

**DISASTER MITIGATION:
GOVERNMENT POLICIES AND
PEOPLE'S PERCEPTION – A CASE
STUDY OF TORNADO HIT
VILLAGE IN WEST BENGAL**

*Dissertation submitted to the Jawaharlal Nehru University in partial fulfillment of
the requirements for the award of the Degree of*

MASTER OF PHILOSOPHY

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CERTIFICATE

Certified that this dissertation entitled " **DISASTER MITIGATION: GOVERNMENT POLICIES AND PEOPLE'S PERCEPTIONS – A CASE STUDY OF TORNADO HIT VILLAGE IN WEST BENGAL**" submitted by **Soumitra Roy** in partial fulfillment of the requirement for the award of the degree of **Master Of Philosophy** has not been previously submitted for any other degree of this or any other university and is his own work.

We recommend that this dissertation maybe placed before the examiners for evaluation.

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Soumitra Roy
Soumitra Roy

Dedicated To
My Beloved Didu
And Dadu

CONTENTS

	PAGE NOS.
Acknowledgement	
CHAPTER 1 INTRODUCTION	1-26
• Conceptual Paradigm	3-12
- Dimension Of Natural Disasters In India, History Of Tornado In India, Study Area, Problem Definition, Magnitude Of The Disaster, Phases Of Disaster Management	5-12
• Hypotheses	12-14
• Rationale Of The Study	14
• Objectives Of The Study	15-16
• Methodology	16-20
- Sources Of Data, Phases Of The Study, Sample And Sampling, Tools Of Data Collection	16-20
• Limitations Of The Study	20
• Review Of Literature	20-25
CHAPTER 2 DISASTER MANAGEMENT POLICY AT NATIONAL, STATE AND DISTRICT LEVEL	27-64
• UN Resolutions On Natural Disaster Reduction	28-31
SECTION 1	
• National Organizational Setup And Policy Of Disaster Management	31-52
- Preparedness, Disaster And Development, Application Of Science And Technology, Community Participation, Awareness Promotion, Education And Training, Role Of NGOs, Role Of Private Business Sector, Disaster Reduction And Sustainable	35-45

	Development, Differential Vulnerability, Risk Assessment And Vulnerability Analysis, Documentation, Evaluation And Research, Media Support	
-	Guidelines For Health Sector Disaster Preparedness In India , Contingency Plan For Various Disasters, Specific Public Health Activities In Disaster	45-52
•	Administrative Response Mechanism To Disaster: State	52-53
-	State Crisis Management Group	
•	Administrative Response Mechanism To Natural Disaster: District	54-56
-	Administrative Setup, District Relief Committee, Contingency Plans, District Control Room, Co-Ordination, Mode Of Communication	54-56
SECTION 2		
•	Disaster Response Mechanism And Preparedness: District Midnapore	56-64
-	Preparedness Of The District, Medical Action Plan, Supply Of Drinking Water And Storage Of Spare Parts, Assistance Of Army And Air Force, Engineering Departments Like PWD(Road), PWD(National Highway), West Bengal State Electricity Board (WBSEB) Etc.	59-64
CHAPTER 3	MITIGATION OF NATURAL DISASTER AND PEOPLES PERCEPTION	65-104
•	The Village	65-77
-	Village Profile, Castes And Sub-Castes In The Village-Their Titles, Electricity And	66-77

	Water Supply, Public Distribution System (PDS), Telephone And Postal Services, Health Services, Primary And Secondary Schools, Irrigation And Agricultural Facilities, Income, Housing Condition	
	• Experience Of The Villagers Of Tornado	77-78
	- The Analysis Of Post Disaster Actions Of The Village Community, Voluntary Organisation And Government Functionary With Time As A Variable	78-84
	- Distribution Of Relief, Corruption, Irregularities And Mismanagement,	84-89
	• An Analysis Of After Effects Of The Tornado	89-103
	- Change In Infrastructure	89-95
	- Change In Housing Pattern	95-103
CHAPTER 4	SUMMARY AND CONCLUSIONS	105-113
	BIBLIOGRAPHY	114-117
	APPENDIX 1 : Case Studies	i-xii
	APPENDIX 2 : Study Conducted By AIIH & PH, Calcutta	xiii-xiv
	APPENDIX 3 : National Policies On Natural Disaster Reduction	xv-xxii
	APPENDIX 4 : Interview Schedules	xxiii-xxiv

CHAPTER I

INTRODUCTION

Floods, earthquakes, fire and tornadoes have wiped out entire community overnight, striking terror to the hearts of countless victims. Slowly during the past few decades, progress has been made in controlling floods and limiting the destruction of fire. Earthquakes and tornadoes are still completely beyond control but at least efforts are being made to understand and guard against the disastrous effects of such natural forces¹. In time of war, there is little opportunity to study the impact of disaster upon the individual and the community under distress. Because everybody concentrates on massive struggle for survival. In time of peace one must wait for a natural catastrophe to strike, before the social impact of such disaster can be investigated. The social scientists are well equipped to study the long and short effects of such disasters. This will also help evolving a comprehensive methodology to reduce the impact of disasters on community².

Traditionally, disaster agents have been divided into two categories: natural and manmade. The former encompasses three broad types. There are those of the 'sudden onset' variety, like earthquakes, cyclones, tornadoes and floods. They are characterised by a rapid build-up, are assumed to offer relatively little warning before they strike. A second type are those subsumed under the heading 'creeping disasters'. Insect infestation and drought are two examples. In theory, indicators of such disasters are more readily predictable than sudden onset ones. Closely related to this second type is a third, namely, 'chronic disasters'. Chronic disaster agents are those that appear to have no specific time limit. They are

'ongoing' usually accepted as emanating from irreversible structural deterioration. These kinds of agents arise from such factors as soil erosion and deforestation.³

It needs to be realised that though, generally speaking, the frequency of natural disasters has not changed much, loss of life and property and losses due to dislocation of developmental activities have gone up alarmingly because of all round growth in human activities resulting from the pressure of demands of our fast growing population. Besides, deterioration in ecological balance also enhances vulnerability of a larger number of people to natural disasters.⁴

Natural disasters have been causing a number of deaths and much suffering worldwide. At least 17 major disasters have occurred during the past four decades, where more than 10000 people were killed in each incident. Earthquakes, landslides, floods, cyclones, hurricanes, volcanic eruptions, wild fires and such other natural calamities have claimed more than 2.8 million lives all over the world in past twenty years, adversely affecting 820 million people. Damaged caused by natural disasters during the last two decades is estimated at 25 to 100 billion dollars⁵.

Table no 1.1
Annual Average No. Of People Killed, Injured, Affected and became Homeless by the Natural Disasters during 1972-1996, Worldwide.

Year	Killed	Injured	Affected	Homeless
1972-76	348631	68583	67023832	2516192
1977-81	22547	29358	93741694	2048248
1982-86	410971	54290	142731613	3099984
1987-91	140381	61453	236421721	10003575
1992-96	31422	142345	177641958	6533815
Total Average	136790	71206	143512164	4840363

Source: World Disaster Report, 1998

Among all the continents Asia, Latin America & Africa are the major sufferers of the effect of natural disasters. Majority of the people killed, injured and affected belongs to these three continents. Together they claim about 65 to 80 percent of all the casualties. The scenario in India is equally grim, as it has been hit by at least one major disaster every year. The loss of life is invariably accompanied heavy economic loss and hardship for the disaster victims. Annual average number of people killed and affected by disaster in our country over the period of 10 years (1987-96) is 5063 and 56563631 respectively. In the year 1997 the figures stand 2540 and 392690 respectively⁶.

Conceptual Paradigm

Of all the natural calamities confronting man, the tornado is most like the man-made disaster of bombing civilian populations. The lack of fore warning, the complete helplessness of community when disaster strikes and the wake of dissolution and destruction which follows the sudden explosive fury of winds, and the brief duration of onslaught so characteristic of bombing in war.

In the book “ *Nature on the rampage*”, Ann and Myron Sutton write about the horrific effects of tornado as, “Notwithstanding mistrals and hurricanes, no windstorm in the earth can do what tornadoes do with such finesse and finality. Each year, with the roar of a thousand banshees these furious funnels slam into towns and villages and blow them to smithereens whirl across the country side clipping and uprooting trees, and in general raise more commotion in more concentrated form than any other wind on the rampage”⁷.

The name ‘*tornado*’ comes from the Spanish *tornado* (“thunderstorm”), which supposedly was derived from the Latin

tornare ("to make round by turning"). It is a powerful vortex or twister whose rotational speed is estimated to be near 480 kilometers (300 miles) per hour but may occasionally exceed 800 kilometers (500 miles) per hour. The direction of the rotation in the Northern Hemisphere is usually, though not exclusively, counter clockwise. The forward speed of an individual tornado is normally 48 to 65 kilometers (30- 40 miles) per hour. The direction of motion is usually from the southwest to northwest. The path of the twisters average only several hundred meters in width and 26 kilometers (16 miles) in length, but large deviations from these average may be expected, for example, the disastrous 1925 tornado was times 1.6 kilometers (1 mile) wide and its path length was 352 kilometers (219 miles).⁸

The United States is the chief playground for tornadoes; however, similar storms have been reported from many parts of Europe, from Australia, India, Russia, China, Japan, the Fuji Islands and south Africa. In United States there are an average of 883 tornadoes were reported during the period 1973 to 1981⁹.

The first visible indication of tornado development is usually a funnel cloud (see the picture no. **1.A**) or 'tube', which extends downwards from the cumulonimbus cloud of a severe thunderstorm. As this funnel dips earth wards, it becomes darker because of the debris those are forced into its intensifying vortex. Some tornadoes give on visible warning until their destruction strikes the unsuspecting victims. Tornado belong to the category of severe local storms which cover fairly small geographical areas or which move along narrow paths and decay before travelling more than 100 kilometers or so¹⁰.The meteorological explanation of the birth of a tornado can be understood from the excerpts of the

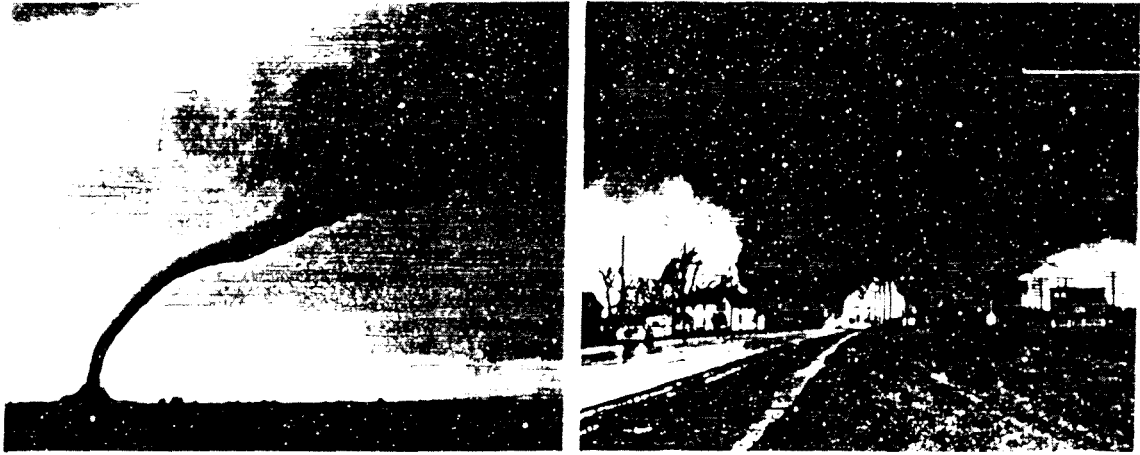


Figure 43. *Tornadoes of the midwestern United States*
 (Left) A typical killer tornado photographed in Tracy, Minnesota, on July 13, 1968; it travelled 1.1 kilometres (13 miles) along the ground. (Right) Twin funnels, in one of the worst recorded tornado outbreaks, crossing a highway south of Elkhart, northern Indiana, on April 11, 1965. Debris can be seen falling out of the left funnel.

PIC: 1-A. VIEW OF A TORNADO.

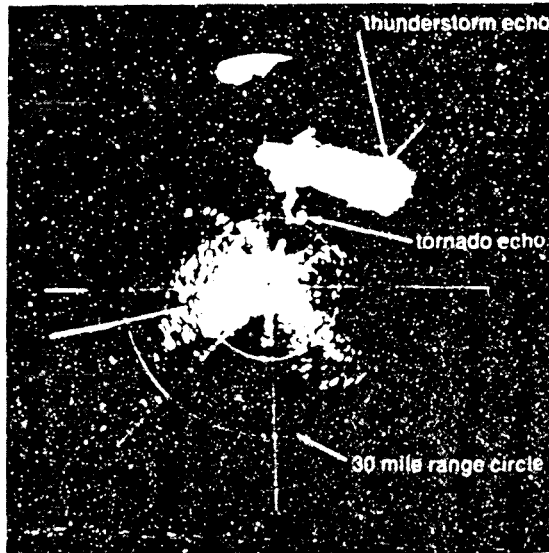


Figure 49. Hook echo of a tornado in Champaign, Illinois, photographed on a radar scope on April 9, 1953. This was the first occasion in which the hook echo, an important clue in the tornado warning system, was recognized and photographed.

PIC: 1-B. HOOK LIKE STRUCTURE AS SEEN IN THE RADAR.

interview with Mr. R.N.Golder, Director, Area Warning Center, Alipore, and Calcutta. According to him, " If there is any sudden formation of tall cloud in a small space, there are the chances of forming a tornado. On the other hand, when there is a wide spread thunder storm activity then the chances of forming a tornado gets lessened. At times from an isolated cloud cell there may be a tornado, the same type of formation of cloud may also lead to 'Norwester'. The other conditions required for the formation of tornado are the flow of moist air from the south or southwest and contrasting cool, dry air from the west or northwest. So far the dynamics of tornado is not well understood. Yet another problem of detecting a tornado is due to its short duration, from formative stage to matured stage. The world scientists have discovered that when the vertical structure of the cloud is taken into the radar, it shows a hook like structure (see picture no. 1.B). However, this hook like structure forms just on the eve of the outburst of the tornado. As our country has a vast area, it becomes very difficult to study each and every part of the cloud separately, with a finer and closer observation. If at all that hook like structure is detected, it will always be late to convey the precautionary message to the area suspected to be hit by a tornado as the time gap between the formation of hook like structure in the cloud and formation of tornado will be hardly 20 minutes.

