss of transportation to the job	☐	3. Loss of transportation to the job	☐
	4. Any other _____		4. Any other _____	
11. How much time do you need to have same level of earning as before the floods?	1. 0-2 days 2. 3-10 days 3. 11 days to a month 4. More than a month	☐ ☐ ☐ ☐	1. 0-2 days 2. 3-10 days 3. 11 days to a month 4. More than a month	☐ ☐ ☐ ☐
12. Is there a decline in your social respect after the disaster?	1. Yes 2. No	☐ ☐	1. Yes 2. No	☐ ☐
13. Do any of the following organizations exist in your neighborhood?	Community based/ Religious Occupation-based	☐ ☐ ☐	Community based/ Religious Occupation-based	☐ ☐ ☐

14. Member of any community based association	1. Yes 2. No	☐ ☐	1. Yes 2. No	☐ ☐	
15. What according to you are the high priority needs for the community to be prepared against next disaster?	Employment Education Housing Finance Any other _____	☐ ☐ ☐ ☐ ☐	Employment Education Housing Finance Any other _____	☐ ☐ ☐ ☐ ☐	
16. Whom do you approach for assistance during the time of floods? (Multiple choice possible)	1. Government 2. Community based organizations 3. Non-Government Organizations 4. Religious Organizations 5. Occupation-based organizations 6. Local community 7. Any other _____ 8. No one	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	1. Government 2. Community based organizations 3. Non-Government Organizations 4. Religious Organizations 5. Occupation-based organizations 6. Local community 7. Any other _____ 8. No one	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	
17. What kind of Insurance of the following do you avail?	1. Life insurance 2. Insurance for machinery/tools/equipment 3. Insurance for house 4. Medical Insurance 5. Accidental insurance	☐ ☐ ☐ ☐ ☐	1. Life insurance 2. Insurance for machinery/tools/equipment 3. Insurance for house 4. Medical Insurance 5. Accidental insurance	☐ ☐ ☐ ☐ ☐	
FOR URBAN/PERI-URBAN HABITANTS			FOR RURAL HABITANTS		
18. How many of your family members are there in the village?			18. How many of your family members are there in the urban area?		
19. How often do you visit your native village in a year?	1. Once a year 2. Once in 3-4 months 3. Once in every month	☐ ☐ ☐	19. How often do you visit the urban area in a year?	1. Once a year 2. Once in 3-4 months 3. Once in every month	☐ ☐ ☐
20. Do you send remuneration to the village?	1. Yes 2. No	☐ ☐	20. Do you send money to the family member/s in the urban area?	1. Yes 2. No	☐ ☐
20.1 For what purpose?	1. Fund for education 2. Living expenses 3. Agriculture/Other Investment 4. Medical Insurance	☐ ☐ ☐ ☐	20.1 For what purpose?	1. Fund for education 2. Living expenses 3. Investment 4. Medical Insurance	☐ ☐ ☐ ☐
21.1 Do you own land/property/house in village?	1. Yes 2. No	☐ ☐	21.1 Do you own land/property/house in urban area?	1. Yes 2. No	☐ ☐
21.2 If 'No', then do you want to own?	1. Yes 2. No	☐ ☐	21.2 If 'No', then do you want to own?	1. Yes 2. No	☐ ☐
22. Urban survival strategy			22. Rural survival strategy		
22.1 In case of unemployment, would you go to your village for financial security?	1. Yes 2. No If No , then Migrate to other city Remain here only Do not know	☐ ☐ ☐ ☐ ☐ ☐	22.1 In case of unemployment, would you go to the urban area for financial security?	1. Yes 2. No If No , then Migrate to other village Remain here only Do not know	☐ ☐ ☐ ☐ ☐ ☐
22.2 In case of a long disaster, would you go to your village for safety?	1. Yes 2. No If No , then Migrate to other city Remain here only Do not know	☐ ☐ ☐ ☐ ☐ ☐	22.2 In case of a long disaster, would you go to the urban area for safety?	1. Yes 2. No If No , then Migrate to other village Remain here only Do not know	☐ ☐ ☐ ☐ ☐ ☐
22.3 Do you plan to return to your native village permanently in the next 5 years?	1. Yes 2. No If No , then Migrate to other city Remain here only Do not know	☐ ☐ ☐ ☐ ☐ ☐	22.3 Do you plan to migrate to the urban area in the next 5 years?	1. Yes 2. No If No , then Migrate to other village Remain here only Do not know	☐ ☐ ☐ ☐ ☐ ☐

ANNEXURE 3- HOUSEHOLD SURVEY (AHMEDABAD) (GUJARATI)



તારીખ : / / ૨૦૧૩, નીતિન શ્રીવાસ્તવ

પ્રશ્નાવલિ ક્રમાંક : URL/HH/ADI/.....

અમદાવાદ, ભારતમાં શહેરી ગ્રામીણ જોડાણો / શુંખલાના સંદર્ભમાં નબળાં વ્યવસાયોને ઓળખવા માટેની પ્રશ્નાવલિ મોજણી

અભ્યાસનું સંચાલન કરનાર :

ઈન્ટરનેશનલ ઈન્વાયરનમેન્ટ એન્ડ ડિઝાસ્ટર મેનેજમેન્ટ લેબોરેટરી

ગ્રોજુએટ સ્કૂલ ઓફ ગ્લોબલ એન્વાયરનમેન્ટ સ્ટડીઝ (GSGES), કચોટા યુનિવર્સિટી, જાપાન અને CEPT યુનિવર્સિટી, અમદાવાદ દ્વારા કરવામાં આવેલું છે.

આ અભ્યાસનો હેતુ શહેરી અને ગ્રામીણ વિસ્તારોમાં આવેલા પૂરના સંદર્ભમાં નબળાં વ્યવસાયોને ઓળખવાનો છે.

આ અભ્યાસના નિષ્કર્ષો, હોનારતના સમયમાં શહેરી ગ્રામીણ જોડાણો / શુંખલામાં નિર્ણાયક ભૂમિકા ભજવતા તત્વોને જાણવામાં મદદરૂપ થશે અને સાથે સાથે શહેર અને ગામડાના નબળાં અને ગરીબ સમુદાયો માટે એવી વ્યૂહરચના ઘડવામાં પણ મદદરૂપ થશે કે જેથી હોનારતના કારણે થતી સામાજિક – આર્થિક અસરો ઓછી કરી શકાય અને હોનારતની અસરમાંથી બહાર આવી શકાય. આ અભ્યાસથી સ્થાનિક સમુદાય, સમુદાય આધારિત સંસ્થાઓ (CBOs), અમદાવાદની સ્થાનિક સરકાર અને સ્વૈચ્છિક સંસ્થાઓને લાભ થશે. મોજણી દરમ્યાન ભેગી કરેલી સમગ્ર માહિતીનો ઉપયોગ માત્ર શૈક્ષણિક હેતુ માટે કરવામાં આવશે.

જ્યાં લાગુ પડે ત્યાં, યોગ્ય વિકલ્પને (✓) કરવી.

