CHAPTER VI

SOCIO-ECONOMIC STUDY:

AN ASSESSMENT OF THE SAMPLE AREA

World Meteorological Organization (WMO) is pledged to work on specific visions towards disaster management, where four (4) areas are identified to work on including: reduction of social and economic impact of natural disaster, increased awareness and preparedness of people, safety of infrastructure and reduced vulnerability of human life and property (Talwar and Juneja, 2008). On the light of the WMO vision, the local level socio-economic status of the study area is tried to be assessed based on some selected indicators in the following analysis.

Vulnerability to natural disaster is a result of a complex range of variables that includes not only the location of human settlement and magnitude of disaster itself, but also the socio-economic, institutional, demographic and environmental characteristics of the disaster area, as well as the quality of the basic infrastructure. Apart from the structural flood control measures like embankment, channel improvement etc. certain non-structural measures are also become popular to complement structural flood control measures. Such non-structural measures include adaptive actions taken by affected communities either individually or collectively and by local and national agencies before, during and after the flood (Bose, 2010).

Vulnerability depends on exposure to hazard and coping capacity of exposed element. Reducing vulnerability involves reducing exposure through pre-disaster
planning, including structural and non-structural interventions. Adaptation on the other hand involves community’s ability to cope with consequences by building capacity like economic capacity (vulnerability is often seen with poverty), infrastructural capacity, environmental capacity etc. (Saxena, 2014).

Human vulnerability is the relative lack of capacity of a person or community to anticipate, cope with, resist and recover from the impact of a hazard. Vulnerability has two components. One is the exposure to hazard and the other is the difficulty in coping with and recovering from them due to lack of resources. Human vulnerability increases with rapid urbanization, population growth, lack of knowledge about how to effectively resist the effects of disaster and poverty (Salpekar and Sharma, 2010).

In flood vulnerability assessment in rainfall belt like monsoon it is important to assess who are the most vulnerable to monsoon and flash flood, what are the significant factors of vulnerability, what coping strategy are followed by the flooded household and why, which are the suitable methodology to estimate household vulnerability to flood, which type of interventions will most likely to reduce vulnerability etc. (Rayhan, 2005).

In the following discussion some of the observation at household level is tried to be analysed. The observation is based on household survey conducted in a case study area comprising of ten (10) flood vulnerable villages from three circles and seven (7) flood vulnerable locations from the municipal wards (old) of Guwahati metropolitan. The analysis is a statistical comparison of rural-urban situations of flood vulnerable locations, based on a structured questionnaire, which is enclosed in form of an appendix (appendix: I) at the end of the thesis. It has three parts of
statistical analysis with various quantitative measures in form of data and figure relevant to the research questions and presented in chapter 6 and 7 respectively. The three (3) parts includes:

(i) General profile of the sample village and ward locations

(ii) Hazard identification of the sample study locations

(iii) Hazard vulnerability assessment of the locations

The flood vulnerable villages are picked up from Flood Management Plan, Kamrup Metropolitan district, 2009, whereas the vulnerable ward location are selected from flood inundation area listed by Guwahati Metropolitan Development Authority (GMDA). In selection of sample villages their location and number of total vulnerable villages of concerned circle is taken into consideration. With maximum of vulnerable villages from Sonapur circle, maximum sample numbers of seven (7) is considered followed by Chandrapur (2) and Azara (1). Out of total 85 flood vulnerable villages from three circles, 71 villages were analysed in terms vulnerability weight, based on population density in between 1971-2011 census (15 from Chandrapur circle were categorised as vulnerable with either no or inconsistent population data). Ten (10) out of 71 villages were taken as sample for case study. The case study area and their corresponding household sample size are enlisted in table 6.1, combining both villages and ward locations.
<table>
<thead>
<tr>
<th>Vulnerable circles/ municipal wards</th>
<th>Villages/ ward location</th>
<th>Sample household (in absolute numbers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Chandrapur circle</td>
<td>i) Rajabari</td>
<td>48</td>
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<tr>
<td></td>
<td>ii) Tatimara</td>
<td>65</td>
</tr>
<tr>
<td>2) Sonapur circle</td>
<td>i) Uttar Dimoria</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>ii) Digarupara N.C.</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>iii) Kasutali</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>iv) Durung</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>v) Murkata</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>vi) Amarapathar</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>vii) Sonapurpathar</td>
<td>24</td>
</tr>
<tr>
<td>3) Azara circle</td>
<td>i) Majirgaon</td>
<td>110</td>
</tr>
<tr>
<td>4) Municipal ward-26</td>
<td>i) Pub-sarania</td>
<td>58</td>
</tr>
<tr>
<td>5) Municipal ward-36</td>
<td>i) Jonali</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>ii) Zoo Road area</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>iii) Sundarpur</td>
<td>44</td>
</tr>
<tr>
<td>6) Municipal ward-39</td>
<td>i) Rajgarh</td>
<td>26</td>
</tr>
<tr>
<td>7) Municipal ward-40</td>
<td>i) Bhaskar Nagar</td>
<td>44</td>
</tr>
<tr>
<td>8) Municipal ward-42</td>
<td>i) Anil Nagar &amp;</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>ii) Nabin Nagar</td>
<td></td>
</tr>
</tbody>
</table>