Dimension Of Natural Disasters in India

All 32 states and union territories in our country are prone to have one or a combination of disaster situations viz. drought, earthquake, flood and cyclone to a great extent. Apart from these, disasters like tornado, landslide, very high or low climatic

temperatures also make the lives of the people distressed frequently. Among all the states and union territories, 24 are considered to be most vulnerable. According to the information provided by the Ministry of Agriculture (Dept. of Relief), at least one state (West Bengal) faces all four types of disasters, 6 states face 3 types of disasters, 12 face 2 types of disasters and 5 face 1 type of disaster¹¹. The following table illustrates this:

Table 1.2
Types of Disasters Faced by States & Union Territories

S.No.	Name Of The State	Drought	Flood	Cyclone	Earthquake	Total
1.	West Bengal	Yes	Yes	Yes	Yes	4
2.	Andhra Pradesh	Yes	Yes	Yes	No	3
3.	Bihar	Yes	Yes	No	Yes	3
4.	Maharashtra	Yes	Yes	No	Yes	3
5.	Orissa	Yes	Yes	Yes	No	3
6.	Uttar Pradesh	Yes	Yes	No	Yes	3
7.	Punjab	Yes	Yes	No	Yes	3
8.	Arunachal Pradesh	No	Yes	No	Yes	2
9.	Jammu & Kashmir	Yes	Yes	No	No	2
10.	Assam	No	Yes	No	Yes	2
11.	Himachal Pradesh	No	Yes	No	Yes	2
12.	Manipur	No	Yes	No	Yes	2
13.	Nagaland	No	Yes	No	Yes	2
14.	Sikkim	No	Yes	No	Yes	2
15.	Meghalaya	No	Yes	No	Yes	2
16.	Andaman & Nicobar	No	Yes	Yes	No	2
17.	Tamil Nadu	Yes	No	Yes	No	2
18.	Tripura	No	Yes	No	Yes	2
19.	Mizoram	No	Yes	No	Yes	2
20.	Gujrat	Yes	No	No	No	1
21.	Haryana	Yes	No	No	No	1
22.	Karnataka	Yes	No	No	No	1
23.	Madhya Pradesh	Yes	No	No	No	1
24.	Rajasthan	Yes	No	No	No	1
	Total	14	18	5	14	

Source: Document, Directorate General Of Health Services, GOI, Review And Planning Meeting On Disaster Preparedness- A Report, 21-22 Sep, 1992, New Delhi

At the district level, out of 443 districts, 90 are under drought prone area programme and 21 under desert development programme. In Rajasthan and Gujrat, there are 73 blocks, which

are perennially affected. There are 137 districts which are flood prone and there are 271 out of 443 districts which are likely to face cyclone. West Bengal is prone to flood and cyclone recurrently. In every year flood occurs in various parts of the state, but the coastal districts are more prone to cyclone. A brief list of frequencies of cyclone crossing the states and districts in eastern coast, and frequency of tornado in the study state are given below.

Table 1.3
Frequencies of Cyclones Cross Various Districts in the States Of Eastern Coast during 1981-89.

State	District	No. Of Storms In 81-89
West Bengal	24 Parganas	23
	Midnapore	12
Orissa	Balasore	19
	Cuttack	17
	Puri	10
	Ganjam	7
Andhra Pradesh	Srikakulam	14
	Vizag	8
	E. Godavari	8
	W. Godavari	0
	Krishna	14
	Guntur	3
	Nellore	21
Tamil Nadu	Chingelput	15
	S. Arcot	5
	Thanjavur	13
	Ramanathpuram	3
	Tirunaveli	2
	Kanyakumari	0

Source: *Encyclopaedia of Disaster Management*, Vol. 7, Ed. P. C. Sinha, (1998) Anmol Publications Pvt. Ltd. New Delhi-02 Pp.169.

History of Tornado in India

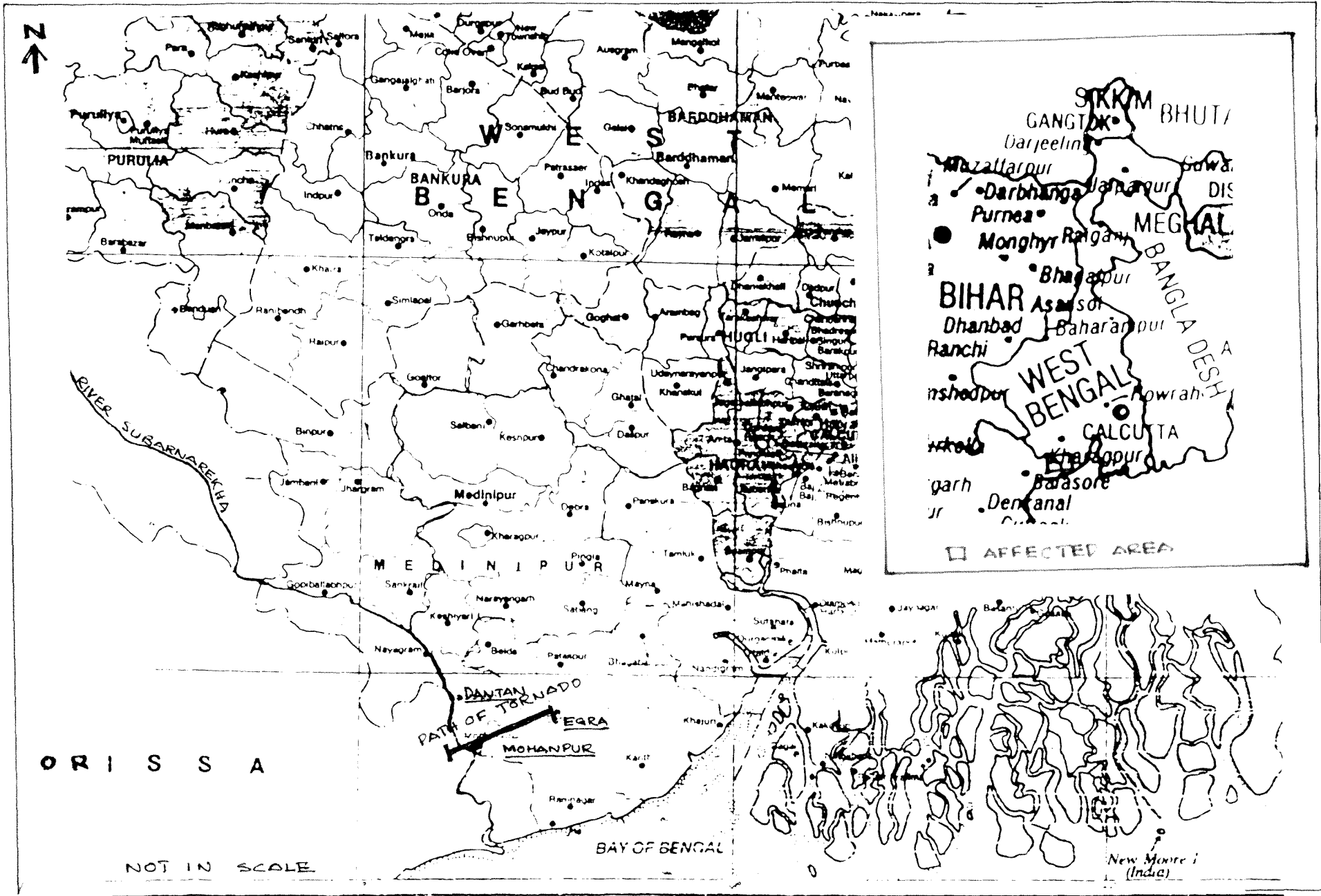
Tornado is generally an infrequent phenomenon in our country. It occurs unpredictably. The eastern region of our country is more prone to it. For a long time the scientists did not know the reasons for the occurrence of tornado. In the last few decades due to the advancement of the science and technology there has been a considerable progress in this field. The observation shows its existence is generally with the pre-monsoon cyclone. The most distinguished tornadoes happened to our country are as given below:

Table 1.4
Tornado Faced by Various Parts of the Country

Year/Month	Place	State	Effect
1963, April	Coach Bihar	West Bengal	Not Available
1969, March	Diamond Harbour	West Bengal	Not Available
1977, April	Contai	West Bengal	500 Killed, 2000 injured And Affected
1978, April	Keonjhar	Orissa	176 Killed, 6000 Affected
1978, --	Delhi	Delhi	26 Killed
1981, --	--	Orissa	120 Killed, 1000 Affected
1984, April	Gaighata, 24 Parganas	West Bengal	2000 Injured, 4000 Affected
1993, April	Gokarna Murshidabad	West Bengal	5 Villages Destroyed, 500 Persons Injured
1998, March	Dantan & Jaleswar	West Bengal & Orissa	70 Killed, 2500 Injured & 32000 Affected
1998, September	Hemtabad Uttar Dinajpur	West Bengal	6 Injured, 60 Houses Fully & 30 houses Partially Destroyed

Source:

1. *Sech Patra (Bengali), Newsletter of Dept. of Irrigation and Waterways, govt. of West Bengal. Vol. 1&2, Jan- Jun'1998. Pp. 1&7.*
2. *Natural disasters by VK Sharma, IIPA, Appendix.*



3. *Shaptahik Bartaman (Bengali Weekly)*, Vol. 17, Sep'19, 1998. Pp. 39
4. *Natural Disasters- A guide for relief workers*. Published by Joint assistance Center, May'1980. Pp. 1-20.
5. *Anandabazar Patrika (Bengali)*, 19 sep'98. A report, Pp. 01.
6. Verma V. K. & Brijbhushan, *Natural Disasters* by V. K. Sharma, Pp. 46- 59

Study Area

Sarta village is situated in *Dantan I* developmental block in *Midnapore* district of *West Bengal*. The village is located at a distance of 3 Kilometers from the village *Sonakania* that lies at the border of *West Bengal* and *Orissa*. The sub-divisional town *Dantan* is 13 Kilometers away, and yet another sub-divisional town *Mohanpur* is about 20 Kilometers away from the village. The seashore of *Bay of Bengal* is 40 Kilometers away from this village. A metalled road that joins *Mohanpur* and *Sonakania* mainly connects the village. A national highway (*Orissa Trunk road*) joining *Kharagpur* in *West Bengal* and *Baleswar* further down to *Cuttack* and *Bhubaneshwar* in *Orissa* runs 3 Kilometers away from the village. *Southeastern railways* track joining *Kharagpur* and *Chennai* goes a few hundred meters away from the village. However this village is unable to take any advantage of the railways as the nearest railway station is about 12 Kilometers away.

The village is inhabited by *Hindus* only, there is no presence of *Christians* or *Muslims*. Among the *Hindus*, the population of *Other Backward Classes (OBCs)* is considerably higher. *Schedule Tribes* and *Schedule Castes* represent about 12.71% and 1.2% of the total population respectively. The sex ratio of the village is better than the national average. It is about 953 per 1000 men. Generally the interaction among the villagers is harmonious. There exists no

tension on the basis of caste. The only dividing factor is politics, as the ratio of supporters of the ruling political party and the opposition is almost 3:2. Neighbourhood problems are discussed and solved in the village Panchayat. Further detailed information about the village is given in the **chapter 3**.

The people of this village are mainly marginal farmers, daily wage labourers and are in self employment like rickshaw puller, provision shop, rice or cow trading etc. as a result the average individual income of the people in this village are very low. About 71.50% people live below the line of poverty. More detailed information about occupation and income of the people of the study village are given in the tables **3.4**, **3.5** and **3.6** placed in **chapter 3**.

Problem Definition

Definition of a natural disaster can be put forward taking into account its different aspects. According to Krimgold, "disaster is a crisis event which outstrips the capacity of a society to manage or cope with it at least for a time"¹².

WHO defines it as a "severe disruption, ecological and psychological, which greatly exceeds the coping capacity of the affected community"¹³.

In yet another definition W. Nick Carter says, "an event, natural or man made, sudden or progressive, which impacts with such severity that the affected community has to respond by taking exceptional measures"¹⁴.

From all the three definitions we find that disaster causes a severe disruption in the normal life of the human being, which needs a response mechanism within the society or an external support to cope with it and bring back the life of the community into

normalcy. To make the response system more effective, in the modern world every society it is trying to set up a well-defined response mechanism. However, the disaster response mechanism and its various activities can not be discussed in isolation. In the modern, complex world each and every activity of the human being is driven by various factors like economic, social, political and environmental. In the case of disaster management operations some such factors influence the disaster management programmes in its various phases.

Magnitude of the Disaster

The tornado struck 4 blocks of West Bengal and Orissa on 24th march'1998. The nature of devastation was similar to its earlier strikes. In a 4 minutes' whirlwind, 22 villages were damaged more or less out of which about 12 villages were devastated badly. Death toll reached to 70 including 16 school children of Gobarghata village of Orissa. About 2500 people got injured including more than 100 severely injured people with permanent physical disability. 32000 people in the region have been affected by the disaster. 2950 houses were destroyed fully and another 3300 houses were damaged partially. About 2000 cattle and domestic animals were killed. Apart from these Boro paddy, pulses, oilseed, summer vegetables, betel vine, have been damaged. The total loss is estimated to be Rs.35 crores.

Phases of Disaster Management

To carry out the disaster management programmes in an organized and effective manner it has been divided into three phases. As per the WHO document, in general, the key activities for

coping with disaster and disaster risks are essentially **preparedness**, which involves all actions designed to minimise loss of life and damage, and to prepare for timely and effective rescue, relief and rehabilitation should disaster strike; **prevention**, which may be described as measures designed to prevent phenomena from causing or resulting in disasters or other related situations; and finally **mitigation**, which means reducing the effects of severely damaging events on man and his environment once they have occurred¹⁵

From the above definition we find that preparedness and prevention are demarcated to form two different phases. In the practical situations we see that preparedness is a part and one among many factors, which help preventing the disasters. Therefore, it could have been more realistic to include the components like training, education and awareness promotion of all the people who suffer or deal with the disasters within the broad head of preparedness apart from the above mentioned components. The next phase should comprise of the concept of *emergency management*. This would make the disaster management more responsive to the actual need of the disaster victims and the adverse situations arising out of the disaster.

Hypotheses

After the tornado had hit the village, an opportunity to study the dynamics of the disaster management could be visualized. In our country, it has been observed that despite having an organized administrative setup, the disaster management programmes remained incomplete due to several reasons. The study conducted by Tata Institute of Social Science (TISS) on Latur earthquake found

that physical and housing rehabilitation programmes were not properly organized and remained incomplete. In the occurrence of other natural disasters, newspapers and periodicals repeatedly report on irregularities in relief distribution, lack of proper emergency management, etc.

After going through the newspaper reports, relevant literatures and government policies prior to conducting the pilot study some variables like politics and economic structure of the locality, social factors viz. Caste & class, family dynamics like inequalities due to sex difference emerged as some areas of interest on which the study could focus.

During the pilot study, the focus was further narrowed down and specific areas were identified for collecting the details. It was hypothesized that there was a lack of training and awareness among the community and the community leaders about how to deal with the disasters. As a result, the numbers of casualties were more. In the emergency management phase there were irregularities in the distribution of relief due to the influence of local politics, economically better off people had more access to the relief materials, on the other hand economically and socially weaker sections were the major victims of the disaster. In the post disaster phase, the economic, physical and housing rehabilitative programmes remained incomplete, resulted into a severe financial crunch among the victims of the disaster. To cope up with the situation, people would cut down on their expenses particularly in the field of education of their children. This would increase the number of dropout cases in that village. As is the prevailing situation in the rest of India, the girl child was considered to be

most severely affected of all. Simultaneously, it was also thought that the intake of food would also decrease.