મૂળભૂત માહિતી			
ઉત્તરદાતાનું નામ:		ઉંમર :	જાતિ : પુ / સ્ત્રી
ગામ _____ (ગ્રામ પંચાયત)/ વોર્ડ _____ (મહાનગરપાલિકા / નગરપાલિકા / નગરપંચાયત)		(કોઈ એકમાં વર્તુળ સકરો)	
કુટુંબનું કદ		શહેરી / ગ્રામીણ / અર્ધ-શહેરી (કોઈ એકમાં વર્તુળ કરો)	
કુટુંબમાં ભૂમિકા	વડા ☐	કુટુંબના સદસ્ય ☐	
ઘરનો પ્રકાર :	કાચું ☐	કાચું-પાકું ☐	પાકું ☐

હોનારતોનો અનુભવ					
છેલ્લા ૧૨ વર્ષોમાં (ગુજરાતમાં ધરતીકંપ પછી) ક્યારે ક્યારે પૂર આવેલું (વર્ષો દર્શાવો) :					
પૂરની વારંવારતા	વર્ષ દીઠ એકથી વધુ ☐	વર્ષ દીઠ એકવાર ☐	દર પાંચ વર્ષે એકવાર ☐	પાંચ વર્ષથી ઓછા સમયમાં ☐	કોઈ પૂર નથી આવ્યું ☐
પૂરનો પ્રકાર	નદીમાં પૂર આવ્યું ☐	સ્થાનિક શેરીઓમાં પાણી ભરાયું ☐	બન્ને ☐		
મૃત્યુ પામેલ કુટુંબના સદસ્યો, જો હોય તો (સંખ્યા દર્શાવો)					
ઈજા પામેલા કુટુંબના સદસ્યો, જો હોય તો (સંખ્યા દર્શાવો)					
નુકસાન થયું હતું ?					
રહેઠાણનું સ્થળ / ઘર / દુકાન (વર્તુળ કરો)					
કેટલું નુકસાન થયું હતું ?	૧. સંપૂર્ણ નુકસાન ☐	૨. આંશિક નુકસાન ☐	૩. મામૂલી નુકસાન ☐	કોઈ નુકસાન નહિ ☐	વર્ષ :
	૧. સંપૂર્ણ નુકસાન ☐	૨. આંશિક નુકસાન ☐	૩. મામૂલી નુકસાન ☐	કોઈ નુકસાન નહિ ☐	વર્ષ :

પ્રશ્નાવલિ					
૬. તમે હાલની જગ્યાએ સ્થળાંતર કરીને આવ્યા ?	૧. હા ☐	૨. ના ☐	ક્યારે ? _____		
૭. જો પ્રશ્ન ૧ માં જવાબ 'હા' હોય તો, તમે કયા સ્થળેથી અહિં આવ્યા ?	૧. ઔડાની અંદર આવેલ નજીકના ગામથી ☐	૨. ઔડાની બહાર પણ ગુજરાતમાંથી ☐			
	૩. ભારતના અન્ય રાજ્યમાંથી (નામ)				
૨.૨ સ્થળાંતરનું કારણ શું હતું ?	૧. રોજગારની શોધમાં ☐	૨. વધુ સારા રોજગારની શોધમાં ☐			
(એક થી વધુ વિકલ્પો શક્ય છે)	૩. મૂળ સ્થાને હોનારત થઈ હોવાથી ☐	૪. અન્ય _____ ☐			
૨.૩ આ સ્થળાંતર કયા પ્રકારનું છે	૧. હંગામી ☐	૨. કાયમી ☐			
	૩. અનિશ્ચિત ☐				
૨.૪ અગાઉના સમુદાય સાથે સંપર્કમાં છે ?	૧. હા ☐	૨. ના ☐			

	હાલની જગ્યાએ		અગાઉની જગ્યાએ (જો સ્થળાંતર કર્યું હોય તો)	
૩. વ્યવસાય	૧. ખેત મજૂર ☐	૨. સરકારી ક્ષેત્રમાં ☐	૧. ખેત મજૂર ☐	૨. સરકારી ક્ષેત્રમાં ☐
	૩. ગૃહ ઉદ્યોગ ☐	૪. બાંધકામ મજૂર ☐	૩. ગૃહ ઉદ્યોગ ☐	૪. બાંધકામ મજૂર ☐

	પ. ફેરિયા	☐	દ. ખેડૂત	☐	પ. ફેરિયા	☐	દ. ખેડૂત	☐
	૭. અન્ય				૭. અન્ય			
૪. કુટુંબની વાર્ષિક આવક (ભારતીય રૂપિયામાં)	૧. ૦-૨૦૦૦૦	☐	૨. ૨૦૦૦૧-૪૦૦૦૦	☐	૧. ૦-૨૦૦૦૦	☐	૨. ૨૦૦૦૧-૪૦૦૦૦	☐
	૩. ૪૦૦૦૧-૭૦૦૦૦	☐	૪. ૭૦૦૦૧-૯૦૦૦૦	☐	૩. ૪૦૦૦૧-૭૦૦૦૦	☐	૪. ૭૦૦૦૧-૯૦૦૦૦	☐
	૫. ૯૦૦૦૧-૧૮૦૦૦૦	☐	૬. ૧૮૦૦૦૦ થી વધુ	☐	૫. ૯૦૦૦૧-૧૮૦૦૦૦	☐	૬. ૧૮૦૦૦૦ થી વધુ	☐
પ. કુટુંબમાં કમાનાર સભ્યોની સંખ્યા								
દ. મુખ્ય કકમાનાર સભ્યની આવક								
૭. જો પ્રશ્ન ઉમાં જવાબ હા હોય (ગૃહ ઉદ્યોગ), તો ગૃહ ઉદ્યોગથી થતી આવક	૧. ઓછી (<૨૫ %)	☐	૨. મધ્યમ (૨૫-૫૦ %)	☐	૧. ઓછી (<૨૫ %)	☐	૨. મધ્યમ (૨૫-૫૦ %)	☐
	૩. વધુ (>૫૦ %)	☐			૩. વધુ (>૫૦ %)	☐		