N.B. Sample household are taken for field survey, which are added in appendix section
6. General Profile of the Sample Village and Ward Locations

Study of general profile of the sample household has covered measurement of eight (8) different parameter including: demographic structure (male-female), age-group of house owner, literacy pattern, type of occupation, income range, source of potable water, house type and health problems faced by the respondent household of the flood vulnerable villages and ward locations. Following is a comparative statistical analysis of the observations. The field data of general profile of the case study area is enclosed with appendix: II (Rural) and appendix: III (Urban).

6.1 Male-Female Structure

The rural-urban male-female structure of the sample study is represented by figure 6.1 and 6.2 respectively. While female status at village level shows fluctuation, with two villages having below 40% female and average 43.86% for entire study area, urban samples shows relative high female representation at 45.8%. In case of district level census observations too, female represents high population volume than its corresponding male.
Figure: 6.1 Male-female structure of the rural sample (in%)

Figure: 6.2 Male-female structure of the urban sample (in%)
6.2 Age-Group of Sample House Owner

Age of people specially of the house owner is an important factor that not only determine the age of the family as a whole but also some other qualitative aspects like their decision making ability during crisis, ability to take right decision at right time etc. Both rural and urban household are analysed in terms of age of the house owner by grouping them into four classes as below 40, 40-50, 50-60 and above 60 years age group.

The observation is those rural samples have larger family with both young (below40) and aged house owner (60+) than urban. Greater size of aged house owner among the rural sample is an indicative of their greater experience to fight with any kind of eventuality during a crisis like an impending flood event. Contrary to that, urban sample have relative higher number of family having mature or technically speaking, working age group of house owner. A total of 66.7% of the urban family have house owner between 40-60 years of age group. The overall situation is represented by figure 6.3 (rural) and 6.4 (urban) respectively. It has also indicated the fact that majority of sample settles in the urban locality are having family with working class age group of house owner, that settled in the region in search of job or other services for their own livelihood support.
Figure: 6.3 Age-group of rural sample house owner (in%)

Figure: 6.4 Age-group of urban sample house owner (x axis indicates respondents in%)
6.3 Literacy Trend with Special Reference to Sample Study

In world context, vulnerable Nations are mostly situated in Sub-Saharan Africa and that having recently experienced conflict. Vulnerability can be analyzed in relation to adaptive capacity, where among many components 'literacy' is taken up as a key indicator of strong adaptation (Brooks, Adger and Kelly, 2005). Among many of the component of adaptation, this part of the chapter tries to analyze the literacy trend of vulnerable villages and the wards of the study area, with special reference to a sample study analysis. Total literacy trend of three (3) most flood vulnerable circles and municipal wards is analysed to see how the general literacy pattern have changed over time (1971-2011). Literacy to total population is calculated (converted to %) and distinguished in 5 ranges as:

i) Very low literacy (below 20%)

ii) Low literacy (20-40%)

iii) Moderate literacy (40-60%)

iv) High literacy (60-80%) and

v) Very high (above 80%).

The general trends of change of literacy of the flood vulnerable circles of Sonapur, Chandrapur, Azara and the municipal wards have been represented by the following bar-diagrams (Figure 6.5 to 6.8). In addition the literacy pattern of the sample population of the surveyed household is also presented to compare the rural-urban differences.
Figure: 6.5 Literacy trends of vulnerable villages, Sonapur Circle
(Source: District Census Handbook, 1971-2011)

Figure: 6.6 Literacy trend of vulnerable villages, Chandrapur Circle
(Source: District Census Handbook, 1971-2011)
The general literacy trend of the most vulnerable circles and municipal wards have shown some identical characters like: declining trend of number of villages with very low (0-20%) and low (20-40%) literacy level, whereas villages with high (60-80 %) and very high (above 80%) literacy are expanding. During this time (1971-2011) municipal wards have also shown a healthy growth of high and very high percent of literacy.