Rationale of the Study

The prominent feature about the distribution of relief in this particular case was the extensive participation of community leaders and people's representatives alongside the government administration. While inquiring about the irregularities in the distribution of relief and installation of various infrastructure facilities, the BDO and officer incharge of relief of the block revealed that they had to work under political pressure. As a result, in some of the situations they had to concede to such pressures and were unable to do anything to stop the irregularities. Further inquiry about the earlier mentioned three aspects of rehabilitation, government officials replied as the economic rehabilitation like providing short term loans to the people to start self employment, providing electricity and water for irrigation would be a decision which cannot be taken in a short time. They found that as the people are already economically weak, it would not be possible to get the repayment of loans proposed to be given to them for the purpose of reconstructing their houses. This resulted into a delayed decision regarding the measures to be taken to provide relief to the disaster victims. The much-needed help, thus, could not reach the sufferers when it was most needed. The disaster management policies have not taken into account the above mentioned aspects. In the present study some such dynamics and unexplored areas of relevant research have been highlighted.

Objectives of the Study

Considering the above-mentioned hypotheses, in the present study, different factors like economic, social, political and environmental, which influence various activities of disaster management, will be studied. At the same time, the disaster management policies of the government would be taken into consideration and the study will try to analyze the effectiveness of such policies at different phases of the disaster management. In the preparedness phase the training undertaken by the government for its own machinery and education and awareness promotion of the people at the receiving end while facing an unpredictable disaster would be studied.

During the emergency phase, the activities of the government machinery, various non-governmental organizations with the relation to relief distribution will be discussed.

In the rehabilitation phase the measures adopted by the government particularly in the sector of housing and employment generation will also be considered. Simultaneously, the dichotomy between the government responses to the disaster and the people's perceptions towards relief and rehabilitative programmes will also be taken into account. The dimensions of the rehabilitative programmes whether they are according to the felt need of the community or it was an imposed approach by the policy makers will also be studied.

While doing such study, the economic and occupational background of the respondents of the study area and also the economic factor that played the key role in the distribution of relief and rehabilitative programmes will be considered. The study would

make a genuine attempt to work out the influence of political scenario prevailing in the area e.g. linkages between the people's access to various benefits being given as a relief measure and the status of the respondent in the power structure of the community.

Methodology

Before going into the intricacies of the tools and techniques those were adopted for this study a discussion about some important terms becomes necessary.

1. **Fully Destroyed Category (FD):** the houses which fell on the exact path of the tornado and collapsed fully, i.e. all the four walls as well the roof were destroyed are placed into this category.

2. **Partially Destroyed Category (PD):** in the case of present study those houses which have sustained only minor damage; particularly the roofs were blown away but all the four walls were still erect were considered as partially damaged. These houses were saved from being completely damaged as they were not in the path of the whirlwind but were lying on the either side of it.

Sources Of Data

Both primary and secondary sources were used to gather the data for this study. Initially newspaper and periodical reports were used to know the extent of damage in the disaster. Census and other related government data were used to know the socio-economic back ground of the study area, frequency of the natural disaster and degree of vulnerability of the area, preparedness of the government to deal with the disaster in terms of infrastructure facilities etc.

Primary data were collected from the field, from disaster victims, local social workers, people's representatives, political activists, government officials of relief, PWD, Block Development Office at the village and block level; Additional District Magistrate at the district level and Deputy Director Of Department Of Relief at the state level. To know the details of the health service system of the area and their working pattern in the emergency situations, the CMO and the staff of Primary Health Center and CHG of the affected village were interviewed. To know the genesis of the tornado expertise knowledge of the Director, regional cyclone warning center has been taken into the consideration.

To have a brief idea the rehabilitative measures taken up by the government of Orissa which was also hit by the tornado on the same day as West Bengal a small survey was conducted, particularly on the field of housing. This helped to make a comparison study of usefulness of the rehabilitative measures taken up by those two state governments.

Phases of Study

This study was conducted in two phases. In the initial phase, a pilot study was carried out in the proposed study area so as to determine the various dimensions of disaster mitigation programmes. The total time period of this phase was of 10 days during the month of October'1998. A total of 15 respondents, selected randomly, were interviewed. Such an exercise enabled to make the objectives of the study more specific and also to identify some factors that could not be visualised while preparing the hypotheses that have been developed through the review of the available secondary literature.

The final phase of the study was conducted after 4 months of the pilot phase during the month of February'1999. It extended over a period of about a month. The details of the final data collection are given in the following paragraphs.

Sample and Sampling

For the purpose of this study, 80 houses out of 161 houses of Sarta village were selected. The houses were so selected belonged to different categories viz. FD and PD (already explained). However, in the FD category sample size consisted of 55 houses while PD category people have suffered more and was, therefore, in acute need of disaster relief. This also helped to make the sample truly representative of the universe.

As regards to the selection of the respondent from a selected household, break up as given in the table 1.5 as follows:

Table 1.5
Respondents of the Interviews Carried Out for the Study

Relation Of The Respondent To The Head Of The Household		No.	%
Self	Male	63	78.75
	Female	03	3.75
Son	Elder	05	6.25
	Younger	01	1.25
Wife		08	10.0

All the female-headed households in the fully destroyed category houses were interviewed which is about 3.75%of the total interviews conducted. Also 10% of the wives of the male-headed households were interviewed deliberately in order to know their views about pros & cons of the disaster management.

Tools of Data Collection

Structured and unstructured interview schedule and participatory observation techniques were mainly used to collect the

data for this study. Apart from those, secondary data from various sources and in some cases informal unstructured interview was also carried out.

(A) Interview schedule- before carrying out the pilot study an unstructured schedule were prepared in the Centre of Social Medicine And Community Health Of Jawaharlal Nehru University, New Delhi for the disaster victims and interviews were carried out in the pilot phase. Identifying the areas to be explored during the same phase, a structured schedule was developed for the final phase.

For interviewing the people related to management of the disaster like community leaders, government officials, etc. the same procedure was followed. However, for the victims and the disaster managers two different interview schedules were prepared.

(B) Observation technique- this was followed throughout the study to have clear ideas and first hand experience about the economic, housing, physical conditions, etc. of the tornado affected village. Group discussions among the villagers were closely observed to take into account various dynamics of people's activities and their perceptions about the disaster management.

(C) Key informants- for the purpose of this study some key informants were identified. Among them, the former sabhapati of the Panchayat Samiti, local political leaders and a social worker of the village, who was also a disaster victim, were considered to be important.

(D) Case study method- as this study is mainly depending upon the qualitative data; case study method has been administered. Within the case reports along with the quantitative information like monthly income, expenditure on housing, loan

taken for reconstruction of the houses of the respondents, etc.; the perceptions and preferences of the relief and rehabilitation, awareness and it's source of weather forecast, etc. were also placed to know the felt need of the people.

Limitations of the Study

Collection of secondary data from government sources was a great difficulty. Particularly the village-wise breakup of relief work done by the Block Development Office was not available. As a result, some information provided by the disaster victims could not be cross-checked.

The income levels of the respondents were understated in most of the cases. In such cases participatory observation method was employed to calculate the approximate income of the respondents.

Similarly the sources those provided loans to the victims for building houses and the amount taken, as loan could not be cross-checked. The reason being that the sources was not disclosed.

Review of Literature

Review of literature helps the researcher to gain a prior knowledge with regard to the problem of study. In our country, we do not find much literature on natural disaster and its various aspects. So far the works have mainly been concentrated in the technical aspects like warning systems, engineering structures of disaster resistant housing etc. but there is a clear paucity of studies focussing sociological and environmental aspects particularly.

The book "*Natural Disaster Reduction*" by G.K. Misra and G.C. Mathur (1993) has discussed about the minutes of the disaster

mitigation programmes including education and training of targeted groups. The importance of warning systems and protection techniques of various disasters like landslide, coastal erosion etc. are also discussed.

In his book "*Natural Disaster Reduction For Nineties: Perspectives, Aspects And Strategies*", D.K. Sinha (1992) has discussed about various technical aspects of disaster mitigation programmes. He has also taken up some social issues like humanitarian approach towards relief and rehabilitation and importance of socio cultural factors, values and ethics of natural disaster mitigation has been pointed out.

In a study Flood Control and Rural Settlement Planning carried by Ajay Kumar (1985) in Kosi river investigates the problems related to rural settlement and suggests a development plan for the region. In the study analysis is made how the pattern of and the distribution of rural settlements are determined by the availability of and flood as the river changes its course abruptly. Finally the author came out with a series of recommendations to control the flood in the study area. Among the recommendations, the construction of barrage, artificial embankments, channel improvements, afforestation are given importance.

A survey was conducted by Tata Institute of Social Science (TISS, 1993) Latur-Osmanabad earthquake. In the study various aspects of the disaster like psychological health of the survivors, impact of disaster on occupational distribution was taken into consideration. In the study, also the changes in the educational profile, psychosocial impact on widows, widowers and orphans were also highlighted.

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In his handbook "*Disaster Management*", W. Nick Carter (1991) comments that modern disaster management is a very important activity of national requirement. Disaster management is recommended to be a comprehensive and continuous activity well within the developmental programmes taken up by the government. This book is designed to be a guideline for the government officials but specialized aspects of disasters, such as economic, technical and sociological issues are not discussed elaborately. Whereas various components of disaster management viz. Preparedness, response, recovery, public awareness, training and education is emphasized.

In developed countries, particularly in USA few studies on disaster and its impact on human life are carried out. In a study Mary B. Anderson discussed the economic aspects of disaster mitigation. The study points out that in the long run prevention is more cost effective than recovery. Initially it may seem that investment for various measures of prevention is an economic burden for the countries of developing economy but when it is measured against the social security provided to its citizens, benefits of prevention prevails over recovery. Yet another dimension of such investment is that it builds up the confidence of the investors, which is beneficial for the developing countries in particular. It is argued that disaster awareness must be integrated into development planning or the development undertaken might add to the possibility of a disaster. Losses as a percentage of national wealth are higher in developing countries although absolute losses from disaster may be higher in developed countries. The marginal utility of a unit of currency is presumably lower in

richer countries. So the poorer the country the greater the impact of the disaster.

Randolph C. Kent (1987) has anatomically discussed the dynamics and structure of international relief process. He found that the process of relief is directly influenced by psychological, sociological, nutritional and anthropological factors.

In a study on behavioural aspects of human being facing a disaster by William H. Form & Sigmund Nosow (1958) find that the individual behaves according to socially established norms. Although the situation in which the individual finds himself may be completely new, he has guides to the behaviour, which he has learnt all through life, and withstands him in good stead in times of crisis. The authors suggest that disaster planners must take into the account the social heterogeneity of the communities in all phrases of their work. The personnel of different disaster would vary in social composition, as will the members within individual organization. Planners themselves represent different segments of the community and they should be completely aware of their own values, assumptions and biases that underlie their plans.

A case study was conducted by 'All India Institute of Hygiene and Public Health' (AIIH & PH, the authority to undertake field level case studies and health sector training programmes in eastern and north-eastern states) in four states of India viz. Bihar, Orissa, Assam and West Bengal. The case report was prepared by R. Biswas, S. P. Mukhopadhyay, D. Sur and K. Dutta (Indian Journal of Public Health, Jan-Mar 1997). The objective of the study was to assess the perceptions and opinions of community leaders and community members about existing preparedness programmes and appropriateness of mitigatory exercise against flood disaster and to

find their experiences about mitigatory exercises undertaken following the disaster.

For the purpose of data collection 13 districts in Assam, 10 districts in Bihar, 9 districts in Orissa and 10 districts in West Bengal were selected. All these districts were prone to various natural disasters. In each of these 2 worst affected Community Development (CD) blocks were selected. From each block 2 most affected villages were taken and finally from each of these so selected villages 10 families were randomly selected. Data was collected by interviewing the head of 10 selected families and 2 community leaders (Panchayat Pradhan and non-formal leader). From West Bengal 80 community leaders and 400 community members were interviewed.

Final analysis of the study showed that according to the community leaders the preparedness programme of the district or block level was rarely co-ordinated at the village level. In West Bengal it is only 20 percent. None of the states had any local monitoring cell for disaster situation and about 54 percent villages of West Bengal used to receive warning signals in time. West Bengal carries advance stock of relief material to the extent of 15 percent of villages and budget provision at 10 percent is also highest there. None of the Panchayat or non-Panchayat formal leaders receive any training to increase their resistance against impact of disaster (refer appendix 2- table 1 to 4).

60 percent of community leaders recalled that response to disaster was delayed (after 8 hours), relief was not available to 80 percent villages, and the need of the victims was not assessed in time. This view was supported by 80 percent of the community leaders in West Bengal. In addition, the same number of the

community leaders said that the relief was not adequate. Only 11.1 percent of community members in West Bengal were satisfied with the adequacy of disaster preparedness programme of the government. Similarly the preparedness of the Panchayat was negligible at 10.6 percent. 27.3 percent of community members opined that they receive warning signal in time. In the same way relief operation was also late. 30.8 percent of the victims were mainly rescued by the government people (31.2%), by villagers themselves (28.5%), through self-help (23.7%) and by the NGOs (9.5%). Timely relief was experienced only by 40.9%. Compensation was received by 60 percent. Community satisfaction was very low regarding the management of disaster being only at 12 percent. 32.2 percent community members felt that Panchayat was involved in disaster mitigation activities properly.

From the study it is evident that self-help and help from the immediate neighbours always play a key role at various stages of handling the disaster. This makes clear argument for more community participation in the training and awareness programme for disaster mitigation.

The expectation of the disaster victims regarding the relief and external help from the government and non-governmental organizations are always high and the affected communities have their own priorities like food, medical supply, fertilizer, money and shelter. Therefore, the study suggests that disaster mitigation plan should include priorities of communities rather than facing them to accept the priorities of local administration. The study also argues that active participation of the communities should be the main focus of disaster mitigation as the programmes are to alleviate their sufferings.

The sociological studies of the impact of natural disasters on the various aspects of public health are very meager in our country and the access to the published studies is also limited. Therefore, in the present study an attempt is being made to evaluate various aspects of disaster mitigation programmes, to compensate for such gaps.

¹ Moore, H.E. (1958), *Tornadoes over Texas, A study of Waco and San Angelo in Disaster*. pp vii

² Ibid.

³ Kent, R.C. (1987), *Anatomy Of Disaster Relief, The International Network In Action*. pp.02.

⁴ Misra, G.K. & Mathur, G.C. Edited, (1993), *Natural Disaster Reduction*. Pp. V.

⁵ International Federation Of Red Cross And Red Crescent Societies, *World Disaster Report-1998*, Oxford University Press.

⁶ Ibid.

⁷ Sutton, Ann & Myron (1962), *Nature on the Rampage, J B Lippincott Company, New York*, pp 72.