	હાલની જગ્યાએ		અગાઉની જગ્યાએ (જો સ્થળાંતર કર્યું હોય તો)	
૮. તમે પૂરમાં ગૃહ ઉદ્યોગને લગતી કોઈ ઉત્પાદક અસ્કયામતો (જેમ કે મશીનરી, સાધનો, કામ કરવાનું સ્થળ) ગુમાવી છે.	૧. હા ૨. ના	☐ ☐	૧. હા ૨. ના	☐ ☐
૯. વધારે વરસાદના કારણે તમે કામના દિવસો ગુમાવો છો ?	૧. હા ૨. ના	☐ ☐	૧. હા ૨. ના	☐ ☐
૯.૧ જો હા, તો કેટલા દિવસો	૧. ૦-૨ દિવસ ૨. ૩-૧૦ દિવસ ૩. ૧૧ દિવસ - ૧ મહિનો ૪. એક મહિનાથી વધુ	☐ ☐ ☐ ☐	૧. ૦-૨ દિવસ ૨. ૩-૧૦ દિવસ ૩. ૧૧ દિવસ - ૧ મહિનો ૪. એક મહિનાથી વધુ	☐ ☐ ☐ ☐
૧૦. હોનારતના સમયમાં શું તમે તમારો વ્યવસાય બદલો છો ?	૧. હા (કેટલી વાર) ૨. ના	☐ ☐	૧. હા (કેટલી વાર) ૨. ના	☐ ☐
૧૦.૧ જો હા, તો શા માટે	૧. પહેલાના વ્યવસાયની આવક ઘટવાથી ૨. પહેલાનો વ્યવસાય ચાલુ રાખી શકાય તેમ નથી. ૩. કામના સ્થળે જવાનું વાહન ગુમાવ્યું.	☐ ☐ ☐	૧. પહેલાના વ્યવસાયની આવક ઘટવાથી ૨. પહેલાનો વ્યવસાય ચાલુ રાખી શકાય તેમ નથી. ૩. કામના સ્થળે જવાનું વાહન ગુમાવ્યું.	☐ ☐ ☐
	૪. અન્ય		૪. અન્ય	
૧૧. પૂર પહેલા તમારી જેટલી આવક હતી, તેટલી જ આવક મેળવવા માટે તમને કેટલો સમય લાગશે.	૧. ૦-૨ દિવસ ૨. ૩-૧૦ દિવસ ૩. ૧૧ દિવસથી ૧ મહિનો ૪. એક મહિનાથી વધુ	☐ ☐ ☐ ☐	૧. ૦-૨ દિવસ ૨. ૩-૧૦ દિવસ ૩. ૧૧ દિવસથી ૧ મહિનો ૪. એક મહિનાથી વધુ	☐ ☐ ☐ ☐
૧૨. હોનારત પછી તમારા માલ-સામાનમાં ઘટાડો થયો છે ?	૧. હા ૨. ના	☐ ☐	૧. હા ૨. ના	☐ ☐
૧૩. તમારા પાડોશમાં આમાંની કોઈ સંસ્થા છે ?	સમુદાય આધારિત ધાર્મિક વ્યવસાય આધારિત	☐ ☐ ☐	સમુદાય આધારિત ધાર્મિક વ્યવસાય આધારિત	☐ ☐ ☐
૧૪. તમે કોઈ સમુદાય આધારિત સંસ્થાના સભ્ય છો ?	૧. હા ૨. ના	☐ ☐	૧. હા ૨. ના	☐ ☐
૧૫. તમારા મુજબ, ભવિષ્યમાં થનાર હોનારતનો સામનો કરવા માટે પ્રાથમિકતાના ધોરણે કઈ બાબતો જરૂર છે ?	રોજગાર શિક્ષણ રહેઠાણ નાણાં અન્ય	☐ ☐ ☐ ☐ ☐	રોજગાર શિક્ષણ રહેઠાણ નાણાં અન્ય	☐ ☐ ☐ ☐ ☐
૧૬. પૂરના સમયે, સહાયતા માટે તમે કોનો સંપર્ક કરો છો ?	૧. સરકાર ૨. સમુદાય આધારિત સંસ્થાઓ ૩. સ્વૈચ્છિક સંસ્થાઓ ૪. ધાર્મિક સંસ્થાઓ ૫. વ્યવસાય આધારિત સંસ્થાઓ ૬. સ્થાનિક સમુદાય ૭. અન્ય	☐ ☐ ☐ ☐ ☐ ☐ ☐	૧. સરકાર ૨. સમુદાય આધારિત સંસ્થાઓ ૩. સ્વૈચ્છિક સંસ્થાઓ ૪. ધાર્મિક સંસ્થાઓ ૫. વ્યવસાય આધારિત સંસ્થાઓ ૬. સ્થાનિક સમુદાય ૭. અન્ય	☐ ☐ ☐ ☐ ☐ ☐ ☐
	૮. કોઈ નહિ	☐	૮. કોઈ નહિ	☐
૧૭. તમારી પાસે કયા પ્રકારનો વીમો છે ?	૧. જીવન વીમો ૨. મશીનરી / સાધન સામગ્રી માટેનો વીમો ૩. ઘરનો વીમો	☐ ☐ ☐	૧. જીવન વીમો ૨. મશીનરી / સાધન સામગ્રી માટેનો વીમો ૩. ઘરનો વીમો	☐ ☐ ☐

	૪. તબીબી વીમો	☐	૪. તબીબી વીમો	☐	
	૫. અકસ્માત વીમો	☐	૫. અકસ્માત વીમો	☐	
શહેરી / અર્ધ શહેરી રહેવાસીઓ માટે			ગ્રામીણ રહેવાસીઓ માટે		
૧૮. તમારા પરિવારના કેટલા સભ્યો ગામમાં છે ?			૧૮. તમારા પરિવારના કેટલા સભ્યો શહેરમાં છે ?		
૧૯. તમે એક વર્ષમાં કેટલીવાર તમારા વતનના ગામની મુલાકાત લ્યો છો ?	૧. વર્ષમાં એકવાર ૨. ૩-૪ મહિનામાં એકવાર ૩. દર મહિને એકવાર	☐ ☐ ☐	૧૯. તમે એક વર્ષમાં કેટલી વાર શહેરી વિસ્તારની મુલાકાત લ્યો છો ?	૧. વર્ષમાં એકવાર ૨. ૩-૪ મહિનામાં એકવાર ૩. દર મહિને એકવાર	☐ ☐ ☐
૨૦. તમે તમારા ગામે પૈસા મોકલો છો ?	૧. હા ૨. ના	☐ ☐	૨૦. તમે શહેરી વિસ્તારમાં રહેતા, તમારા પરિવારના સભ્યોને પૈસા મોકલો છો ?	૧. હા ૨. ના	☐ ☐
૨૦.૧ કયા હેતુ માટે	૫. શિક્ષણ માટે ૬. ઘર-ખર્ચ માટે ૭. ખેતી / અન્ય રોકાણ માટે ૮. તબીબી વીમા માટે / તબીબી ખર્ચ માટે	☐ ☐ ☐ ☐	૨૦.૧ કયા હેતુ માટે	૯. શિક્ષણ માટે ૧૦. ઘર-ખર્ચ માટે ૧૧. ખેતી / અન્ય રોકાણ માટે ૫. તબીબી વીમા માટે / તબીબી ખર્ચ માટે	☐ ☐ ☐ ☐
૨૧.૧ તમે ગામમાં જમીન / ઘર / મિલકત ધરાવો છો ?	૧. હા ૨. ના	☐ ☐	૨૧.૧ તમે શહેરી વિસ્તારમાં જમીન / ઘર / મિલકત ધરાવો છો ?	૧. હા ૨. ના	☐ ☐
૨૧.૨ જો ના તો શું તમે ગામમાં જમીન / ઘર / મિલકત ખરીદવા માંગો છો ?	૧. હા ૨. ના	☐ ☐	૨૧.૨ જો ના તો શું તમે શહેરી વિસ્તારમાં જમીન / ઘર / મિલકત ખરીદવા માંગો છો ?	૧. હા ૨. ના	☐ ☐
૨૨. ગુપ્ત ટકાવી રાખવાનો શહેરી વ્યૂહ			૨૨. ગુપ્ત ટકાવી રાખવાનો ગ્રામીણ વ્યૂહ		
૨૨.૧ બેરોજગારીની સ્થિતિમાં, આર્થિક સલામતી માટે તમે તમારા ગામમાં જશો ?	૧. હા ૨. ના જો ના, તો બીજા શહેરમાં સ્થળાંતર કરીશ અહિંયા જ રહીશ ખબર નથી	☐ ☐ ☐ ☐ ☐	૨૨.૧ બેરોજગારીની સ્થિતિમાં, આર્થિક સલામતી માટે તમે શહેરી વિસ્તારમાં જશો ?	૧. હા ૨. ના જો ના, તો બીજા ગામમાં સ્થળાંતર અહિંયા જ રહીશ ખબર નથી	☐ ☐ ☐ ☐ ☐
૨૨.૨ લાંબી હોનારતની સ્થિતિમાં, સલામતી માટે તમે તમારા ગામમાં જશો ?	૧. હા ૨. ના જો ના, તો બીજા શહેરમાં સ્થળાંતર કરીશ અહિંયા જ રહીશ ખબર નથી	☐ ☐ ☐ ☐ ☐	૨૨.૨ લાંબી હોનારતની સ્થિતિમાં, સલામતી માટે તમે શહેરી વિસ્તારમાં જશો ?	૧. હા ૨. ના જો ના, તો બીજા ગામમાં સ્થળાંતર અહિંયા જ રહીશ ખબર નથી	☐ ☐ ☐ ☐ ☐
૨૨.૩ શું તમે આવતાં પાંચ વર્ષોમાં કાયમી ધોરણે ગામમાં પાછા ફરવાનું વિચારો છો ?	૧. હા ૨. ના જો ના, તો બીજા શહેરમાં સ્થળાંતર કરીશ અહિંયા જ રહીશ ખબર નથી	☐ ☐ ☐ ☐ ☐	૨૨.૩ શું તમે આવતાં પાંચ વર્ષોમાં શહેરી વિસ્તારમાં સ્થળાંતર કરવાનું વિચારો છો ?	૧. હા ૨. ના જો ના, તો બીજા ગામમાં સ્થળાંતર અહિંયા જ રહીશ ખબર નથી	☐ ☐ ☐ ☐ ☐

