CHAPTER-I

Introduction

1.1 Title of the Thesis

‘A CRITICAL STUDY OF EFFECTIVENESS OF MUMBAI DISASTER MANAGEMENT PLAN IN THE LIGHT OF MAJOR DISASTERS IN MUMBAI’

1.2 Statement of Problem

Mumbai is one of the most important megacities of the country. It is the financial capital of India and main center of commerce and entertainment. A report on Greater Mumbai City Development Plan For 2005-25 (prepared by MCGM) states that Mumbai city contributes 5% of India’s GDP, 40% of Maritime trade and 25% of country’s industrial output. Almost 70% of capital transactions are conducted on both the stock exchanges i.e. Bombay Stock Exchange (BSE) and National Stock Exchange (NSE). Mumbai also contributes 33% of the total Income Tax, 60% of Custom Duty, 20% of Central Excise Tax and a significant quantum of Corporate Tax to the exchequer of the country.

On the other hand, the Report further states that Mumbai megacity is highly vulnerable to many natural and man-made hazards. Due to unrestricted growth, living more than half of the population in informal settlements exposing themselves to many such hazards. Asia’s largest squatter community Dharavi is situated in Mumbai. Very high density of population, concentration of hazardous industries, increasing level of pollution, encroachment of land and river basin, age old and inadequate drainage and sewerage system pose a severe threat to Mumbaikars making them soft target of natural as well as man-made disasters like floods, landslides, earthquake, terror attacks and bomb blasts causing a huge damage to human life, property, livelihood and livestock in the city.

Despite the tremendous growth in science and technology due to abovementioned reasons disasters take place.
On this background the researcher has studied the various aspects of disasters taking place in Mumbai and made an attempt to find out various measures to be undertaken by the concerned authorities to cope up with these disasters and ensure steady growth of Mumbai and maintain the status of Mumbai as an international metro city.

The State Government of Maharashtra, under the Disaster Management Act, 2005, has assigned the Municipal Corporation of Greater Mumbai (MCGM) the responsibility to provide proper and conducive environment for the smooth functioning of all the above-mentioned stakeholders. (Flood Preparedness Guidelines, 2012 by MCGM).

Also, the Mumbai Municipal Corporation Act, 1888, sections 63(k) and 64(2A), has mandated the Municipal Corporation of Greater Mumbai for mitigation and management of natural or man-made disasters and is expected to take all necessary measures to promote public safety and minimize danger or damage to the life and property of the citizens.

In the last few years Mumbai city has been facing number of disasters- either natural or manmade such as floods (2005), serial train bomb blasts (2006), terrorists attack on Mumbai (2008), Building collapse and landslides are a regular feature in Mumbai.

Considering the responsibility assigned by both the acts mentioned above, the MCGM has prepared a Disaster Management Plan for Mumbai. In order to implement this plan effectively, the MCGM has established a well equipped Disaster Management Unit at the Head Office of the MCGM and a disaster management unit at all the 24 ward offices of MCGM in Mumbai Mahanagar.

While reviewing the literature on disaster management plan of Mumbai, the researcher found no significant study conducted on disaster management plan and evaluating its effectiveness in mitigating or/and preventing the disaster risk in Mumbai.
In order to find out the effectiveness of disaster management plan for Mumbai, on certain attributes, the study is conducted with special reference to major disaster took place in Mumbai on 26th July, 2005 the deluge.

1.3 **Objectives of the Research Study**

Following are the main objectives of the research study

1) To study the policies adopted by government agencies such as Central, State and Local-Self Governments towards disaster management.

2) To study the preparedness level of MCGM’s officials towards deluge as a major disaster in Mumbai.

3) To compare the effectiveness of MCGM’s Disaster Management Plan on specific attributes such as promptness, awareness, coordination, and communication experienced by the affected households during the disaster with the effectiveness perceived by them on the same attributes, in any such future disaster in Mumbai.

4) To identify the gaps in the current Disaster Management Plan of MCGM in order to propose corrective measures for effective implementation of the plan for any future disaster in Mumbai.

1.4 **Hypotheses**

\( H_{01} \) There is no significant difference in the effectiveness of MCGM’s Disaster Management Plan with regards to awareness level at the time of deluge and thereafter perceived by flood affected households Mumbai.