The literacy pattern of the sample villages and ward location are represented by the following figures in 6.9 and 6.10. Among the rural villages, a large section of people is under illiterate category. Among the remaining too, up-to 10\textsuperscript{th} standard and 10+2 secondary level
of education tops the sample, while a marginal section is shared by highly educated and section with technical education. Contrary to that, urban literacy is more enriched in terms of highly educated section, with degree and masters level. In addition a healthy section of representation is from technical and other education.

**Figure: 6.9** Literacy pattern of the rural sample (x-axis indicated respondents in %)
Figure: 6.10 Literacy pattern of the urban sample (x-axis indicated respondents in %)

6.4 Occupation Type of Sample Household

Rural occupation type is dominated by self employed agriculture and related services, followed by business and private sector occupation. The government sector has a very marginal share. Contrary to that, urban occupation type is dominated by government and business sectors. The contrasting situation is reflected by figure 6.11 and 6.12 respectively.
Figure 6.11 Occupation type of the rural sample (x-axis indicated respondents in %)

Figure 6.12 Occupation type of the urban sample (x-axis indicated respondents in %)
6.5 Income Range of Sample Household

Income of the surveyed household is represented in five ranges in terms of rupees as: up-to 1 lakh, 1-2, 2-3, 3-4 and above 4 lakh. It has been observed that with dominating self employed agriculture, rural villages have maximum household with income range up-to 1 lakh, which remains as low as 47.3% of the household in Majirgaon, to as high as 89.3% in Murkata. It is followed by second largest volume of household with 1-2 lakh range of income and gradually has been marginalized towards the upper range. Contrary to that, urban household has lesser representation under 1 lakh income, and increases the percentage of household above the 4 lakh income range. The contrasting situation is a product of occupation type, which is dominated by government and business related service sector in urban locations under survey. The situation is shown by figure 6.13 and 6.14.

Figure 6.13 Income range of the rural sample household (x-axis indicated respondents in %)
6.6 Source of Potable Water of the Sample Locations

There are four common types of potable water sources used by both rural and urban samples namely: tube well, well, government supply and pond. However there is an exclusive 5th type used only by rural vulnerable villages in form of river. Data has revealed that villages in close proximity to riverside like Majirgaon, Tatimara, Kasutali, Digarupara NC etc. have main source of potable water as rivers. Contrary to rural situation, major sources of potable water of urban vulnerable location is government supply, followed by well and tube well as shown by figure 6.15 and 6.16.
Figure: 6.15 Sources of potable water of rural samples (x-axis indicated respondents in %)

Figure: 6.16 Sources of potable water of urban samples (x-axis indicated respondents in %)
6.7 House Type of Sample Location

House type is a crucial determiner of damage impact during a flood event. In case of the sample study contrasting situation have been observed in rural and urban survey. Rural house type is dominated by traditional katcha, pucca and Assam type houses, which are more vulnerable to flood water. More or less all sample villages have successful implementation of houses under Indira Awas Yojna scheme (IAY), where houses are allotted against family under poverty line. Contrary to that, urban house type is dominated by both Assam type and multi-storied building, which are expected to be less vulnerable to flood.

![House Type of the Rural Sample](image)

**Figure: 6.17** House types of rural samples (x-axis indicated respondents in %)

The contrasting house type between rural and urban is an indicator in itself regarding the vulnerability patterns of the household. While the rural type is dominated by katcha type, urban have greater share of Assam type and multistoried concrete houses, which can always withstand flood hazard. However the urban
dwellers are always at the receiving end in terms of their household related damages, during flood in terms of household materials and damage of interior items, including vehicular damage.

**Figure: 6.18** House types of urban sample (x-axis indicated respondents in %)

### 6.8 Health Problem Faced by the People

A comparative graphical analysis of the health problem faced by the rural-urban respondents is presented in figure 6.19.
HEALTH PROBLEMS FACED DURING HAZARD
RURAL-URBAN RESPONDENTS (IN%)
KAMRUP METRO DISTRICT

Figure 6.19 Comparative analysis of rural-urban health problem

Based on the figure 6.19 the following health related responses can be derived:

(i) Rural villagers have higher percent of respondents with health problem, though they are fluctuating from one to another village than urban locations. On an average 80.3% villagers have responded assertively towards having health problem faced during hazard, while only 19.7% responded negative.

(ii) Contrary to rural, positive response towards health problem during hazard faced by the urban people is almost half at 43.4% in an average, with majority 56.6% responded negative.

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