⁸ *Encyclopedia Britannica* (Climate And Weather) Vol. 17, pp.516-521.

⁹ Ibid.

¹⁰ Natural Disasters – A guide for Relief Workers, Published by Joint Assistance Center, May 1980, New Delhi, pp. 1-20.

¹¹ Directorate General Of Health Services, GOI, *Review And Planning Meeting On Disaster Preparedness- A Report*, 21-22 September, 1992, New Delhi.

¹² Krimgold, Frederick(1976), *Overview Of The Priority Area Natural Disaster*, United Nations, New York.

¹³ WHO, Document, Psychological consequences of disasters, 1992, Geneva.

¹⁴ W. Nick Carter (1991), *Disaster Management- A Disaster Manager' HandBook*, Asian Development Bank.

¹⁵ Ibid.

CHAPTER II

Disaster Management Policy at National, State and District Level

The unique geo-climatic conditions of Indian subcontinent make this region among the most vulnerable to natural disasters in the world. Disasters occur with amazing frequency and while the community at large has adopted itself to these regular occurrences, the economic and social costs continue to mount year after year¹. Disasters have been with us as long as recorded history and presumably even longer. Generations of people have suffered the consequences and recovered from them, and life has continued on. At the same time this is also very true that it is virtually impossible to fight against such onslaught of the nature individually. As a result a collective effort of the society along with the patronage of state has been developed to mitigate the disasters faced by the people.

From the historical evidence we find that India had one of the longest traditions of disaster management, particularly droughts and floods. But the approach was one of the exercises in philanthropy. At the political level there was opaqueness on the long-term needs for management. (Mr. B. Narasimhan, 1992 STC Meeting, New Delhi). Quest to reduce the ill effects of disaster faced by the people started in early Indian civilisation. Kautilya was the first Indian planner who documented about natural disasters and elaborately described the rituals that should be performed by the king as well as citizens when a disaster was struck. Negligence in performing duties was treated as offensive and guilty were fined heavily and that was the policy during his times (Sama Sastry, 1929). There were occasional references in the writings of Elliot in

regard to Mohammed -bin- Tughlak's administration in times of distress during 1343 drought In which he described the kind of initiatives undertaken by the sultanate administration to reduce the miseries of the people suffered in drought by exempting the taxes, distributing food grains etc. (Elliot, 1964). Some documents regarding cyclones and their effects are also existing during the rule of East India Company in India. The lukewarm attitude towards the distribution of relief and initiating other relief measures during the cyclones in Andhra Pradesh coastal areas during 1697 and 1706, by the then rulers only added to the miseries of the people suffering in the cyclone. It was only the native communities who rendered assistance in the form of cooked food, drinking water and grains to the victims (Mimeo 1697). A nominal response from the East India company was extended to the survivors against five major cyclones between the years 1758- 1857 in the madras province alone, even during this period what ever money spent and its benefits were countermanded by the equal incompetence of east India company administration (Loveday, 1985). In post independent India the major milestone was achieved by appointing cyclone disaster mitigation committee (CDMC) in response to large-scale destruction caused by 1969 cyclone in coastal Andhra Pradesh. The members of CDMC went into the minute details and spelt out clear cut strategy in the event of cyclone threat and produced meticulous plan for the district in the form of district contingency plan which was later adopted by different states that were prone to natural disaster².

UN Resolutions on Natural Disaster Reduction

In the decade of 70s and 80s the whole world witnessed a series of disasters which led to massive loss of property and human

lives. To encourage people to protect communities from natural disasters, the United Nations launched the International Decade for Natural Disaster Reduction (IDNDR, 1990-2000). The objective of IDNDR is to reduce, through concerted international action, the loss of life, property damage, and social and economic disruption caused by natural disasters, especially in developing countries. The governing body of UN then chalked out some resolutions to reduce the effects of natural disaster. All the member countries of UN were agreed to honour the resolutions.

The IDNDR programme plan for 1997-2000 is built around five primary themes:

- Hazard, vulnerability and risk assessment
- Early warning issues
- Disaster and sustainable development
- Political and public policy commitment
- Shared knowledge and technology transfer.

In its resolution declaring IDNDR, the UN General Assembly has laid special emphasis on the crucial role of professional, scientific and technological communities in the formulation and implementation of specific programmes designed to bring about a general reduction in the occurrence and impact of natural disaster. The ideas are targeted to:

- To improve the capacity of each country to mitigate the effects of natural disasters expeditiously and effectively, paying special attention to assisting developing countries in the assessment of disaster damage potential and in the establishment of early warning systems and disaster reduction structures when and where needed.

- To advise appropriate guidelines and strategies for applying scientific and technical knowledge, taking into account the cultural and economic diversity among nations.

- To foster scientific and engineering endeavours aimed at closing critical gaps in knowledge in order to reduce loss of life and property.

- To disseminate existing and new technical information related to measures for the assessment, prediction and mitigation of natural disasters.

- To develop measures for assessment, prediction, prevention and mitigation of technical assistance and technology transfer, demonstration projects and education and training tailored to specific disaster locations to evaluate the effectiveness of their programmes.

The United Nations in accordance with the resolution has set up a Scientific and Technical committee (STC). The STC is a body of 24 experts, for assisting the member nations in the identification of major problems and devising strategies in the application of scientific and technological input in the natural disaster management within the respective countries. The STC is a non-political body consisting of eminent persons selected for their expertise in relation to different types of disasters.

The STC has been meeting frequently to review the general global efforts in natural disaster reduction and makes specific suggestions and recommendations for adoption in respect of individual problems. The STC also highlights the regional problems and makes specific recommendations to the member nations for implementation. The deliberations of the STC in a developing country would help in focussing global attention on the specific

problems of the region and could lead to solutions for intractable problems, and international support for specific disaster reduction measures recommended by the STC in respect of the countries of the region. Endorsement of the national effort in specific areas by the STC could promote flow of aid as a result of donor interest and also lead to regional and international co-operation in respect of specific technological measures in relation to forecasting, warning and mitigation.

It also says that it needs hardly to be emphasised that this is the right time to make collective efforts, governmental and non-governmental organisations and people of the country to develop the strategy to mitigate natural disasters to serve humanity and accelerate the pace of national development³.

Section I

National Organisational Setup and Policy of Disaster Management

The United Nations General Assembly has called upon National governments to set up National committees for pursuing goals of the decade and take up specific policies. As a signatory of UN resolutions India has also declared the current decade as IDNDR since 1st January, 1990 and policies and strategies have been formulated at the various levels of government functionary and community to take steps to reduce the impact of natural disaster. A cabinet committee on natural calamities has been constituted, which will direct the implementation of programmes to give effect to the objectives to the IDNDR. A National Advisory council on IDNDR has also been constituted, as suggested in the UN General assembly resolution, under the chairmanship of Agriculture minister, to

formulate and recommend programmes for natural disaster mitigation during IDNDR and to give specific thrust to the reduction components in the sectoral development programmes of the five year plans. In the department of agriculture & co-operation, a core group on IDNDR is also working to study the issues relating to natural disaster management programme and identify specific areas for intervention. The committees are taking various minutes of the disaster management into the account, which are highlighted in the following sections:

The organisational arrangements to cope with natural disasters vary depending upon the level of economic development, science and technology, infrastructure, ability of trained manpower and the nature of hazards faced by the country.

Basically, the responsibility of managing natural disasters in the federal set up of our country vests with the respective state governments. The national government supplements the efforts of the state governments dealing with disaster situations, while providing the major part of the financial and supports needed for disaster response. An institutional arrangement at the national, state, district and community levels have been set up to deal with emergency situations. A national contingency action plan exists for ensuring emergency assistance in the wake of natural disasters at the national, state and district levels. The respective state governments have their own relief manuals containing procedures and powers for emergency management and provision of relief.

The national organisational arrangement consists of a cabinet committee on natural disaster management at the national level, and a crisis management group presided over by the cabinet secretary. A central relief commissioner in the ministry of

agriculture effects disaster relief co-ordination. Each state government has a relief commissioner and a co-ordination committee. At the district level, the district collector presides over the relief committee, which consist of people's representatives.

The present scheme of financing the relief expenditure arising out of natural calamities has come into force with effect from April 1990 consequent upon the acceptance of the recommendations of the ninth finance commission. Under this scheme, a calamity relief fund (CRF) has been constituted for each state with certain amount allocated to them. Of this amount, 75% is contributed by the central government and given to the states in four equal instalments. The balance 25% is provided by the State Government from its own resources. Following the constitution of CRF, it is the responsibility of the concerned state government to meet the expenditure on calamity relief unless and until the crisis of a rare severity, in which case, the government of India examine the case and if found deserving give additional funds to the state⁴.

Technical assistance regarding the monitoring of rainfall situation or cyclone detection comes from India Meteorological Department (IMD), which works through 10 cyclone detection radar located on the coasts. A geo-stationery satellite (INSAT- 1B) monitors cyclone movements. There is a disaster warning system for rapid and direct dissemination of warnings.

The central water commission (CWC) has a flood forecast system with 157 flood forecasting centres covering 62 inter-state river basins. The flood forecasting centres, in collaboration with IMD, monitors rainfall situations and water level in the reservoirs. With this information, the CWC issues flood forecast and warning

about floods. The IMD's seismological branch has 35 observatories for monitoring seismic disturbances.

The disaster mitigation programmes have been undertaken over the years to mitigate the impacts of draught, floods and cyclones in India. The programmes such as Drought Prone Area Programmes (DPAP), Desert Area Development Programme (DADP) and the National Watershed Development Programme (NWDP) are intended to mitigate the impact of droughts. The main thrust of mitigation efforts in different river basins has been to modify the floods through specific structural measures such as reservoirs, embankments, channel improvements and town protection. From 1952 to 1992 the main flood management works included 15800 kilometres of embankments, drainage improvement of 32000 kilometres, 850 towns have been protected from flood through embankments. These measures provided a reasonable degree of protection to an area of 1400 million hectares. The total cost of mitigation efforts from 1951 to 1992 is around Rs.31.50 Billion⁵.

A national effort has been made to construct cyclone shelters in the cyclone prone areas. Around 1200 cyclone shelters have been constructed in the coastal region. Efforts have been made to forest the coastal areas to break winds. Some cyclone resistant houses have been made. A cropping strategy has been evolved, keeping in view cyclone seasons to reduce the loss of crops. Attempts are now being made to link development programmes with disaster mitigation efforts.

Due to the diversified physical characteristics of the peninsular in which our country is situated, natural hazards are unavoidable, though can certainly be reduced, if not entirely prevented. According to the latest planning programmes emphasis is

slowly shifting from disaster response to mitigation. Thinking on the same line the initiatives have taken up are as follows:

Preparedness

Preparedness is considered to be the most useful tool to reduce the impact of unforeseen hazards. To strengthen various programmes of preparedness at levels from national to state and further down to the level of community arrangements in administrative set up, allocation of resources and operating environment has been clearly defined in the government policy as these are the crucial aspects of preparedness. To ensure the smooth working of different parts of such set up, which are either directly or indirectly involved in the management of emergency situations is taken into account well in advance. In its policy government highlights the review of existing legal and institutional arrangements in various levels of governmental set up in all the levels. Contingency action plans for infrastructures crucial for disaster management like hospital, drinking water supply stations and power plants are to be prepared. To strengthen the administrative set up at local level, decentralisation of authority, flexibility in the operating procedures and adequate financial, material and equipment support including stock piling of essential articles in high-risk prone areas are administered. At the community level priority is given to awareness promotion and encouraging traditional disaster mitigation activities.

Disasters and Development

The linkages between natural disasters and development are often overlooked. Development programmes are at times designed,

ignoring the impact of hazards e.g. people are encouraged to build their houses in the low land of Sunderbans or on the slopes of land slide prone or earth quake prone mountain areas in search of new living places. This accentuates the vulnerability of the areas and the people to natural disasters. There is an urgent need for an integrated approach from disaster to development. The development has to be viewed as an integrated long term activity in which the planning must incorporate appropriate technically apposite evaluation, particularly a conceptual framework and an emphasis for preparedness and participation of the community as part of the wider need for mitigation and prevention⁶. To address the need the govt policy suggests – the areas like prioritising the projects meant for disaster reduction and preparedness, caring for the vulnerable and disadvantaged groups who may become first victims of a development programmes, which have a bearing on natural disasters and proper land use planning as a first step to disaster preparedness.

Application of Science and Technology

Over the centuries, natural disasters have posed scientifically challenging problems. Prediction of natural disasters continued to be a perennial area of pursuit for scientists and technologists. Over The decades, there has been a realisation that without relenting in our endeavours for prediction, one can possibly do some thing again by using science and technology to reduce the losses due to natural disasters⁷. In our country there has been a considerable development in the science and technology capabilities for disaster reduction, particularly in the area of forecasting and warning in respect of floods, cyclones and drought and some of the valuable

information gathered through these technologies is shared by various other countries. A number of institutions like All India Institute of Hygiene and Public Health, Calcutta, JIPMER Centre, Pondicherry etc. are engaged in research and development of appropriate disaster reduction technologies, beside activities relating to training and education.

In its resolution for IDNDR, United Nations has also shown a definite tilt towards science and technology. It emphasises three major concepts: (i) The communication of knowledge, (ii) the application of knowledge and (iii) the generation of knowledge. The same theme has been reflected in the policies undertaken in our country. It advocates optimum use of available scientific and technological knowledge for vulnerability analysis, hazard evaluation, risk mapping etc. upgradation of forecasting and warning systems and wider application of low cost disaster reduction techniques are considered to be encouraged.

Community Participation

In disaster situation it is the community which responds first before any other agencies, including the government, are able to reach. Over the years the communities have evolved their own coping mechanisms to manage disaster situations. The accumulated experience of the community and the resilience built by it are valuable assets in disaster reduction and management which can be effectively used, shared and suitably strengthened by supportive and empowering measures. The measures like identification of potential social worker or community leader to mobilise community efforts relating to disaster reduction and management. Local communities to be encouraged with the information and knowledge,

development of skills and required material support for a cost effective disaster management system. The policy also suggest that, to discharge the responsibility of the local self government and elected bodies may be supported with allocation of resources, equipment and extension of technology.

Awareness Promotion

The impact of the disasters can be reduced significantly by promoting awareness various levels of government functionary as well to the people at the receiving end. In the one hand it will help the decision-makers to understand the gravity of the situation and enable them to respond quickly to both in preparedness and emergency situations. On the other hand the people those who actually face disaster can respond to the government action with more organised manner. As a positive towards achieving these goals policy suggests to cerate awareness among disaster managers and professionals through seminars, workshops, demonstration projects, exposure to real life situations and exchange of experience. Wide spread through mass media and traditional and rural art form will also become useful measures to improve the awareness about disaster reduction at national, state and community levels.