\( H_{a1} \) There is a significant difference in the effectiveness of MCGM’s Disaster Management Plan with regards to awareness level at the time of deluge and thereafter perceived by flood affected households in Mumbai.

\( H_{02} \) There is no significant difference in the effectiveness of MCGM’s Disaster Management Plan with regards to promptness level at the time of deluge and thereafter perceived by flood affected households in Mumbai.
Ha2 There is a significant difference in the effectiveness of MCGM’s Disaster Management Plan with regards to promptness level at the time of deluge and thereafter perceived by flood affected households in Mumbai.

H03 There is no significant difference in the effectiveness of MCGM’s Disaster Management Plan with regards to communication level at the time of deluge and thereafter perceived by flood affected households in Mumbai.

Ha3 There is a significant difference in the effectiveness of MCGM’s Disaster Management Plan with regards to communication level at the time of deluge and thereafter perceived by flood affected households in Mumbai.

H04 There is no significant difference in the effectiveness of MCGM’s Disaster Management Plan with regards to coordination level at the time of deluge and thereafter perceived by flood affected households in Mumbai.

Ha4 There is a significant difference in the effectiveness of MCGM’s Disaster Management Plan with regards to coordination level at the time of deluge and thereafter perceived by flood affected households in Mumbai.

1.5 Research Methodology

Research Methodology is a systematic way of solving a research problem. It is a science of studying how the research is to be conducted. It is a step by step procedure by which a researcher goes about his work of describing, explaining and predicting phenomena. The research methodology explains why a particular research study is undertaken, how to formulate a research problem, what type of data are to be collected, which technique is to be used for data collection, why a particular technique is used for data analysis. In short, it is a roadmap of solving a particular research problem. Therefore, a researcher chooses that methodology which suits his research problem. The research methodology is problem specific, so the researcher has to customize it to solve the research problem. (De Vos et al. (2005:101) note that the nature of the research problem and questions determines the methodology to be used.

(De Vos, A.S. and Others. 2005).
With regards to MCGM’s Disaster Management Plan and its effectiveness on specific attributes as introduced in the Literature Review, the researcher has adopted a methodology in three phases.

In the first phase as one has to study the policies adopted by the government agencies such as Central Government, State Government and Local Government, the institutional framework set up by them at various levels to implement the policies effectively towards disaster management, the research design used has been descriptive in nature, for which the researcher has exclusively used the secondary data as a source of data collection. The researcher has referred to various books on Disaster management authored and/or edited by foreign as well as Indian scholars such as Prof. E. L. Quarentelli from University of Delaware, USA, Mr. Prabhas C. Sinha, Mr. P. C. Chawla, Mr. Pradeep Sahni and others, Mr. B. Narayan, Mr. P. Nambudripad etc. reports published by the Ministry of Home Affairs, Government of India, Government of Maharashtra, report by Dr. Archana Patankar on Climate Change, report by Fact Finding Committee headed by Dr. Madhav Chitale, various websites.

In the second phase, the researcher has used an exploratory research design, since one has to explore the preparedness level of MCGM Officials who have been assigned the responsibility of managing various disasters in their respective wards. The methodology adopted for which is qualitative in nature, as one has to perform an in-depth analysis with regards to the preparedness level.

In order to collect primary data, the research instrument used is structured interviews of MCGM’s officers. The officers who have been interviewed by the researcher include Assistant Commissioner (earlier known as Ward Officer, who is the over all in charge of the disaster management of his ward), In-charge officer for the disaster management in the ward, Health Officer of the ward and the Fire Brigade in charge in the ward. From eleven wards, which were severely affected by the deluge on 26th July, 2005, in-depth interviews of 30 officers were conducted by the researcher to study the preparedness level of the officers in implementing the disaster management plan of MCGM in their respective wards.
In the third phase, since the researcher has to find whether there is a significant difference in the effectiveness of MCGM’s Disaster Management Plan with regards to specific attributes such as awareness, promptness, coordination and communication at the time of deluge and thereafter perceived by the flood affected households in Mumbai, the research design is causal in nature. As one has to study the extent to which the flood affected households find a significant difference in the effectiveness of MCGM’s Disaster Management Plan, this causality is affected by sheer reach of such households and hence the methodology used is quantitative in nature.