ANNEXURE 4- KEY INFORMANT SURVEY (JAMNAGAR)



Date _____ 2013, Nitin Srivastava

Questionnaire No.: URL/KI/JMN/.....

In-depth key informants' Interview for identifying vulnerable occupations with reference to urban rural linkages in Jamnagar, Gujarat, India

Introduction Key Components: • Thank you • Your name • Purpose • Confidentiality • Duration • How interview will be conducted • Opportunity for Questions	I want to thank you for taking the time to meet with me today. My name is Nitin Srivastava. I would like to talk to you about your community's experiences in recent past regarding salinity and the affected livelihood with special reference to occupations. Specifically, how the local people cope up with salinity. The interview should take less than 25 minutes. Although I will be taking some notes during the session, yet I can't possibly write fast enough to get it all down. Therefore I will be recording the session because I don't want to miss any of your comments. All responses will be kept confidential. This means that your interview responses will only be shared with research team members of Graduate School of Global Environmental Studies, Kyoto University, Japan. We will ensure that any information we include in our report does not identify you as the respondent. Remember, you don't have to talk about anything you don't want to and you may end the interview at any time. Are there any questions about what I have just explained? Are you willing to participate in this interview? Interviewee : _____ Location : _____ Age : _____ Gender: <u> M/ F </u> Education : _____ Designation : _____ Witness(if any) _____
1. BACKGROUND Can you tell me something about your community/neighborhood? Background Age Composition (no. of households, ethnicity etc.) Approximate population	Answer: <i>If it is a rural community, how far is it from the nearest towns/cities?</i> <i>Do people go to work to those cities/towns?</i> _____ <i>If yes, approximately how much percentage?</i> _____ <i>What kind of work?</i> _____

Questions

2. PAST SALINITY EXPERIENCE 2.4 When did your community first experience the effects of salinity? <i>(year)</i> 2.5 What were the effects of salinity on the community in that disaster? <i>(Tick one or more)</i>	Answer: Direct Effects : ☐ Deaths ☐ Health ailments _____ ☐ Loss in crop production ☐ Reduction in agricultural output ☐ Reduction in number of livestock ☐ If other (please specify _____) Indirect Effects : ☐ Shift in cropping pattern ☐ Reduction in animal output ☐ Shift from shore fishing to deep sea fishing ☐ If other (please specify _____)												
3. MIGRATION / DISPLACEMENT 3.4 Did you/your community members migrate due to salinity and its effects? 3.5 What were the reasons for migration? <i>(Tick one or more)</i> 3.6 Is this migration permanent/temporary/periodic/seasonal? <i>(Tick one or more)</i>	Answer: 1. Yes ☐ 2. No ☐ If Yes, how many and to which place _____ ☐ Find employment ☐ Better employment ☐ Loss of assets (Agricultural ☐ Livestock ☐ Others _____) ☐ Decline in productivity (Agricultural ☐ Livestock ☐ Others _____) ☐ If other (please specify _____) ☐ Permanent ☐ Temporary ☐ Periodic ☐ Seasonal												
4. OCCUPATION AND ALTERNATIVE LIVELIHOOD ACTIVITIES <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;"></th> <th style="width: 30%;">At present place of stay</th> <th style="width: 30%;">At previous place of stay <i>(if applicable)</i></th> </tr> </thead> <tbody> <tr> <td>4.1 What are the most important livelihood activities in the community and when these take place in a year?</td> <td></td> <td></td> </tr> <tr> <td>4.2 What was the overall impact of the salinity on livelihood activities in the community?</td> <td colspan="2"></td> </tr> <tr> <td>4.3 What are the responses of the community people with regards to occupation?</td> <td colspan="2"></td> </tr> </tbody> </table>			At present place of stay	At previous place of stay <i>(if applicable)</i>	4.1 What are the most important livelihood activities in the community and when these take place in a year?			4.2 What was the overall impact of the salinity on livelihood activities in the community?			4.3 What are the responses of the community people with regards to occupation?		
	At present place of stay	At previous place of stay <i>(if applicable)</i>											
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4.2 What was the overall impact of the salinity on livelihood activities in the community?													
4.3 What are the responses of the community people with regards to occupation?													

4.4 What are the livelihood alternatives available for the community to deal with effects of salinity?		
4.5 Any other aspect of occupation change?		

5. ASSETS

What amongst the following does your community have access to?	At present place of stay	At previous place of stay (if applicable)
5.1 Human Capital (<i>labour power, health and nutritional status, skills etc.</i>)		
5.2 Natural capital (<i>access to natural resources, land , water, wildlife, forest etc.</i>)		
5.3 f. Social capital (<i>social trust, norms and networks, kin networks and group membership</i>) g. Is there community based association active at the present place? h. Whom do you approach for assistance during the time of need? i. Do you find current community as strongly linked? If migrated, j. Have you lost contact with earlier community?	1. Yes ☐ 2. No ☐ ☐ Government ☐ NGO ☐ Our own community ☐ None ☐ Others _____ 1. Yes ☐ 2. No ☐ 1. Yes ☐ 2. No ☐	
5.4 Physical capital (<i>houses, vehicles, equipment, livestock, physical reproducible goods</i>)		

5.5 a. Financial capital (<i>monetary resources, savings, jewellery, income, net access to credit and insurance</i>) b. What kind of insurance of the following does the community avail?	☐ life insurance ☐ medical insurance ☐ insurance for house ☐ insurance for machinery/tools ☐ accidental insurance ☐ Other _____
6. POTENTIAL ROLE OF STAKEHOLDERS What do you think is potential role of each of the following in economic recovery of the people : a. Individual b. Community c. Government	
7. What according to you are the high priority needs for the community to tackle salinity?	
8. URBAN RURAL LINKAGES 8.4.How often do you visit your native village in a year? 8.5. How many family members are there in the village/urban area? 8.6. Remuneration 3. Do you send remuneration to the village? 4. If yes, for what reason? 8.6. Urban survival strategy 4. In case of unemployment, would you go to your village for security? 5. In case of disaster, would you go to your village for safety? 6. Do you plan to return permanently? 8.7. Land accessibility : 3. Do you own land in village? 4. Do you want to own land in village?	1.Yes ☐ 2. No ☐ 1. Fund for education ☐ 2.Living expenses ☐ 3. Agriculture investment ☐ 4.Medical Insurance ☐ 1.Yes ☐ 2. No ☐ 1.Yes ☐ 2. No ☐ 1.Yes ☐ 2. No ☐ 1.Yes ☐ 2. No ☐ 1.Yes ☐ 2. No ☐
9. Any other additional information	

ANNEXURE 5- HOUSEHOLD SURVEY (JAMNAGAR) (ENGLISH)



Date _____ 2014, Nitin Srivastava

Questionnaire No. : URL/HH/JMN/.....