Education and Training

Trained manpower with the basic knowledge of disaster management comes handy in both pre and post disaster situations. Unfortunately in our country education and training in disaster reduction and management are not adequately developed. The extent of mobilisation of human resources would be considerably enhanced if a well designed education and training programme is

put in place. This would require technical training, skill development and attitudinal changes. There are many organisations like Australian Counter Disaster College or Asian Disaster preparedness centre at Bangkok or Disaster Management Centre at Oxford or Centre for Research on the Epidemiology of Disasters at Belgium have their well knit programmes on various fields of disaster management. Australian Counter Disaster College offers variety of courses like, Introduction of Disaster Management, Counter Disaster Planning, Hazard Analysis for Disaster Managers evacuation management etc. in our country such formal education can be imparted with the help of Professional institutions and non-governmental organisations. The existing mechanisms of continuing education, adult education or even mass education can be effectively used as instruments for imparting disaster education and training⁸. In the administrative level various cadres of state services like in West Bengal and Haryana receive training of short duration on disaster management. Disaster management the policies highlight the importance of imparting of training in concurrence with the requirement in the various levels of government functionary and local conditions, inclusion of formal education on disaster phenomena and appropriate precautionary steps towards these to the school children and training of craftsmen and artisans to help encouraging disaster resistant constructions.

Role of NGOs'

There are obvious limitations to a government taking up activities for mobilisation of community efforts, awareness creation, extension of technologies etc. Non-governmental organisations with skill and experience discharge this area of responsibility more

effectively. The NGOs can provide the needed linkages between the people and the government and help reach the benefits of disaster mitigation programmes to the targeted groups. They can also mobilise local skills and resources for disaster reduction and development. The emerging trend of involving NGOs in various activities of disaster management has created a good scope to enlarge their area of work as well. To exploit the potential of NGOs in the field of disaster management a well-laid policy has been drawn up.

- i. The NGOs may be increasingly involved in:
 - A. Building up awareness among the people about the impact of natural disaster, possibilities of disaster reduction, needed response to working and in strengthening the coping mechanism of the community.
 - B. Dealing with instances of trauma cases and in providing counselling to those emotionally disturbed by the impact of disasters.
 - C. Reaching relief and development assistance to the people and ensuring an equitable share of this to the most vulnerable section.
 - D. Dissemination of disaster reduction technologies, particularly in the area of house construction.
 - E. Facilitating people's participation and mobilising community efforts in the planning and implementation of disaster reduction and management programmes.
 - F. Preparing local communities for management of common property resources, such as grazing grounds and traditional water harvesting systems etc.

G. Promoting thrift groups of self-help.

- ii. NGOs, who have varied skills and experience in dealing with disasters, may network among themselves and with the government, thereby creating a forum of interaction for effective sharing of their resources and experience.
- iii. With view to bring about a greater transparency in their operations, the international donor agencies, funding NGOs may initiated to the concerned governments the details of their contributions to enable all concerned to appreciate their activities;
- iv. The NGOs who do not receive any international assistance or other donor assistance and face constraints in organising their activities may be assisted to establish the required essential facilities;

Based on the identified types of NGOs and their capabilities, organised action of NGOs can be very useful in following activities in different stages of disaster management:

<u>STAGE</u>	<u>ACTIVITY</u>
Pre-disaster	<ul style="list-style-type: none">• Awareness and information campaigns• Training of local volunteers• Advocacy and planning
During disaster	<ul style="list-style-type: none">• Immediate rescue and first aid including psychological aid.• Supply of food, water, medicines and other immediate need materials.

- Ensuring sanitation and hygiene.
- Damage assessment.

Post disaster

- Technical and material aid in construction.
- Assistance in seeking financial aid.
- Monitoring.

Role of Private Business Sector

Natural disaster causes damage to infrastructure and disrupt economic activities. At the same time, a considerable opportunity is thrown up in manufacturing, trade and services sectors for catering to various needs of the disaster prone areas. Hence, the business sector has a stake in reducing the impact of disasters. But this aspect has not received adequate recognition. To encourage business sector to play a vital role in the field of disaster management policy suggest the banks and other financial institutions to provide credit to the families affected by natural calamities for repair and reconstruction, acquisition to provide assets for restarting activities and suggest business sector to commercialise the technologies, which have a bearing on disaster reduction.

Disaster Reduction and Sustainable Development

Environmental degradation also heightens the potential for natural disaster. Environmental improvement and natural disaster reduction measures often place disproportionate burden on the poor, which further aggravates their vulnerability (Document, 1992). The plan suggests that poverty alleviation is to be made an integral

part of sustainable development and the need and interests of the poor and vulnerable groups towards disaster to be taken care of and finally the development efforts must be accompanied by equitable distribution of resources and benefits.

Differential Vulnerability

The poor people are the most affected by natural disasters. Their capacity to stand up to the impacts of disaster arises from several factors. The poor often occupy disaster prone marginal lands, have diminishing access to productive assets and are least equipped with resources to build up necessary mechanisms to resist disaster impacts. The social disabilities, which affect them in addition to poverty, further compound their vulnerability. The socially backward, the handicapped, the aged, the women and the children suffer from greater vulnerability than other section of the affected population. There is a need to recognise the existence of differential vulnerability needs to be recognised in disaster reduction and mitigation planning. The potential to reduce the incidence of this vulnerability lies in lies in empowering them by undertaking programmes aimed at alleviation of poverty and neutralisation of disabilities. According to the plan layout special care for socially disadvantaged, the disabled, the women and the children are to be taken. In the way the interests of such groups should be an essential part of risk mapping.

Risk Assessment and Vulnerability Analysis

The effectiveness of disaster reduction measures is dependent to a large extent on the depth of analysis about the probability and nature of disaster and degree of loss of elements at risk. It is

therefore, becomes necessary to undertake risk assessment with a reasonable degree of accuracy. Science and technology inputs have not always been fully used in hazard evaluation in our country. In vulnerability analysis also, there is inadequate appreciation of socio-economic factors relevant to the understanding of various groups within the society and the potential already existing for applications of traditional practices in coping with natural disasters (Document, 1992). To fulfil the shortcoming of the policy more intense use of social and physical science in the field of risk assessment and vulnerability analysis has been administered.

Documentation, Evaluation and Research

Our country is lacking in efforts relating to documentation of natural disasters, research into their socio-economic dimensions and evaluation of mitigation efforts. Detailed documents of natural disasters, highlighting their physical characteristics, impact and the response of the government and to her agencies would serve as institutional memory, providing useful lessons for managing future hazards. Evaluation of disaster mitigation efforts would bring out their strengths and weaknesses, which could improve the quality of management. The research on socio-economic aspects of such events would help reorient public policies and initiate appropriate disaster reduction programmes. Training and education efforts would greatly benefit from these inputs (Document, 1992). In our country there is a scope to up date the documentation and conducting research in the field of disaster management by utilising the existing infrastructure. The policy suggest that the educational institutions to come forward and do the needful in this field.

Media Support

In the age of electronic media, it has become well accessible to the people living in the remotest place of our country, which has prompted the media to play a multidimensional key role. On the one hand it can help promoting awareness among the people about the natural or man made disasters. On the other hand it can help propagating training and educational programmes to all the concerned officials as well as to the people, those who actually face the disaster. Other important roles can be played by the media, is reporting accurate information about disaster events and their impacts, providing support to the government in disaster mitigation programmes by highlighting the unassessed and uncovered areas particularly about the people's perception on the programmes taken up for them.

Guidelines for Health Sector Disaster Preparedness in India

The most dreaded effect of the disaster is the loss of human lives and the disruption of the normal way of living life. The disruptions in the infrastructure facilities including health care systems warrant an extra ordinary response from outside the effected community or area. A country's health service system and public health infrastructure must be organised and kept ready to react in any emergency situations.

The Emergency Medical Relief Division, (EMR) of the directorate General of Health Services in the Ministry of Health And family Welfare is the technical wing exclusively for the management of crisis situations. The division is headed by the Director, Emergency medical services and relief. He is accountable and

responsible directly to the Director General of Health Services and Secretary, ministry of health and family welfare. In the ministry of health and family welfare, the co-ordination is ensured through the office of the director, EMR among the Director of the Health Services of the states, stores division under central government, vaccine producing units, National Institute of communicable Diseases and Director malaria⁹.

During the emergency, the Director (EMR) keeps regular contacts with the control room and the officer concerned at the state level by various modes of communication and gets the feed back on:

1. The extent of disaster situation on a particular day;
2. Population affected; and
3. Health profile like number of patients, type of patient any problem to deal with the situation.

Generally the initial deployment of medical team in the disaster hit areas is done by the district chief medical officer from various PHCs under him, if required medical team from other districts by the state directors of health services and by the Director General of Health Services through director (EMR) at the federal level. But as the states carries adequate manpower, federal deployment of medical services is a rare phenomenon.

The disease surveillance is undertaken by the surveillance units of each state and co-ordinated at the central level by the National Institute of Communicable diseases.

Contingency Plan for Various Disasters

Disasters like flood, cyclone and drought are the regular phenomena in our country. Some parts are more prone to these kinds of disasters than others. With the development of science and

technology the forecasting such of disasters and prior identification of the vulnerable places can be done well in advance. In the case of the disasters with rapid onset, like cyclone, tornado, landslides, earthquake etc. are still unpredictable and preparedness is the only way out to deal with the evil effects of such disasters. Some of the highlights of the health problems and their remedial measures relating to various disasters are summarised below.

The health problems relating to natural disasters can be wither due to (a) direct impact on human population (b) existing infrastructure or (c) resulting effects due to combination of these factors.

A. Direct impact

Resulting in drowning, dragged by high-speed wind, crushed by wall fall, starvation, hit by high speed flying objects etc.

B. Damage to existing infrastructure:

- i. Direct effect on water, power supply and sanitation facilities, forcing the community to consume polluted water and stay in unsanitary conditions.
- ii. Damage of existing health infrastructure resulting in ineffective functioning of available facilities;
- iii. Destruction of houses: the affected population is exposed to adverse climatic conditions leading to disease particularly respiratory infections and fever.
- iv. Damaged ration shops and other shops providing food may lead to shortage of food in affected community leading to starvation conditions.
- v. Shortage or drying up of supply of food resulting in malnutrition in general and particularly among children, lactating and pregnant mothers in drought affected areas.

C. Combination of Factors

The above factors may change the living conditions of the community temporarily till they are finally rehabilitated. Sudden change in environment leads to following factors, each contributing to health problems:

- i. *Population displacement*: There are two ways by which population displacement may affect the health of the affected community:
 - a) Movement of population results in overcrowding at new places with possibility of transmission of diseases from moving population to local population in new places.
 - b) Health problems in temporary shelters: When the affected population is shifted temporarily to a new place, existing water supply system, toilet, cooking space become inadequate leading to insanitary conditions resulting in different types of diseases specially diarrhoeal diseases. Epidemic may be a possibility.
- ii. *Population density*: density of population increases proximity, resulting in spread of diseases.
- iii. *Work pressure on existing health infrastructure*: the existing health centres may suddenly start getting large number of patients which may be more than their existing capacity. Additionally, if these centres are also affected by floods, it may be difficult for them to discharge their responsibility.
- iv. *Psychological manifestation*: loss of property and loss of lives of relatives produces tremendous tension and pressure on mind, resulting in anxiety, neurosis or

depressions. Due to such psychological manifestations, the affected persons remain unhappy despite any amount of gratuitous relief, which are commonly seen during such situations.

Specific Public Health Activities in Disaster

Water borne diseases are one of the most common phenomena during all kinds of disasters. Diarrhoeal diseases are one of the earliest manifestations. The incidents of diseases like typhoid, infective hepatitis and poliomyelitis are usually seen after about a fortnight. Therefore, emphasis is put on observing preventive measures such as providing safe drinking water, public education by demonstrating dos and don'ts and sanitary arrangements and distribution of disinfectants like bleaching powder, lime etc.

- i. *Safe drinking water*: Safety of drinking water can be ensured either at the point of storage or distribution. Various methods practised are:
 - a) *Boiled water*: Water could boil for 10 to 15 minutes and then stored in clear and covered containers. This could be used after it has cooled.
 - b) *Use of chlorine tablets*: Nascent chlorine makes water safe for drinking. Varied ranges of chlorine tablets are available to purify different quantity of water.
 - c) *Bleaching powder*: bleaching powder is used to disinfect usually bigger source of water.
 - d) *Monitoring*: Chlorine content of water is estimated by Chlorinometer. At least 0.245 PPM of chlorine should be available in water for safe drinking.

- ii. Simultaneously the activities like disposal of water and excreta, fly proofing in housing and surrounding areas are carried out regularly by Public Health authority by spraying of bleaching powder.
- iii. *Health education*: using the mass media like radio, newspaper, pamphlets, leaflets containing small repeated message on following points are transmitted to the population:
 - a) Personal hygiene
 - b) Water consumption
 - c) Use of boiled water and chlorine tablets
 - d) Food consumption- avoiding use of cheap ice creams,
 - e) candles, food prepared and stored in the open
 - f) Non-consumption of stale and overnight food etc.
- iv. *Surveillance*: a close watch is required to be kept so that any rise in disease can be detected at very early stage. This can be done only with a careful watch at the sub-centre level.

Apart from the above mentioned policies a list of action plans are also chalked out to provide timely, appropriate and adequate health facilities during the disaster and post disaster periods. They are as follows:

- a) Identification of disaster prone areas and its population (Blockwise at the district, district wise at the state and state wise at the national level.);
- b) Identification of disease pattern of the high risk areas;
- c) Identification of factors responsible for aggravating disease during disasters;

- d) Identification of number and location of the health facilities in high risk areas;
- e) Location of manpower available in the area (both general and specialised);
- f) Arrangement for the training of personal-medical and para-medical at operational and the managerial levels to explain the details of contingency plan;
- g) Preparation of a contingency action plan with specific responsibilities assigned to specific persons;

For the organisation of emergency medical and public health relief, the following plan is chalked out:

- a) Identification of the list of medical supplies based on prevalence of diseases;
- b) Based on past experience, quantification and stockpiling of the emergency supplies at the district and PHC levels;
- c) Preparation of the list of mobile teams consisting of medical and paramedical personnel for deployment on short notice;
- d) Provision of support facilities to local health authorities for transportation of manpower and supplies and communication from the field to the district head quarters;
- e) Arrangement for disease surveillance activities and health information feed back as laid down in the contingency plan for biological disasters;
- f) Arrangement for treatment of injured patients at the PHC, district and other hospitals;

- g) Arrangement for rapid health assessment within two days of disaster situation by a team of district/ state level experts for analysis of disaster pattern and suggesting remedial measures;
- h) Arrangement for case studies and also to conduct operational research.

To achieve these objectives the respective states take proper initiative to make arrangement of technical and administrative support.

Here one can find that in our country a well-defined plan has been drawn up at the national level to handle the emergency situations during the disaster. In this plan all the pros and cons of the natural disasters, their effects and possible ways to reduce their impact are explored. In the policy more emphasis is put on preparedness than response. In the policy the needs like Public health practices, responsive administrative machinery and application of science and technology are given more importance.