In order to collect the primary data, the Data Collection Tool used for this phase is ‘Questionnaire’, since this tool has maximum close-ended questions, majority in the form of rating of these specific attributes.

1.5.1 **Sampling Design:**

On 26\(^{th}\) July, 2005 over 60% area of Mumbai was affected by deluge to various degrees. Hence the exact population size was not possible to be measured. So the population under study for the research were the flood affected households adopted from across the 11 municipal wards in Mumbai which were severely flooded on 26\(^{th}\) July, 2005 by using the Multistage Sampling Framework as per following stages: (Flood Preparedness Guidelines, 2012 by MCGM).

**Stage-1:** For administrative purpose the MCGM has divided the Mumbai city into 24 administrative wards. Out of which the researcher has selected 11 wards which were severely affected by flood on 26th July, 2005 by using non-probabilistic judgmental sampling.

Stage-2: From these 11 wards, 10 spots each have been selected. (a spot means a low lying residential area identified by the MCGM as ‘chronically flooded spot’ in every monsoon.) The researcher used here the judgmental sampling methodology.
Stage-3: Within each chronically flooded spot (CFS), the researcher selected 8 to 10 flood affected households by using probabilistic simple random sampling.

*A relevant sample size of 920 flood affected households were selected. Their ward-wise composition is as follows:*

*Table No. 1.1 List of the wards where the survey was conducted*

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Ward</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F ( South)</td>
<td>88</td>
</tr>
<tr>
<td>2</td>
<td>G ( South)</td>
<td>86</td>
</tr>
<tr>
<td>3</td>
<td>H ( East)</td>
<td>84</td>
</tr>
<tr>
<td>4</td>
<td>K ( East)</td>
<td>85</td>
</tr>
<tr>
<td>5</td>
<td>L</td>
<td>85</td>
</tr>
<tr>
<td>6</td>
<td>M ( West)</td>
<td>81</td>
</tr>
<tr>
<td>7</td>
<td>N</td>
<td>87</td>
</tr>
<tr>
<td>8</td>
<td>P ( North)</td>
<td>75</td>
</tr>
<tr>
<td>9</td>
<td>R ( South)</td>
<td>86</td>
</tr>
<tr>
<td>10</td>
<td>R ( North)</td>
<td>80</td>
</tr>
<tr>
<td>11</td>
<td>S</td>
<td>83</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>920</strong></td>
</tr>
</tbody>
</table>

1.5.2 *Pilot Survey:*

In order to test the validity and reliability of the questionnaire, the researcher conducted a pilot survey with a relevant size of 50 households from the flood affected area and collected their responses. This helped the researcher to refine the questionnaire and its validity and relevance found in tune with the objectives of the study. The questions based on certain attributes which were selected to evaluate the effectiveness of the Disaster Management Plan of MCGM got tested and proved to be valid from the replies of respondents in the pilot survey.( These attributes have been explained in the literature review.)
While conducting the pilot survey, the researcher faced some difficulties such as understanding the meaning of some of the questions, as respondent found from different states speaking different languages, illiteracy in slum area etc.

1.5.3 Questionnaire Design:

After completing the pilot survey the questionnaire for the research was finalized. Total 35 questions were addressed to flood affected households. Out of which 11 questions were asked for preliminary information and remaining questions were based on certain attributes such as awareness, communication, promptness and coordination to evaluate the effectiveness of MCGM’s Disaster Management Plan. The responses of the affected households were asked about their experience regarding effectiveness of disaster management plan of MCGM on the day of deluge and their perception about the same in any future disaster in Mumbai. Accordingly, the researcher visited 920 households, who were affected by the flood on 26\(^{th}\) and 27\(^{th}\) July, 2005 and recorded their responses. Out of 920 questionnaires 10 were found incomplete, so the analysis was based on 910 questionnaires.

The questionnaire is attached as Appendix-

1.5.4 Data Analysis:

After collecting the primary data with the help of the questionnaire from flood affected households, the researcher analysed the data in the form of tables, charts and graphs. The researcher analysed the collected data by using simple statistical techniques with SPSS software. A qualitative analysis has been done of the data collected from MCGM Officers and presented in the form of findings of the study.

1.6 Sources of Information:

The researcher has used both the sources of information primary as well as secondary.
Firstly, the researcher conducted an extensive literature review. For the purpose the researcher used secondary sources of information which include books, published reports, articles website materials etc.