Questionnaire Survey for identifying vulnerable occupations with reference to urban rural linkages in Jamnagar, Gujarat, India

The study is conducted by

International Environment and Disaster Management (IEDM) Laboratory,

Graduate School of Global Environment Studies (GSGES), Kyoto University, Japan and CEPT University, Ahmedabad, India

The objective of this questionnaire is to identify the vulnerable occupations with reference to salinity in Jamnagar. The finding from this questionnaire will contribute in ascertaining the crucial elements in urban rural linkages during the period of salinity. The results will help formulate strategies for both urban and rural vulnerable poor communities to lessen the socio-economic impact of the salinity and also recover from their impacts. The expected beneficiaries of this result will be the local community, Community Based Organizations (CBOs), Jamnagar Local Government, and Non-Government Organizations (NGOs). All the information collected will be strictly used for the academic purpose.

Please tick the appropriate option (v), wherever applicable.

BASIC INFORMATION			
Name of the respondent :		Age :	Gender : M /F
Village _____ (Gram Panchayat)/Ward _____ (Mahanagar Palika/Nagar Palika/Nagar Panchayat) <i>(Please circle one)</i>			
Household Size :		Urban/Rural/Peri-urban <i>(Please circle one)</i>	
Role in the family :	Head ☐	Family Member ☐	
Type of dwelling :	Kachcha ☐	Semi-pucca ☐	Pucca ☐

SALINITY EXPERIENCE				
In which decade the impact of salinity was first seen in last 40 years :				
1970s ☐	1980s ☐	1990s ☐	2000s ☐	Recent ☐
The salinity has caused damage to : <i>(Multiple choice possible)</i>				
Agriculture ☐	1. Complete loss ☐	2. Partial loss ☐	3. Minor loss ☐	Year :
Income ☐	1. Complete loss ☐	2. Partial loss ☐	3. Minor loss ☐	Year :
Tourism ☐	1. Complete loss ☐	2. Partial loss ☐	3. Minor loss ☐	Year :
The salinity has which of these effects : <i>(Multiple choice possible)</i>				
Loss to agricultural produce ☐ Damage to soil in the fields ☐ Loss to household income ☐ Loss of drinking water ☐				
Other _____				

QUESTIONNAIRE			
8. Did you migrate to the present location?	1. Yes ☐		When ? _____
	2. No ☐		
9. If 'Yes' to 1, 2.1 Where did you migrate from, to the present location? Name _____	1. From nearby village within JADA ☐		2. within Gujarat, outside JADA ☐
	3. From other Indian states _____ (name)		
2.2 What was the reason for migration?	1. Find Employment ☐		2. Better Employment ☐
	<i>(Multiple choice possible)</i>		
2.3 What is the nature of this migration?	3. Salinity at original place ☐		4. Other _____ ☐
	1. Temporary ☐		2. Permanent ☐
	3. Uncertain ☐		
2.4. Is there a contact with the earlier community?	1. Yes ☐		2. No ☐

	AT PRESENT LOCATION				AT EARLIER LOCATION <i>(if migrated)</i>			
3.Occupation	1.Agriculture laborer ☐		2.Government /Private sector ☐		1.Agriculture laborer ☐		2.Government/ Private sector ☐	
	3.Household ☐		4.Construction ☐		3.Household ☐		4.Construction ☐	

	industry		laborer		industry		laborer	
	5. Hawker	☐	6. Cultivator	☐	5. Hawker	☐	6. Cultivator	☐
	7. Self Help Group	☐	8. Other		7. Self Help Group	☐	8. Other	
4. Household Annual earnings (in INR) _____	1.0-20000	☐	2. 20001-40000	☐	1.0-20000	☐	2. 20001-40000	☐
	3. 40001-70000	☐	4. 70001-90000	☐	3. 40001-70000	☐	4. 70001-90000	☐
	5. 90001-180000	☐	6. More than 180000	☐	5. 90001-180000	☐	6. More than 180000	☐
5. No. of earners in the family?								
6. Earning from principal earner?								
7. Occupation of other members?								
8. If answer to 3 is 3 (household industry), was the earning of the industry being affected by salinity? If yes what was the scale of the effect? :	1. Low (<25 %)	☐	2. Medium (25-50 %)	☐	1. Low (<25 %)	☐	2. Medium (25-50 %)	☐
	3. High (>50 %)	☐			3. High (>50 %)	☐		
	AT PRESENT LOCATION				AT EARLIER LOCATION (if migrated)			
9. Did you lose any productive asset (such as machinery, tools, work place) due to salinity, related to the household industry?	1. Yes	☐	2. No	☐	1. Yes	☐	2. No	☐
10. In recent years (post 2001), did you lose working days in your job due to salinity?	1. Yes	☐	2. No	☐	1. Yes	☐	2. No	☐
10.1 If yes, then how many days?	1. 0-2 months	☐	2. 3-8 months	☐	1. 0-2 months	☐	2. 3-8 months	☐
	3. 9-12 months	☐	4. More than a year	☐	3. 9-12 months	☐	4. More than a year	☐
11. Do you change your occupation during the salinity impact years?	1. Yes, _____ (no. of times)	☐	2. No	☐	1. Yes, _____ (no. of times)	☐	2. No	☐
11.1 If yes, for what reason?	1. Loss of income at previous occupation	☐	2. Cannot carry out the previous occupation at all	☐	1. Loss of income at previous occupation	☐	2. Cannot carry out the previous occupation at all	☐
	3. Any other _____				3. Any other _____			
12. Is there a decline in your social respect after the salinity effects?	1. Yes	☐	2. No	☐	1. Yes	☐	2. No	☐
13. Are you a member of any community based association	1. Yes	☐	2. No	☐	1. Yes	☐	2. No	☐
13.1 Which of these?	Community/Village based	☐	Religious	☐	Community/Village based	☐	Religious	☐
	Occupation-based/Self-help Group	☐			Occupation-based/Self-help Group	☐		
14. What according to you are the high priority needs for the community to minimize the effects of salinity on the community?	Employment	☐	Education	☐	Employment	☐	Education	☐
	Housing	☐	Finance	☐	Housing	☐	Finance	☐
	Any other _____	☐			Any other _____	☐		
14.1 What kind of work you want to work if given opportunity?								
15. Whom do you approach for assistance to tackle the effects of salinity? (Multiple choice possible)	1. Government	☐	2. Community based organizations	☐	1. Government	☐	2. Community based organizations	☐
	10. Non-Government Organizations	☐	11. Religious Organizations	☐	3. Non-Government Organizations	☐	6. Religious Organizations	☐
	12. Occupation-based organizations	☐	6. Local community	☐	7. Occupation-based organizations	☐	6. Local community	☐