Administrative Response Mechanism to Disaster: State

In the federal set up of government as we follow in our country the primary responsibility to response to a natural disaster is essentially that of the concerned state government. The central government only supplements the efforts of the state governments. State governments are autonomous in organising relief operations in the event of natural disaster and in the long-term preparedness and rehabilitation measures.

The state relief commissioners who are in charge of the relief measures in the wake of natural disasters in the respective states.

In the absence of relief commissioner, the chief secretary or an officer nominated by him is in overall charge of the relief operations in the concerned state.

Chief secretary is the head of the state administration. The state head quarters has, in addition, number of secretaries, head of the various departments handling specific subjects under the overall supervision and co-ordination of the chief secretary. At the level of state government natural disasters are usually the responsibility of the revenue department or the relief department. While important policy decision are taken at the state head quarters by the cabinet of the state headed by the chief-minister. Day-to-day decisions involving policy matters are taken or exercised by the secretary in the department.

State Crisis Management Group

There is a state crisis management group (SCMG) under the chairmanship of chief secretary /relief commissioner. This group comprises senior officers from the departments of revenue /relief, home, civil supplies, power, irrigation, water supply, Panchayat (local governments), agriculture, forests, rural development, health planning, public works and finance. The SCMG receives the guidance from appropriate authority at the national level to formulate action plan to deal with different natural disasters.

The relief commissioner of the state establishes an emergency operation centre in case a disaster situation develops and create a net work among agencies like Indian Meteorological department (IMD), district administration, NGOs etc. for up dated information on forecasting and warning of disaster and their distribution. The centre becomes contact point for the various concerned agencies.

Administrative Response Mechanism to Natural Disaster: District

Administrative Setup

The government machinery at the national and state levels are confined mostly in the activity of policy making. The first hand implementers of laid down policies are the district level government functionaries. It is the district collector who is the focal point at the district level for directing supervising and monitoring relief measures for district and for preparation of district level plans.

The collector exercises co-ordinating and supervising powers over functionaries of all the departments at the district level. During actual operations for disaster mitigation or relief, the powers of the collector are considerably enhanced, generally, by standing instructions or orders on the subject, or by specific government's orders, if so required. Sometimes the administrative culture of the state concerned permits, although informally, the collector to exercise higher power in emergency situations and the decisions are later ratified by the competent authority.

A district is subdivided into sub-divisions and tehsils or talukas or blocks. The head of the sub-division is called the sub-divisional officer (SDO), while the head of a tehsil is generally known as the Tehsildar (Talukdar or Mamlatdar in some state), Block Development Officer (BDO) keep contact with the individual villages through the village officer or Patwari, who has one or more villages under his charge. When disaster is apprehended, the entire machinery of the district, including officer of technical and other departments, swing into action and maintain almost continuous contact with each village in the disaster threatened area. In case of

extensive disasters like draught, contact is maintained over a short cycle of few days.

District Relief Committee

The relief measures are reviewed by the district level relief committee constantly by the official and non-official members including the local legislators and the members of the parliament.

The disaster relief plans are prepared for specific agencies for their implementation in different types of disasters in respective areas.

Contingency Plans

A contingency plans for different disasters is drawn up by the collector/deputy commissioner and approved by the state government. The collector or deputy commissioner also co-ordinates and secures the input from the local defence forces unit in preparation of the contingency plans. These contingency plans lay down specific action points, key personnel and contact point in relation to all aspects.

District Control Room

In the wake of natural disasters, a control room is set up in the district for day to day monitoring of the rescue and relief operations on a continuing basis.

Co-Ordination

The collector maintains close liaison with the central government authorities in the districts, namely the army, air force,

navy, ministry of water resources etc., who supplement the effort of the district administration in the rescue and relief operation.

The collector also co-ordinates voluntary efforts by mobilising the non-governmental organisations capable of working in such situations.

Mode of Communication

The entire hierarchy right from the central government (the department of agriculture and co-operation in the ministry of agriculture) to the district level, and even the subdivision level, is connected with the telecommunication system. The normal mode of telecommunications is over land telephone and telegraphy, but in times of stress and if there is a break down of the over land system, radio telecommunications is resorted to. The wireless network is generally run and maintained by the police organisation in the country. Besides the district officials, a host of other bodies to supplement their efforts in disaster situations particularly the armed forces and the non-governmental voluntary organisations.

Section II

Disaster Response Mechanism and Preparedness: District Midnapore

In the previous section we saw the administrative set up and the set of working plans at the various levels to deal with the natural disaster. In the present study the study village is located in Midnapore district of West Bengal. Before analysing various activities and aspects of disaster management in the disaster hit village let us see the preparedness and kind of infrastructure is

available in the district to handle the emergency situations with a brief introduction of the district.

The district of Midnapore is situated at the southern part of West Bengal. This district is characterised by its topographic pattern, which is highly variable ranging from hilly to sub-hilly to flat and flat concave. The western and north-western part of the district is undulating alternative ridge and valleys, the western part is concave with some basin areas like Ghatal, Moyna etc. The main rivers are Cossye, Subernarekha, Silabati, Rupnarayan, Keleghai and Haldi. There are numerous other small rivers existing in the district. The riverbeds of all these rivers have become shallow due to deposit of silt, which has reduced substantially the drainage capacity of these rivers. If there is a substantial rainfall in a short period in the upper catchment area, the river level rises and sometimes overflows. The situations further get worsened if there is a discharge of water from Kansabati dam. As a result some parts of this district are very much prone to flood.

The southern part of the district is touching Bay of Bengal. Apart from 24 Parganas (south), Midnapore is the only district in West Bengal having some coastal line. As a result southern and southeastern part of the district is very much vulnerable to the cyclonic storm particularly during pre-monsoon and monsoon season.

Apart from recurring floods and cyclones this district also faces occasional natural disasters like tornado, earthquake etc. therefore, this expresses the need to have a very strong government and other supporting functionary within the district to deal with such adverse situations.

Administrative set-up:

- Sub-divisions : 07
- Blocks : 54
- Gram Panchayats : 514
- Municipalities : 12
- Towns : 22
- Police stations : 46

Total area of the district is 14081 square kilometers. This is the largest district in West Bengal.

Population of the district (as per 1991 census):

- Total population : 8331912
- Male : 4284954
- Female : 4046958

Health service facilities:

- District hospitals : 01
- Sub-divisional hospitals : 05
- State general hospital : 02
- Block primary health centres : 54
- Primary Health Centre : 135
- Sub-centres : 1284
- TB sanatorium : 01
- Urban Family Welfare centre : 03
- Leprosy control units : 17
- No. of homeopathic-dispensaries attached to
PHC : 35
- State dispensaries : 02
- Dispensaries run by Panchayat: 120.

Preparedness of the District

A) Rescue and Relief

Rescue and relief are the two most important operations carried out by the administration. During disaster sub-divisional officers (SDOs) meet the Block development officers (BDOs), Sabhapaties (President) of Panchayat samities and Pradhans of gram Panchayat frequently to ensure proper rescue and relief operations. To ensure sufficient manpower in the operations the officials and staffs of different departments are ordered to stay back at their respective departments. Non-governmental organisations (NGOs) are allowed to work in the event of disaster but in each and every case they are to obtain prior written clearance from the district magistrate.

B) Availability of Country Boats, Mechanised Boats and Speed Boats

As this district is prone to flood, the requirement of various types of vessels for rescue and relief operations have been identified. It has been experienced that country boats and mechanised boats are more effective than speedboats. As a result all the SDOs of respective subdivisions prepare the list of boatmen having country boats or mechanised boats with their addresses, so that their services can be availed at the time of requirement, at short notice.

C) Stock of Food Grains and Other Essential Commodities

The Administration maintain the buffer stock of food grains, kerosene oil, dal, salt, match box, baby food, edible oil, milk powder and candles in the blocks, which are particularly prone to flood. The administration keep vigil at the dealers of kerosene oil and all the dealers and retail sellers of dry food like chira (Bidden rice), bread, gur (molasses) etc. so that there is no artificial scarcity created during the days of emergency.

District administration authorises the BDOs to procure foodstuff promptly from the local markets in case of out break of emergency. The priority is given to the supply of food to the victims at the first instance. BDOs arrange the distribution of relief. Gruel kitchens are opened only in grave situations. To open such gruel kitchens approval is obtained by the BDOs from the SDO concerned in each and every case. However, the BDOs are debarred from purchasing items like tarpaulin, garments etc. locally. In emergency situations district magistrate is the authority for the purchasing of such items.

Administration has also issued a notification that each agent must have a rolling reserve of 10 kiloliter of kerosene oil, each big dealer should have a rolling reserve of 500 litres and kerosene retailer should have 200 litres in his reserve.

All the dealers of baby food are identified at the sub-divisional level and SDOs keep contact with them for uninterrupted supply during emergency.

D) Sites for Air Dropping, Relief Camps and Flood Shelters

Sites for air dropping of relief materials, places for landing of helicopters and sites for camps have already identified. School or college authorities receive prior information for using

those buildings in emergency. Apart from that, the district authority is presently possessing 17 government flood shelters.

Medical Action Plan

District administration make sure that adequate arrangements are made for storing and regular supply of adequate stock of essential medicines, vaccines, disinfectants, first aid kit etc. at the district and sub-divisional medical stores. Such items are even stored at the block primary health centres of flood prone blocks. A list of essential life saving drugs and supporting medical equipment like bleaching powder, halogen tablets, ORS packets, anti-diarrhoeals, antibiotics, anti-venom injections, chemotherapeutics, anti malarial drugs, anti pyretic drugs, analgesics, anti allergic drugs, chlorosol i.e. fluids and sets of paediatric formulations for treatment of gastro-enteritis and respiratory infections. First-aid kit containing splints, tourniquets, dressings and assorted bandages, antiseptic creams, scissors and safety pins etc. for this purpose are made available at the point of supply and use.

Supply Of Drinking Water and Storage of Spare Parts

The executive engineer, Public health engineering (PHE) is responsible for preparing an advance plan for providing safe drinking water to the people of flood effected area. This plan should includes:

- i) Advance stock of tube well materials
- ii) Formation of special repair squads
- iii) Raising of tube wells and
- iv) Disinfecting of spot sources.

Assistance of Army and Air Force

The use of army and air force becomes handy in emergency situations like natural disasters, and with the help of such organisations, operations like distribution of relief and rescue can be executed in more disciplined and efficient manner. As per the laid down procedures the requisition for the services of army to conduct rescue and relief operations are made officially through the chief secretary, government of West Bengal. In these cases The SDOs intimate the district magistrate for such requisitions.

The air force authorities help the district administration in combating the flood and other disaster situations in extreme cases by making available their helicopters for rescue of marooned people and air dropping of foodstuff to the flood victims. The helicopters may also be available for survey of flood victims. As per The policy, the district administration should intimate the air force authority at least 8 to 10 hours in advance to seek their service. 8-10 hours notice.

The air force also requested to intimate the district magistrate for any abnormal rainfall in the district as per the observation of their meteorological centre situated near district head quarter of Midnapore.

Engineering Departments like PWD (Road), PWD (National Highway), West Bengal State Electricity Board (WBSEB) Etc.

It is equally important to keep the conditions of the roads well to avoid disruption of surface communication in the event of natural disaster. The responsible departments for maintaining the roadways like PWD (road) and PWD (NH) are always kept in touch with the district administration for necessary services.

The WBSEB (West Bengal State Electricity Board) looks after the prompt and steady supply of electricity places of emergency. They also keep vigil and disconnect the electricity supply to shallow/deep tube well lines if flood water rises to a high level in order to avoid accident and death due to electrocutions to the passenger of ferry boats or rescue and relief operation boats.

Table 2.1.
No. Of Flood Prone Blocks In Each Subdivision, Places Suitable For Landing Of Helicopter, Camping Sites, Government Flood Shelters, Places Need Special Attention And Suitable Places For Air Dropping Of Relief Materials

Subdivisions	Midnapur Sadar	Kharagpur	Haldia	Jhargram	Ghatal	Tamluk	Contai
No. of blocks prone To flood	04	08	03	05	05	06	12
No. of places Suitable for landing of helicopters	09	36	NA	09	14	15	38
No. of camping sites	55	70	NA	54	94	48	59
No. of govt. flood Shelters	02	01	NA	NA	07	06	NA
No. of vulnerable Places and Sluices on Embankment need special attention	03	09	18	05	23	09	40
No. of places suitable For air dropping of Relief materials	11	21	03	26	17	05	29

Source: Annual Action Plan for Combating Flood Situation, Office of the District Magistrate, Midnapore.

From the above table we can find that as a part of preparedness and risk mapping carried out by the district

administration. The table shows the number of flood prone blocks and further down below the number of vulnerable places and sluices identified as greater accuracy. The table reflects the preparedness of the district to the natural calamities by identifying the places for landing of helicopter, camping sites and places suitable for air dropping of relief materials in cases of extreme emergency. However, the flood shelters in the district are not made matching with the number of vulnerable places to the disaster. For example, in Kharagpur subdivision there are 8 flood prone blocks but only 1 flood shelter is available¹⁰.

Thus we find that the district has a well-formulated policy guideline as well as an administrative set-up for disaster management. We should now try to see whether this policy is implemented in actual disaster situation and how far these help those people who are in the receiving end.

¹ Sharma V.K. (1992), *Natural Disasters*, pp.79.

² Prasad PVV (1991), *Natural Disaster and Health: A Case study of A village affected by Andhra Pradesh Cyclone In 1990*, Unpublished Dissertation presented to Jawaharlal Nehru University.

³ Document: "Scientific and technical committee of IDNDR", Dept. of Agriculture (1992).

⁴ *ibid.*

⁵ South Asian Regional report on natural disaster reduction, Yokohama, Japan (1992).

⁶ Sinha D. K. (1992), *Natural Disaster For Nineties: Perspectives, Aspects And Strategies*, pp 3-68.

⁷ *ibid*

⁸ *ibid*

⁹ Directorate General of Health Services (GOI), 1992, *Guidelines of DGHS for Flood & Drought* pp. 13-27.

¹⁰ Office of the District Magistrate, Relief Department (1998), *Annual Action Plan for Combating Flood situation*, pp.1-73.

CHAPTER III

MITIGATION OF NATURAL DISASTER AND PEOPLES PERCEPTION

The previous chapters discussed the probability of natural disasters in West Bengal. They also discussed the preparedness of the governmental machinery at their various levels from union government to district administration. The government policies that deal with various types of disasters were also discussed.

The present chapter presents a discussion on a specific disaster, which had hit some villages in Orissa and West Bengal in the afternoon of 24th March 1998. In this context, an analysis of the compatibility of the government machinery to tackle the emergency situations, in concurrence with the earlier mentioned policies, is called for. It also becomes important to take people's perception into account to verify the efficiency and suitability of disaster management operations carried out by various agencies, including governmental and non-governmental organisations.