The researcher got an opportunity to visit University of Delaware, U.S.A. wherein Disaster Research Center of the University has been conducting research in disaster and its management for the last 50 years. Lot of material was made available to the researcher from the resource center of the university on international developments in the field, which provided much wanted insight in the subject.

The researcher collected firsthand information from the deluge affected households and structured interviews were conducted of MCGM’s officers.

The researcher also conducted interviews of experts from NGOs, Social activists, Councilors of MCGM which helped in giving suggestions for effective implementation of the disaster management plan of the MCGM.

1.7 **Scope and limitations of the study:**

Mumbai is one of the most important cities of the country. Mumbai plays a vital role in the economy by contributing revenue to a great extent to the exchequer of the country. It provides jobs to any job seeker and naturally people are attracted towards Mumbai for this purpose. It is overcrowded and therefore vulnerable to various disasters- natural and manmade. In Mumbai there are number of establishments and offices of different organizations- national, international private and public. They have their own disaster management plans. For example, Indian Railways disaster management plans, various business organizations like Tatas, Reliance etc. Port Trust of India, Military Establishment have their own plans. The researcher has conducted the study of only MCGM’s disaster management plan and its effectiveness.
1.8 Limitations of the study:

1) The study is about the effectiveness of disaster management plan prepared by Municipal Corporation of Greater Mumbai (MCGM) only. There are many institutions which have their own disaster management plans.

2) The study is limited to only 11(out of 24) wards of MCGM which were severely affected by the deluge on 26th July, 2005 and thereafter.

3) The time frame selected for the study is between 2005 and 2014.

4) The researcher selected the study of effectiveness of disaster management plan of MCGM in respect of a major natural disaster in Mumbai on 26th July, 2005, the deluge and thereafter.

5) The scope of this disaster was so vast that selecting any other manmade disaster for study would have become unwieldy. Therefore, the researcher has restricted to only Natural Disaster took place on 26th July, 2005 for study.

1.9 Significance of the study:

Mumbai is one of the most important centers in India. Mumbai city faces different types of disasters like the other mega cities in the world. The city has witnessed deluge in 2005, serial train bomb blast in 2006, terror attack in 2008, building collapse is almost a regular phenomena wherein life and property damages take place to a very great extend. The city has become most vulnerable to these natural and man-made disasters. The vulnerability profile in Chapter V gives us a detail picture of its vulnerability. Despite this situation, to make Mumbai a safer place to live and prosper there was an urgent need to have a robust and flawless plan to save Mumbai from any type of calamity.

The MCGM has been assigned this task to prepare a plan and protect Mumbai as per the Mumbai Municipal Corporation Act, 1888 and the Disaster Management Act, 2005. In order to fulfill this obligation, the MCGM has prepared a Disaster Management Plan to mitigate and protect the city against any disaster.

(Sections 63(k) and 64(2A) of the Mumbai Municipal Corporation Act, 1888 clearly indicates that the Municipal Corporation of Greater Mumbai is responsible for mitigation and management of natural and man-made disasters and is expected
to take all necessary measures to promote public safety and minimize danger or damage to life and property of the citizens).


But it is observed that there is a difference in planning and its effective implementation. Well planned and prepared administration and unplanned government- a glaring difference was observed in case of Japan and Haiti. The magnitude of Japanese earthquake was 9.0 on Richter Scale in 2011 and loss of lives was 20,000 (majority of them died due to tsunami which came after earthquake.) whereas the Haitian earthquake was measured at 7.0 on Richter Scale still the death toll was 2,22,000 people in 2010. It indicates that if a country is well prepared she can control the losses of life and property. (World Disaster Report, 2012).

Therefore, the present disaster management plan of MCGM needs to be reviewed regularly and to be up dated accordingly. The study is conducted to evaluate the effectiveness of this disaster management plan on certain attributes and the researcher has made important suggestions and recommendations to the concerned authorities in this regards.

1.10 Chapter Scheme:

Chapter I Introduction

Chapter II Theoretical Framework and Literature Review

Chapter III Present Scenario of Disaster Management: at International level, at National level and at State level

Chapter -IV Mumbai Profile

Chapter-V Data Analysis and Interpretation

Chapter -VI Summary of findings and conclusions

Chapter - VII Suggestions and Recommendations

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