	7. Any other _____	☐	7. Any other _____	☐
	10. No one	☐	8. No one	☐
16. What strategy do you adopt to minimize the effects of salinity on household income?	1. Insurance for agricultural produce ☐ 2. Wind breaker plantation (Afforestation) ☐ 3. Ground water recharge ☐ 4. Water management ☐ 5. More earners in the family ☐ 6. Joining SHGs ☐ 7. Earning through govt policies such as MNREGA, Mission Mangalam ☐ 8. Others _____ ☐		1. Insurance for agricultural produce ☐ 2. Wind breaker plantation (Afforestation) ☐ 3. Ground water recharge ☐ 4. Water management ☐ 5. More earners in the family ☐ 6. Joining SHGs ☐ 7. Earning through govt policies such as MNREGA, Mission Mangalam ☐ 8. Others _____ ☐	

FOR URBAN/PERI-URBAN HABITANTS			FOR RURAL HABITANTS		
17. How many of your family members are there in the village?			17. How many of your family members are there in the urban area?		
18. How often do you visit your native village in a year?	1. Once a year ☐ 2. Once in 3-4 months ☐ 3. Once in every month ☐		18. How often do you visit the urban area in a year?	1. Once a year ☐ 2. Once in 3-4 months ☐ 3. Once in every month ☐	
19. Do you send remuneration to the village?	1. Yes ☐ 2. No ☐		19. Do you send money to the family member/s in the urban area?	1. Yes ☐ 2. No ☐	
19.1 For what purpose?	12. Fund for education ☐ 13. Living expenses ☐ 14. Agriculture/Other Investment ☐ 15. Medical Insurance ☐		19.1 For what purpose?	6. Fund for education ☐ 7. Living expenses ☐ 8. Investment ☐ 9. Medical Insurance ☐	
20. Land accessibility :			20. Land accessibility :		
20.1. Do you own land/property/house in village?	1. Yes ☐ 2. No ☐		20.1 Do you own land/property/house in urban area?	1. Yes ☐ 2. No ☐	
20.2 If 'No', then do you want to own?	1. Yes ☐ 2. No ☐		20.2 If 'No', then do you want to own?	1. Yes ☐ 2. No ☐	
21. Urban survival strategy			21. Rural survival strategy		
21.1 In case of unemployment, would you go to your village for financial security?	1. Yes ☐ 2. No ☐ If No , then Migrate to other city ☐ Remain here only ☐ Do not know ☐		21.1 In case of unemployment, would you go to the urban area for financial security?	1. Yes ☐ 2. No ☐ If No , then Migrate to other village ☐ Remain here only ☐ Do not know ☐	
21.2 In case of a long disaster, would you go to your village for safety?	1. Yes ☐ 2. No ☐ If No , then Migrate to other city ☐ Remain here only ☐ Do not know ☐		21.2 In case of a long disaster, would you go to the urban area for safety?	1. Yes ☐ 2. No ☐ If No , then Migrate to other village ☐ Remain here only ☐ Do not know ☐	
21.3 Do you plan to return to your native village permanently in the next 5 years?	1. Yes ☐ 2. No ☐ If No , then Migrate to other city ☐ Remain here only ☐ Do not know ☐		21.3 Do you plan to migrate to the urban area in the next 5 years?	1. Yes ☐ 2. No ☐ If No , then Migrate to other village ☐ Remain here only ☐ Do not know ☐	

ANNEXURE 6- HOUSEHOLD SURVEY (JAMNAGAR) (GUJARATI)



તારીખ : / / ૨૦૧૪, નીતિન શ્રીવાસ્તવ

પ્રશ્નાવલિ ક્રમાંક : URL/HH/ADI/.....

અમદાવાદ, ભારતમાં શહેરી ગ્રામીણ જોડાણો / શૃંગલોના સંદર્ભમાં નબળાં વ્યવસાયોને ઓળખવા માટેની પ્રશ્નાવલિ મોજણી

અભ્યાસનું સંચાલન કરનાર :

ઈન્ટરનેશનલ ઈન્વેસ્ટમેન્ટ સ્ટડીઝ ડિપાર્ટમેન્ટ મેનેજમેન્ટ લેગેરેટરી

ગ્રોથયુઝેડ સ્કૂલ ઓફ ગ્લોબલ એન્વાયરનમેન્ટ સ્ટડીઝ (GSGES), કચોટા યુનિવર્સિટી, જાપાન અને CEPT યુનિવર્સિટી, અમદાવાદ દ્વારા કરવામાં આવેલું છે.

આ અભ્યાસનો હેતુ શહેરી અને ગ્રામીણ વિસ્તારોમાં આવેલા પૂરના સંદર્ભમાં નબળાં વ્યવસાયોને ઓળખવાનો છે.

આ અભ્યાસના નિષ્કર્ષો, હોનારતના સમયમાં શહેરી ગ્રામીણ જોડાણો / શૃંગલોમાં નિર્ણાયક ભૂમિકા ભજવતા તત્વોને જાણવામાં મદદરૂપ થશે અને સાથે સાથે શહેર અને ગામડાના નબળાં અને ગરીબ સમુદાયો માટે એવી વ્યૂહરચના ઘડવામાં પણ મદદરૂપ થશે કે જેથી હોનારતના કારણે થતી સામાજિક – આર્થિક અસરો ઓછી કરી શકાય અને હોનારતની અસરમાંથી બહાર આવી શકાય. આ અભ્યાસથી સ્થાનિક સમુદાય, સમુદાય આધારિત સંસ્થાઓ (CBOs), અમદાવાદની સ્થાનિક સરકાર અને સ્વૈચ્છિક સંસ્થાઓને લાભ થશે. મોજણી દરમ્યાન ભેગી કરેલી સમગ્ર માહિતીનો ઉપયોગ માત્ર શૈક્ષણિક હેતુ માટે કરવામાં આવશે.

જ્યાં લાગુ પડે ત્યાં, યોગ્ય વિકલ્પો (✓) કરવી.

મૂળભૂત માહિતી					
ઉત્તરદાતાનું નામ:		ઉંમર :		જાતિ : પુ / સ્ત્રી	
ગામ _____ (ગ્રામ પંચાયત)/ વોર્ડ _____ (મહાનગરપાલિકા / નગરપાલિકા / નગરપંચાયત)		(કોઈ એકમાં વર્તુળ સકરો)			
કુટુંબનું કદ	શહેરી / ગ્રામીણ / અર્ધ-શહેરી (કોઈ એકમાં વર્તુળ કરો)				
કુટુંબમાં ભૂમિકા	વડા ☐	કુટુંબના સદસ્ય ☐			
ઘરનો પ્રકાર :	કાચું ☐	કાચું-પાકું ☐	પાકું ☐		
હોનારતોનો અનુભવ					
છેલ્લા ૧૨ વર્ષોમાં (ગુજરાતમાં ધરતીકંપ પછી) ક્યારે ક્યારે પૂર આવેલું (વર્ષો દર્શાવો) :					
પૂરની વારંવારતા	વર્ષ દીઠ એકથી વધુ ☐	વર્ષ દીઠ એકવાર ☐	દર પાંચ વર્ષે એકવાર ☐	પાંચ વર્ષથી ઓછા સમયમાં ☐	કોઈ પૂર નથી આવ્યું ☐
પૂરનો પ્રકાર	નદીમાં પૂર આવ્યું ☐	સ્થાનિક શેરીઓમાં પાણી ભરાયું ☐	બન્ને ☐		
મૃત્યુ પામેલ કુટુંબના સદસ્યો, જો હોય તો (સંખ્યા દર્શાવો)					
ઈજા પામેલા કુટુંબના સદસ્યો, જો હોય તો (સંખ્યા દર્શાવો)					
નુકસાન થયું હતું ?					
રહેઠાણનું સ્થળ / ઘર / દુકાન (વર્તુળ કરો)					
કેટલું નુકસાન થયું હતું ?	૧. સંપૂર્ણ નુકસાન ☐	૨. આંશિક નુકસાન ☐	૩. મામૂલી નુકસાન ☐	કોઈ નુકસાન નહિ ☐	વર્ષ : _____
	૧. સંપૂર્ણ નુકસાન ☐	૨. આંશિક નુકસાન ☐	૩. મામૂલી નુકસાન ☐	કોઈ નુકસાન નહિ ☐	વર્ષ : _____