THE VILLAGE

A preliminary introduction of the village Sarta, which has been selected as the study area for the purpose of the study, has already been dealt with in the previous chapters. In the present chapter the infrastructure facilities and other details concerning this village are being discussed at length. Buses serve as the main public transport for these villages and the small hamlets. But due to poor frequency of bus services and lack of adherence to the timings, people rely more on their own feet or on bicycles to go from one place to another. For the transportation of heavier goods like paddy

sacks, they use trolleys or vans. These are used at times for transporting people too.

Inside the village all the roads were kutcha before the tornado struck but after it had, the main road, which passes right through the village was repaired. This work was carried out using bolder to facilitate smooth passage of incoming vehicles for rescue & relief operations and other purposes. An equal number of houses lie on both sides of the road. The tornado destroyed almost all the houses on the northern side of the road as they fell on the path of the high-speed whirlwind. The houses on the southern side of the road sustained very little damage.

Village Profile: *

Area (ha)	179.56
Number of households	161

**Table No.3.1
General Population Table**

S.No.	Categories	Total	Male	Female
1.	Population	912	467	445
2.	Age 0-6	171	83	88
3.	S.C.	11	6	5
4.	S.T.	116	55	61
5.	Literate	475	304	171

*(Census 1991, GOI.)

Castes and Sub Castes in the Village - Their Titles

General castes: Brahmin: Misra.Baisnab: Das.

Other Backward Classes: Raju: Jana, Pal, Giri, Patra, Maity, Nandi, Dutta, and Singha.

Napit: Barik.

Schedule castes: Dhobi : Shit. Tanti : Bera, Raul.

Schedule tribes: Murmu, Tudu, Hansda, Hembram, Baski, Mandi, Kisku and Soren.

Electricity and Water Supply

Power supply is not yet available to the village. Sonakania village has received the electricity very recently. There is no regular water supply (drinking or otherwise) to the village. As a result the village solely depends on tube wells for drinking water. The tornado badly damaged and uprooted most of the tube wells that existed. Apart from these tube wells, there are about 50 small and medium sized ponds in the village. These are mainly used for the fish culture, for bathing, washing clothes and some times for irrigating the small agricultural land holdings in the vicinity. The villagers never use these tanks for drinking water.

Public Distribution System (PDS)

The nearest Public Distribution Shop is in Sonakania. The supplies of rice and kerosene oil are regular but the supply of sugar is irregular. The quantity distributed per head is insufficient. Generally people in this area are very particular about taking kerosene oil and sugar from the PDS. Barring a few, most people are not keen on taking rice, as the quality of rice is generally poor. The consumers of rice through PDS are mainly people without agricultural land or with very little rice production. Otherwise people consume rice cultivated in their own fields.

Telephone and Postal Services

There is a small post office situated at Sonakania village. However, telegrams can only be sent from the post office at the sub divisional town of Dantan. This village does not have any telephone facility. A field telephone was installed in 1993, which has remained unserviceable throughout.

Health Services

A health service network exists in the block. The population of Dantan block is 129672 persons as per the 1991 census, which has now gone up to 148000 (Authority, BPHC Dantan). One Block Primary Health Center (BPHC) caters to the health needs of the whole population. This is located at Dantan and two Primary Health Centers (PHC) function under it. One is in Rajnagar (towards Belda), and the other one is at Bhundi (8 Kilometers) away from village Sarta towards Mohanpur. There is a sub-center at Sonakania, which is operated by a female Multi Purpose Worker (MPW).

The BPHC at Dantan is a 15 bedded hospital. The availability of the hospital staff is:

Doctors-	2
Nurses-	4
Laboratory assistant-	1
Clerk-	1
Safaiwala-	2

According to the Chief Medical Officer, there is always a pressure on account of in-patients over the capacity of the hospital. As a result, about 25 patients are accommodated at a time, with great difficulty, through the year. The visits of out patients are also high at this BPHC. On an average two doctors attend to about 80 to 100 patients on outdoor days. Once a week, doctors and other staff, devote their time for various family planning activities. No ambulance facility is available at the BPHC.

Both the PHCs under this BPHC are non-bedded. They are operated on specific outdoor days and in case of emergencies. The works of the MPWs are scheduled as per the following routine:

Clinic day-	1
Meeting day-	1
Field days-	4.

In the study village there is one Community Health Guide (CHG), who is authorised to administer common medicines for small cuts or scars, insect bite etc. In addition to these, he also detects leprosy and TB, advises people on taking medicines and family planning and also bandages wounds.

Though there is a presence of health service system in the area, the people of the study village are unable to avail of this facility. 62.5 % of the respondents insist on visiting local Registered Medical Practitioners (RMPs) for minor health problems as pointed out in Table No.3.2 below. The reasons pointed out by them for not availing the government health service system and visiting RMPs are that they are:

- more accessible,
- available in odd hours,
- medicines administered by them are cheaper.

Table: 3.2
People Availing of Health Care System for Minor Health Problems.

People Visiting	Number	Percentage
RMP+ Homeopath	50	62.5
Village CHG	6	7.5
BPHC Dantan	6	7.5
BPHC Baragaria	8	10.0
Do not go (go only when problems become intolerable)	1	1.25
PHC Bhundi	4	5.0
Private practitioners (MBBS)	3	3.75
Ayurveda	2	2.50
Total	80	100.0

Source: Data Collected from Field.

On the other hand the government health centers are far from the village, generally people have to buy the prescribed medicines from the open market.

At the same time, in case of major health problems, respondents prefer visiting PHCs, which is evident from table 3.3. About 75% of the respondents prefer nearby PHCs as they find the PHCs offer:

- good treatment in serious cases,
- treatment is more reliable and
- in some cases due to acquaintance with hospital staff, a few medicines are available free of cost.

However, the PHC in Orissa is preferred to the BPHC at Dantan as the BPHC is far from the village, few medicines are available and the hospital is too crowded.

On the other hand, the PHC in Orissa offers:

- better treatment,
- cleaner environment, and
- well-behaved hospital staff.

Table No.3.3
People Availing of Health Care System during Major Health Problems.

People Visiting	Number.	percentage
RMP	8	10.00
BPHC Dantan	15	18.75
BPHC Baragaria	45	56.25
Nursing Home Or Private Practitioners (MBBS)	6	7.50
Midnapore Or Calcutta Hospital	6	7.50
Do Not Go	0	0.0
Total	80	100.0

Source: Data Collected from Field.

Primary and Secondary Schools

A primary school exists in an adjacent hamlet to this village called Sabraping. The school facilitates the education of both girls and boys up to class IV. This school has 75 students and 1 teacher. Before the tornado the school building had walls made of mud and had tin roofing. Another primary school is available in the Panchayat at village Sejua. The number of students studying in this school is about 140. There are two teachers available to teach the students. For higher education, up to the secondary level, students of this village have to go to Sonakania village, where separate higher secondary schools for both girls and boys exist. The nearest college is in Dantan town.

Mid day meal schemes are available to both the primary schools of the village. Officially each student is entitled to 3 Kgs of rice per month, but they receive 3 Kgs of rice only once every 2 to 3 months. The quality of rice is usually poor.

The average literacy rate in the village is high. Average schooling years for males are 6 and for females 4 years. People do feel that after the total literacy campaign carried out in the district in 1991-92, some adult illiterates did receive education.

There was a center for Adult and Continuing Education in the village before the tornado, but has been discontinued since.

Irrigation and Agricultural Facilities

The village is situated about 40 kilometers away from the seashore of Bay of Bengal. The geographical location of the village is quite adverse as far as surface irrigation is concerned. Though the river Subarnarekha is flowing only 3-kilometer s away from the village, except during monsoon, the river carries very little water, which is insufficient for canal irrigation. Due to the same reason, no canal has existed around these villages. As a result, the villagers largely depend upon good and timely monsoon rain for harvesting crops. A slight deviation from the natural monsoon always affects adversely the yield. Yet another problem with the river Subarnarekha, due to its lack of depth, is that the water overflows on both the sides of the embankments, whenever there is rush of water in the river after a heavy down pour around this area. The overflow of the water causes floods in the surrounding villages. The study village experiences both forms of disasters. In 1997 there was a mild flood, which caused heavy loss to crops but could not damage the houses much. In the following year, after facing the wrath of the tornado, as the shattered villagers hoped for a good monsoon, things did not come their way. In 1998 there was very less rain, that too untimely, affecting the crop yield once again. In 1998 the farmers could hardly grow crops that would be sufficient for their own subsistence. Alternative irrigation like deep or shallow tube wells are also not available due to the non-availability of power supply.

**Table No3.4
Economic Profile***

Occupation	Male	%	Female	%
Cultivation	163	17.87	--	--
Agricultural labourers	61	9.76	28	3.07
Manufacturing processing, servicing, repairs in household industries	02	0.22	--	--
All other household industry	04	0.44	--	--
Trade and commerce	07	0.77	--	--
Transport, storage and communication	03	0.33	--	--
Other services	14	1.53	01	0.11
Non-worker	213	23.35	416	45.61

Total population: 912.

**(Census 1991, GOI).*

From the census data in Table 3.4 we find that about 17.87% of the total population is engaged in agriculture and about 9.76% are agricultural labour. As people in this region are heavily dependent upon agriculture, due to non-availability of irrigation facilities, they insist on one time sowing of seeds a year during the monsoons only. Thus they are engaged in their profession for 4 to 5 months in a year and insist on part time and makeshift occupational activities. From Table 3.5 we can see the break up of main and part time occupational activities taken up by the study sample.

Table 3.5
Breakup of occupational activities of the respondents

Occupation	No.	%	Part Time Occupation	No.	%
Unemployed	03	3.75	--	--	0.0
Cultivation	43	53.75	Private Money Lending	03	6.97
			Daily Wage Labourer/ Head Load Worker	22	51.16
			Cow Trading	03	6.97
			Rice Trading	04	9.30
			Others	04	9.30
			Self-Employed: Rickshaw Puller, Provision/ Sweet Store, Cow/ Rice Trading, Barber, Etc.	25	31.25
			CHG	01	4.0
			Cultivation	08	32.0
			Others	--	0.0
Govt./ Private Service	09	11.25	Business/ Cultivation	06	66.67
			Tution	03	33.33

Source: Data Collected from Field.

** As All The Respondents Do Not Opt For Part Time Occupation, There Is A Difference Between The Numbers Of People In Main And Part Time Occupation Categories*

From this table we find that 53.75% respondents of the village are engaged in agricultural activities compared to 31.25% who are self-employed. 36 respondents out of 43 (83.72%) engaged in agricultural activities seek part time employment. The most advantageous group in the village seems to be people in the service sector, as all of them are engaged in some secondary employment.

Table 3.5 (A)
Availability of Daily Wage Work in the Lean Period of the Year

Days of Work	No.	%
10-12	18	81.82
15-20	04	18.18
Total	22	100.00

Source: Data collected from field.

From table **3.5 (A)** we can find that out of 22 people of cultivation category who seek part time employment as head load worker or daily wage labourer only 18.18% get employment for 15-20 days in a month during the lean months of cultivation. Otherwise a majority of such group, i.e., 81.82% get employment only for 10-12 days during the same period.

From the data analysis of these two tables there is a clear trend of underemployment in the specified study area that highlights the urgent need of creating the income generation activities and employment opportunities. As a result of underemployment, the income levels of people in the villagers very low.

Income

From the table **3.6** we get the glimpse of the income levels of the fully destroyed and partially destroyed category people in the study area. From the table we find that 56.37% people of fully destroyed category and 52% people of partially destroyed category have income below Rs. 1000 per month. As it is evident from this table, 72.5% of the total respondents live Below the Poverty Line (BPL). People with the monthly income of Rs.1500/- are considered as living in BPL.

TABLE-3.6

INCOME LEVELS OF RESPONDENTS OF FD* AND PD
CATEGORIES**

S.NO.	INCOME GROUP (AMOUNT IN Rs.)	FD CATEGORY		PD CATEGORY		TOTAL	
		NO.	%	NO.	%	NO.	%
1	NIL	1	1.82	1	4.00	2	2.50
2	<500	8	14.55	1	4.00	9	11.25
3	500-1000	22	40.00	11	44.00	33	41.25
4	1001-1500	11	20.00	3	12.00	14	17.50
5	1501-2000	4	7.27	1	4.00	5	6.25
6	2001-4000	5	9.09	4	16.00	9	11.25
7	>4000	4	7.27	4	16.00	8	10.00
8	TOTAL	55	100.00	25	100.00	80	100.00

*FD=FULLY DESTROYED

**PD=PARTIALLY DESTROYED

Source: Data Collected from Field.

Housing Condition

Before the tornado struck the village, only 7 to 8 houses out of 161 houses in Sarta village were of pucca construction with concrete roof and the facility of toilet and latrine within the premises. The other houses were single or double storied, had walls made of mud with varying types of roofs, like straw, tiles, tin, asbestos etc. Table No. 3.7 shows that 77 respondents out of 80 (96.25%) were living in either single or double storied mud houses.

Table No. 3.7
Table Showing Housing Condition of Respondents before Tornado

Condition Of The House	No.	%
Thatched House	00	0.0
Single Storey Mud Wall with Straw/Tin/Tiles/Asbestos Roof	44	55.0
Double Storey Mud Wall with Straw/Tin/Tiles/Asbestos Roof	33	41.25
Single Storey Pucca House with tiles/Tin/Asbestos Roof	01	1.25
Single/Double Storey Pucca House with Concrete Roof	02	2.50

Source: data collected from the field.

Experience Of the Villagers of Tornado

On 24th March'98 since morning the sky was cloudy but it never rained. In the afternoon, the temperature rose considerably it was calm all around; it seemed to be a presage of a heavy thunder squeal still the daily life of the villagers were going on as usual. Around 2.45 p.m. people watched a dark cloud in the western horizon. The elderly and experienced people warned the younger to remain indoors. The storm came suddenly and passed through the village virtually before anybody could understand it's intensity and it reduced half of the village in to rubble. According to eyewitnesses, initially there was a dark cloud with bright gold coloured lining. Suddenly they heard a deafening sound as if a number of aeroplanes were flying passed the village at a low altitude while some others thought that a train has got derailed and was coming towards the village making a huge sound. It was an unprecedented experience; the experience so terrible that can never be imagined by any one. The people who were severely injured described the situation as if they found as if they were flying and lots of pieces of bricks

were being poured over them suddenly. Some of them were even slashed against the tree or thrust in to a wall. People who have entered their houses after listening to the high pitch sound of the wind experienced that the roofs were flown away by the wind as if they were bits of paper. Many of them found themselves buried underneath the collapsed wall with in no time. While interviewing all the respondents and their family members, they said that to protect themselves from the high speed whirlwind they rushed into their houses or ducked themselves behind the walls. In all the cases they were in the erect position and were never lying down. Experts' opinion and observation showed that lying down on the floor or on the ground is an effective measure to be saved from being sucked in the whirlwind of tornado. However, people had no idea about it. Little awareness about dealing with such situations could have averted many casualties. People those who were fairly near to the whirlwind had experienced that the flow of wind was very hot, some did see a vortex or funnel like cloud touching the earth and moving forward. The direction of the wind was from southwest corner to northeast corner. All three of these are a characteristic of a tornado. The high velocity of the wind lasted only for 30 seconds or so around this particular village. And the total duration was about 4 minutes (IMD Calcutta) from its beginning to the end.