પ્રશ્નાવલિ					
૧૩. તમે હાલની જગ્યાએ સ્થળાંતર કરીને આવ્યા ?	૧. હા ☐	૨. ના ☐	ક્યારે ? _____		
૧૪. જો પ્રશ્ન ૧ માં જવાબ 'હા' હોય તો, તમે કયા સ્થળેથી અહિં આવ્યા ?	૧. ઔડાની અંદર આવેલ નજીકના ગામથી ☐		૨. ઔડાની બહાર પણ ગુજરાતમાંથી ☐		
	૩. ભારતના અન્ય રાજ્યમાંથી (નામ)				
૨.૨ સ્થળાંતરનું કારણ શું હતું ?	૧. રોજગારની શોધમાં ☐		૨. વધુ સારા રોજગારની શોધમાં ☐		
	(એક થી વધુ વિકલ્પો શક્ય છે)				
૨.૩ આ સ્થળાંતર કયા પ્રકારનું છે	૧. હંગામી ☐		૨. કાયમી ☐		
	૩. અનિશ્ચિત ☐				
૨.૪ અગાઉના સમુદાય સાથે સંપર્કમાં છે ?	૧. હા ☐		૨. ના ☐		

	હાલની જગ્યાએ				અગાઉની જગ્યાએ (જો સ્થળાંતર કર્યું હોય તો)			
૩. વ્યવસાય	૧. ખેત મજૂર ☐	૨. સરકારી ક્ષેત્રમાં ☐	૩. ગૃહ ઉદ્યોગ ☐	૪. બાંધકામ મજૂર ☐	૧. ખેત મજૂર ☐	૨. સરકારી ક્ષેત્રમાં ☐	૩. ગૃહ ઉદ્યોગ ☐	૪. બાંધકામ મજૂર ☐
	૫. ફેરિયા ☐	૬. ખેડૂત ☐	૭. અન્ય ☐		૫. ફેરિયા ☐	૬. ખેડૂત ☐	૭. અન્ય ☐	
૪. કુટુંબની વાર્ષિક આવક (ભારતીય રૂપિયામાં)	૧. ૦-૨૦૦૦ ☐	૨. ૨૦૦૧-૪૦૦૦ ☐	૩. ૪૦૦૧-૬૦૦૦ ☐	૪. ૬૦૦૧-૮૦૦૦ ☐	૧. ૦-૨૦૦૦ ☐	૨. ૨૦૦૧-૪૦૦૦ ☐	૩. ૪૦૦૧-૬૦૦૦ ☐	૪. ૬૦૦૧-૮૦૦૦ ☐

	૩. ૪૦૦૦૧-૭૦૦૦૦	☐	૪. ૭૦૦૦૧-૮૦૦૦૦	☐	૩. ૪૦૦૦૧-૭૦૦૦૦	☐	૪. ૭૦૦૦૧-૮૦૦૦૦	☐
	૫. ૮૦૦૦૧-૧૮૦૦૦૦	☐	૬. ૧૮૦૦૦૦ થી વધુ	☐	૫. ૮૦૦૦૧-૧૮૦૦૦૦	☐	૬. ૧૮૦૦૦૦ થી વધુ	☐
૫. કુટુંબમાં કમાનાર સભ્યોની સંખ્યા								
૬. મુખ્ય કકમાનાર સભ્યની આવક								
૭. જો પ્રશ્ન ૩માં જવાબ હા હોય (ગૃહ ઉદ્યોગ), તો ગૃહ ઉદ્યોગથી થતી આવક	૧. ઓછી (<૨૫ %)	☐	૨. મધ્યમ (૨૫-૫૦ %)	☐	૧. ઓછી (<૨૫ %)	☐	૨. મધ્યમ (૨૫-૫૦ %)	☐
	૩. વધુ (>૫૦ %)	☐			૩. વધુ (>૫૦ %)	☐		

	હાલની જગ્યાએ		અગાઉની જગ્યાએ (જો સ્થળાંતર કર્યું હોય તો)	
૮. તમે પૂરમાં ગૃહ ઉદ્યોગને લગતી કોઈ ઉત્પાદક અસ્કયામતો (જેમ કે મશીનરી, સાધનો, કામ કરવાનું સ્થળ) ગુમાવી છે.	૧. હા ૨. ના	☐ ☐	૧. હા ૨. ના	☐ ☐
૯. વધારે વરસાદના કારણે તમે કામના દિવસો ગુમાવો છો ?	૧. હા ૨. ના	☐ ☐	૧. હા ૨. ના	☐ ☐
૯.૧ જો હા, તો કેટલા દિવસો	૧. ૦-૨ દિવસ ૨. ૩-૧૦ દિવસ	☐ ☐	૧. ૦-૨ દિવસ ૨. ૩-૧૦ દિવસ	☐ ☐
	૩. ૧૧ દિવસ - ૧ મહિનો ૪. એક મહિનાથી વધુ	☐ ☐	૩. ૧૧ દિવસ - ૧ મહિનો ૪. એક મહિનાથી વધુ	☐ ☐
૧૦. હોનારતના સમયમાં શું તમે તમારો વ્યવસાય બદલો છો ?	૧. હા (કેટલી વાર) ૨. ના	☐ ☐	૧. હા (કેટલી વાર) ૨. ના	☐ ☐
૧૦.૧ જો હા, તો શા માટે	૧. પહેલાના વ્યવસાયની આવક ઘટવાથી ૨. પહેલાનો વ્યવસાય ચાલુ રાખી શકાય તેમ નથી. ૩. કામના સ્થળે જવાનું વાહન ગુમાવ્યું. ૪. અન્ય	☐ ☐ ☐ ☐	૧. પહેલાના વ્યવસાયની આવક ઘટવાથી ૨. પહેલાનો વ્યવસાય ચાલુ રાખી શકાય તેમ નથી. ૩. કામના સ્થળે જવાનું વાહન ગુમાવ્યું. ૪. અન્ય	☐ ☐ ☐ ☐
૧૧. પૂર પહેલા તમારી જેટલી આવક હતી, તેટલી જ આવક મેળવવા માટે તમને કેટલો સમય લાગશે.	૧. ૦-૨ દિવસ ૨. ૩-૧૦ દિવસ ૩. ૧૧ દિવસથી ૧ મહિનો ૪. એક મહિનાથી વધુ	☐ ☐ ☐ ☐	૧. ૦-૨ દિવસ ૨. ૩-૧૦ દિવસ ૩. ૧૧ દિવસથી ૧ મહિનો ૪. એક મહિનાથી વધુ	☐ ☐ ☐ ☐
૧૨. હોનારત પછી તમારા માલ-સામાનમાં ઘટાડો થયો છે ?	૧. હા ૨. ના	☐ ☐	૧. હા ૨. ના	☐ ☐
૧૩. તમારા પાડોશમાં આમાંની કોઈ સંસ્થા છે ?	સમુદાય આધારિત ધાર્મિક વ્યવસાય આધારિત	☐ ☐ ☐	સમુદાય આધારિત ધાર્મિક વ્યવસાય આધારિત	☐ ☐ ☐
૧૪. તમે કોઈ સમુદાય આધારિત સંસ્થાના સભ્ય છો ?	૧. હા ૨. ના	☐ ☐	૧. હા ૨. ના	☐ ☐
૧૫. તમારા મુજબ, ભવિષ્યમાં થનાર હોનારતનો સામનો કરવા માટે પ્રાથમિકતાના ધોરણે કઈ બાબતો જરૂર છે ?	રોજગાર શિક્ષણ રહેઠાણ નાણાં અન્ય	☐ ☐ ☐ ☐ ☐	રોજગાર શિક્ષણ રહેઠાણ નાણાં અન્ય	☐ ☐ ☐ ☐ ☐
૧૬. પૂરના સમયે, સહાયતા માટે તમે કોનો સંપર્ક કરો છો ?	૧. સરકાર ૨. સમુદાય આધારિત સંસ્થાઓ ૩. સ્વૈચ્છિક સંસ્થાઓ ૪. ધાર્મિક સંસ્થાઓ ૫. વ્યવસાય આધારિત સંસ્થાઓ ૬. સ્થાનિક સમુદાય ૭. અન્ય	☐ ☐ ☐ ☐ ☐ ☐ ☐	૧. સરકાર ૨. સમુદાય આધારિત સંસ્થાઓ ૩. સ્વૈચ્છિક સંસ્થાઓ ૪. ધાર્મિક સંસ્થાઓ ૫. વ્યવસાય આધારિત સંસ્થાઓ ૬. સ્થાનિક સમુદાય ૭. અન્ય	☐ ☐ ☐ ☐ ☐ ☐ ☐
૧૭. તમારી પાસે કયા પ્રકારનો વીમો છે ?	૧. જીવન વીમો ૨. મશીનરી / સાધન સામગ્રી માટેનો વીમો ૩. ઘરનો વીમો ૪. તબીબી વીમો ૫. અકસ્માત વીમો	☐ ☐ ☐ ☐ ☐	૧. જીવન વીમો ૨. મશીનરી / સાધન સામગ્રી માટેનો વીમો ૩. ઘરનો વીમો ૪. તબીબી વીમો ૫. અકસ્માત વીમો	☐ ☐ ☐ ☐ ☐

શહેરી / અર્ધ શહેરી રહેવાસીઓ માટે			ગ્રામીણ રહેવાસીઓ માટે		
૧૮. તમારા પરિવારના કેટલા સભ્યો ગામમાં છે ?			૧૮. તમારા પરિવારના કેટલા સભ્યો શહેરમાં છે ?		
૧૯. તમે એક વર્ષમાં કેટલીવાર તમારા વતનના ગામની મુલાકાત લ્યો છો ?	૧. વર્ષમાં એકવાર ૨. ૩-૪ મહિનામાં એકવાર ૩. ૬૨ મહિનેએકવાર	☐ ☐ ☐	૧૯. તમે એક વર્ષમાં કેટલી વાર શહેરી વિસ્તારની મુલાકાત લ્યો છો ?	૧. વર્ષમાં એકવાર ૨. ૩-૪ મહિનામાં એકવાર ૩. ૬૨ મહિનેએકવાર	☐ ☐ ☐
૨૦. તમે તમારા ગામે પૈસા મોકલો છો ?	૧. હા ૨. ના	☐ ☐	૨૦. તમે શહેરી વિસ્તારમાં રહેતા, તમારા પરિવારના સભ્યોને પૈસા મોકલો છો ?	૧. હા ૨. ના	☐ ☐
૨૦.૧ કયા હેતુ માટે	૧૬. શિક્ષણ માટે ૧૭. ઘર-ખર્ચ માટે ૧૮. ખેતી / અન્ય રોકાણ માટે ૧૯. તબીબી વીમા માટે / તબીબી ખર્ચ માટે	☐ ☐ ☐ ☐	૨૦.૧ કયા હેતુ માટે	૨૦. શિક્ષણ માટે ૨૧. ઘર-ખર્ચ માટે ૨૨. ખેતી / અન્ય રોકાણ માટે ૧૦. તબીબી વીમા માટે / તબીબી ખર્ચ માટે	☐ ☐ ☐ ☐
૨૧.૧ તમે ગામમાં જમીન / ઘર / મિલકત ધરાવો છો ?	૧. હા ૨. ના	☐ ☐	૨૧.૧ તમે શહેરી વિસ્તારમાં જમીન / ઘર / મિલકત ધરાવો છો ?	૧. હા ૨. ના	☐ ☐
૨૧.૨ જો ના તો શું તમે ગામમાં જમીન / ઘર / મિલકત ખરીદવા માંગો છો ?	૧. હા ૨. ના	☐ ☐	૨૧.૨ જો ના તો શું તમે શહેરી વિસ્તારમાં જમીન / ઘર / મિલકત ખરીદવા માંગો છો ?	૧. હા ૨. ના	☐ ☐
૨૨. ગુપ્ત ટકાવી રાખવાનો શહેરી વ્યૂહ			૨૨. ગુપ્ત ટકાવી રાખવાનો ગ્રામીણ વ્યૂહ		
૨૨.૧ બેરોજગારીની સ્થિતિમાં, આર્થિક સલામતી માટે તમે તમારા ગામમાં જશો ?	૧. હા ૨. ના જો ના, તો બીજા શહેરમાં સ્થળાંતર કરીશ અહિંયા જ રહીશ ખબર નથી	☐ ☐ ☐ ☐ ☐	૨૨.૧ બેરોજગારીની સ્થિતિમાં, આર્થિક સલામતી માટે તમે શહેરી વિસ્તારમાં જશો ?	૧. હા ૨. ના જો ના, તો બીજા ગામમાં સ્થળાંતર અહિંયા જ રહીશ ખબર નથી	☐ ☐ ☐ ☐ ☐
૨૨.૨ લાંબી હોનારતની સ્થિતિમાં, સલામતી માટે તમે તમારા ગામમાં જશો ?	૧. હા ૨. ના જો ના, તો બીજા શહેરમાં સ્થળાંતર કરીશ અહિંયા જ રહીશ ખબર નથી	☐ ☐ ☐ ☐ ☐	૨૨.૨ લાંબી હોનારતની સ્થિતિમાં, સલામતી માટે તમે શહેરી વિસ્તારમાં જશો ?	૧. હા ૨. ના જો ના, તો બીજા ગામમાં સ્થળાંતર અહિંયા જ રહીશ ખબર નથી	☐ ☐ ☐ ☐ ☐
૨૨.૩ શું તમે આવતાં પાંચ વર્ષોમાં કાયમી ધોરણે ગામમાં પાછા ફરવાનું વિચારો છો ?	૧. હા ૨. ના જો ના, તો બીજા શહેરમાં સ્થળાંતર કરીશ અહિંયા જ રહીશ ખબર નથી	☐ ☐ ☐ ☐ ☐	૨૨.૩ શું તમે આવતાં પાંચ વર્ષોમાં શહેરી વિસ્તારમાં સ્થળાંતર કરવાનું વિચારો છો ?	૧. હા ૨. ના જો ના, તો બીજા ગામમાં સ્થળાંતર અહિંયા જ રહીશ ખબર નથી	☐ ☐ ☐ ☐ ☐