The Analysis of Post Disaster Actions of the Village Community, Voluntary Organisation and Government Functionary with Time as A Variable

Immediately after the disaster the people who were affected were so puzzled that it took them a long time to realise what had

happened to them in such a short span of time. The first hand experience of such phenomena is provided by Mr. Prafulla Patra a part time college lecturer and social worker of the village. According to him the people were so puzzled that they even forgot to initiate any movement to recover the near relatives or the valuable buried under the collapsed houses. They could not even cry. Only there was the screaming of the wounded. He reached to the scenario very soon and looking at those he himself was so puzzled that he could not initiate any work of recovery.

The first action of retrieving the people from underneath the rubbles was started within half an hour. The youths of nearby unaffected villages, the villagers of the less affected area of village and the others who were not there at time the disaster rushed towards the village and started the recovery work. Initially there was no coordination among the people working at the scene of disaster. Again it was felt that there was a lack of training while dealing with such adverse conditions. As a result the people who were volunteering in the recovery work could not exercise it with greater efficiency. The same thing has been echoed from the statement of the village social worker. According to him, initially many people converged at the place of disaster to help out the distressed but were only running around doing no significant recovery work. Some more people who rushed to the disaster site later on were not so traumatised and so were able to initiate some recovery work in systematic ways. Among the volunteers some stood at the main road at Sonakania and started directing the passing vehicles towards the affected villages so that they could take the wounded to various

hospitals. As the tornado was followed by a brief but heavy spell of rain the recovery work became more difficult. Due to the falling of the broken trees blocked the Kutcha roads inside the village. Virtually it was impossible for the vehicles to reach up to the core of destruction. Understanding the necessity some people started clearing the roads by cutting and removing these broken trees. The process of carrying the wounded to the vehicles was also chaotic. No one had any basic idea as to how to handle the injured people. Case report no. 1 had a sever injury in his hip joint, hand and shoulder and was carried by the enthusiastic volunteers in such a way that he got even more hurt while being carried to the vehicle.

The reaction of the BDO was spontaneous, and immediately after receiving the news of the disaster he had send four officials from his department to assess the actual situation. The gravity of the disaster, that was confirmed very soon as the people from the disaster hit villages were being carried to hospitals in front of the BDO's office. Immediately after that, the BDO had to take a series of actions like procuring dry food for the immediate relief from the local market, sending the message of disaster to the district head quarters at Midnapore by telephone, asking officer-in-charge of the sub-divisional police station to send the forces to the site of disaster to maintain the law and order. It was also required to arrange for vehicle to send tarpaulin sheets to the site for the temporary arrangements to provide shelter to the homeless. BDO himself had visited the Sarta village at 8 PM. The victims were supplied with dry foods like Chira (Bidden rice), Gur (Jaggery), Biscuits etc. around the same time. About 200 sheets of tarpaulin were send to the study

village in the same night. Assessing the situation quick messages were sent to the district head quarters, in turn to the state head quarters at Calcutta to send further help in respect of food and food grains, tarpaulin sheets, medical manpower and medicines, monetary sanctions etc.

The urgent needs of the first day were to arrange for the drinking water and the rescue of the people at night. However, both the things could not be arranged in the same day, as Dantan sub-division town did not possess any facility of tank for carrying drinking water or heavy generator set for the arrangement of the flood lights in the village. Both the things could be arranged only on the next day. The supply of the drinking water through tankers was not sufficient. Local medical team also visited the village in the same evening, they referred the severely injured people to the hospitals and the people with minor injury got the treatment. 4 dead bodies were retrieved from the debris, within five hours. They were medically checked by the visiting medical team and were cleared for the cremation. Under the prevailing condition, building temporary camps was very difficult, as there was shortage of wooden poles or bamboo sticks. However, the majority of the affected people, particularly the women, children and elderly people, were accommodated in their relatives' houses. The unhurt and able people were busy in searching the fellow villagers from the debris and safe guarding their left over properties.

To support the rescue operation 16 ambulances, 30 trucks, 15 trekkers, 45 small vehicles and other transport means were pressed into the service. In total 200 people were rescued from the debris¹.

The following days were very hectic. As this phenomenon was uncommon and had left most dreaded mark of destruction, it was caught in the media hype. The reporting of the disaster in the national and local newspaper was very high. It has been estimated that the local newspapers had spent about 15-30% of their front-page space on reporting the news of tornado. The same thing had happened to national newspapers also. As a result there were a great convergence of people of various types, starting from the national and state level ministers, administrators, voluntary agencies, local volunteers, casual visitors and curious onlookers. To maintain the law and order situation and to assist in other emergency activities a battalion of eastern frontier rifles were called.

Rescue operation was completed by the evening of the next day. However, as a support to the various relief operations the floodlights were installed, and it came out to be a great help for the disaster victims. According to them, the arrangement of the electrical lights helped them psychologically to recover from the horror of the devastation. The children of the village were virtually suffering from a fear psychosis of the high-speed wind. The availability of the electrical lights at night worked as an immediate support to be relieved from such fear (Case study no.8).

To control any out break of epidemics, the government machinery concentrated on two key issues. Making available potable water and cleaning the environment with providing sanitation facilities were the targeted issues. The public health engineering department was mobilised immediately to restore the

available and workable spot sources by disinfecting them. At the same time for emergency requirement water was supplied in the water tanker in a small volume. The dead livestock were removed and disposed off within the 3rd day. Removal of debris and cleaning of ponds was taken as the next measure, but non-availability of the skilled and trained labour was a major constraint for a quick restoration work. Which made the cleaning operation of the ponds and the surrounding village more delayed.

The NGOs were permitted to serve in the area with prior permission of the District Magistrate (DM). Some of the well-known NGOs like Rama Krishna Mission, CARE, CASA, Luthera etc. started their work on the 3rd day after the disaster. RK Mission opened a gruel kitchen and served meals to the victims, they also provided kutchra latrine to all the destroyed houses in the village. CARE had supplied 750 units of household items which include Hurricane lanterns, mosquito nets, plastic mats, cooking and other utensils like thali, bati (small container), glass etc. They also promised to give an assistance of Rs.7000/- to all the fully destroyed category houses. Luthera initially distributed food items like chira, gur, biscuits and other dry foods, then promised to provide house building raw materials like cement, twisted rods etc. CASA and Marwari Sangha distributed child garments, blankets, buckets, etc. However, no NGO was permitted to work independently. For the distribution of foodstuff, garments or any other household items the NGOs had to go by the identification made by the local self-government. In case of small NGOs, local clubs or business associations the same rule was applied. All such assistance were pooled together

and distributed to the people with the help of local volunteers under direct supervision of Panchayat members.

Though government administration responded to the situation quickly (within 4 hours) but for the first two days the supply of relief materials was inadequate. From the third day relief materials like tarpaulin sheets, sari, dhoti, lungi, children garments, blankets, food materials like chira, gur, rice, milk powder, dal, etc. were distributed. Apart from that kerosene oil, edible Refined Vegetable (RV) oils, cattle feed/green fodder/paddy straw was also distributed².

However, the village wise breakup of the distributed materials was available neither with BDO's office nor was it traceable in the DM's office. As a result, the distribution of such relief materials per family in the affected village could not be cross-checked with the information provided by the villagers.

Distribution of Relief

As it was mentioned earlier that all the relief materials were distributed to the affected people after identifying and categorising them by the village committee under the direct supervision of the Panchayat members and the BDO. According to the BDO special care was taken for ST and socially & economically weaker classes at the time of distribution of the relief. While distributing the rice, dal, edible oil etc. people were asked to come to the place where these were being stored. In the cases of distribution of garments, blankets, utensils etc. the volunteers used to carry the items to the houses of the people. The decision regarding the quantity to be distributed was taken by the village committee, which was consisted of 21 people of the

village. The decision of the committee was to distribute the relief materials as well as the house building grant to all the houses equally. Unlike other villages, in the study village every household was given a grant of Rs. 2000 irrespective of the damage sustained by the houses.

At the time of collecting the data in both the phases, lots of complaints were received particularly from the people categorized as fully destroyed. According to them the decision of distributing all the relief materials equally was an irrational decision and such decision was taken under the political pressure. The interview with two respondents who were the members of the Relief Distribution Committee, named, Mr. Lasa Murmu, a tribal said that he was not consulted while taking the decision and another person Mr. Mritunjay Sinha (case report no.1) revealed that he did not agree with this decision and consequently, due to the development of conflict resigned from the committee's membership. Both these respondents had argued that the extent of the damage to fully destroyed category people was much more in comparison to the people of the partially destroyed category. The people of FD category had lost all their belongings in addition to their houses. This needed greater help from the external world to bring back the life to normal. This was not the case for PD category people.

When asked about the decision of relief distribution to former Sabhapati of PS, he replied that the tornado was followed by a 'hailstorm', which damaged all the houses of the study village as well as some nearby villages and the extent of damage was equally grave as the houses damaged in tornado. This prompted the committee to take such decision. However, the



PIC: 3-A. B FULLY DESTROYED HOUSE.



PIC: 3-B. PARTIALLY DESTROYED HOUSE.

observation of the partially damaged houses could not agree with the statement offered by former Sabhapati. Picture 3-A and 3-B would give the evidence of damage sustained by two different categories of people.

The view of the above mentioned respondents were supported by all the respondents of the FD category respondents (table 3.8). Even 20 percent of the respondents of PD category also thought that there should have been some difference in the quantity in the relief distributed between the two categories. In the PD category people argued that the distribution of relief in an equitable manner was justified, as they were equally poor as the FD category people.

Table 3.8
Remarks on distribution patterns of relief by FD and PD category people

Category	Distribution of relief was rational	No.	%
FD	Yes	--	--
	No	55	100.0
PD	Yes	20	80.0
	No	5	20.0

Source: Data Collected from Field.

Though as high as 60 percent of the FD category and all the respondents of PD category had agreed to the point that the quantity received by them was sufficient yet a considerable percentage of them-> 40 percent have expressed their discontentment about this issue (Table 3.9).

Table 3.9
Remarks on quantity of relief received

Category	Is sufficient	No.	%
FD	Yes	33	60.0
	No	22	40.0
PD	Yes	25	100.0
	no	--	0.0

Source: Data Collected from Field.

Corruption, Irregularities and Mismanagement

On 30th march many local newspapers reported about the irregularities and corrupt practices in the distribution of relief. The reports were mainly coming as the relief materials were being distributed to the people of the villages, which were not affected by the tornado. Houses of Sabraping, Janadihi etc. have received two pieces of tarpaulin sheets, two Kgs of rice, 500 gms of dal and 1 liter of RV oil per head in the first week after the disaster. Few people also received utensils and household items like mat, lantern etc. meant for the people of disaster hit villages, supplied by the NGOs.

The local political leaders argued that the surrounding villages of the study village were considered equally affected as they suffer from a hailstorm. The government administration revealed that such decisions of distributing relief materials to the unaffected villages were politically motivated. Otherwise the people of unaffected villages did not deserve.

Irregularities in the distribution of relief within the village were also found, which have been discussed earlier. In the pilot phase of the study, in an informal interview, the Deputy BDO informed that out of 20,000 pieces of tarpaulin sheets, which they have received following the tornado, could not be fully

distributed even after 6 months of the occurrence of the tornado. In the store of BDO's office still 5000 pieces of such sheets were lying and they were gradually being distributed to the other villages within the block. At the same time in the disaster hit village it was witnessed that the people, those who were living in the thatched houses were really in need of tarpaulin sheets in order to cover their houses from rain. The attitude of the local community leaders was indifferent towards such pathetic condition of the people. They replied that the disaster victims already had enough relief and as such do not require any thing more. The same thing was repeated in the distribution of tin sheets, which was used for roofing. Four such sheets were given to the FD category houses and two sheets to the PD category houses irrespective of the damage suffered. Observation of the houses during the collection of the data, found that there were some houses in the PD category those who had suffered no damage at all; the tin sheets received by them as relief were still lying idle at the side of the wall. On the other hand the houses of FD category were in the acute need of the roofing materials.

The rehabilitation in housing sector has also been adversely affected by the mismanagement in dealing with pre and post disaster situations. A prior training about the concept of cost effectiveness and resistant housing to disaster of disaster managers could have avoided or atleast minimised such miserable suffering of a considerable number of people.

From all these discussions and analysis of the dynamics of the disaster relief the it can be stated with out doubt that though there may be a well laid administrative setup and infrastructural facilities, the response to the disaster may be made more

prompt; the materials supplied to the victims may prove to be sufficient both qualitatively and quantitatively but owing to the absence of right morality or direction, the whole system of management becomes dysfunctional. The situation gets worsened particularly in the case when the disaster managers are found to be driven solely by their own vested interests leaving the disaster victims helpless and with sheer mental stress.

An Analysis of After Effects of the Tornado

The tornado has brought a great change in the overall scenario of the village. Apart from instilling fear of high-speed wind in the minds of the villagers, it brought a sudden change in the infrastructure and housing condition of the people in the village.

Change In Infrastructure

(A) Roadways

As the tornado had demolished most of the material possessions of the villagers, the government had to take initiatives of restoring the normal way of life of the disaster victims. The first in this was taken as repairing the main Kutccha road of the village. Within two days of being struck by the disaster, the road had to be repaired to facilitate the incoming vehicles, which were helping in the relief operations. It was also confirmed by the Public Works Department (PWD) functionaries that they were instructed to repair the road within the village as well as the main metallic road leading to the village on war footing as large number of VIPs who were visiting the area. A temporary helipad was prepared overnight in open field

near the village by using bricks, sand and cement as flooring material.

(B) Drinking Water

In the tornado the drinking water facility in the village was badly hit. Most of the tube wells were damaged while instructions were issued not to drink water from remaining tubewells till they are not disinfected. The people were virtually running short of drinking water. To tackle the situation the BDO had arranged water tankers temporarily. However, it took eighteen hours to make such arrangements. Dantan, being it a small sub-divisional town it was very difficult to arrange for the drinking water in such large volume to supply to all disaster hit villages under this sub-division. As a result of that the administration had to take a prompt step to restore the proper availability of it by digging new tubewells. Within a week the first tubewell was dug and the entire study village was allotted with 17 such tubewells. The expenses for digging of the tubewells were met from the development fund of Jilla Parishad. UNISEF also funded some of the tubewells. To install all the tubewells it took about one month.

During the collection of data for this study, severe discontentment about the selection of the site for new tubewells was witnessed. According to the respondent (case study no.10) the tubewells had been installed in the places, which were convenient for the influential people of the village. During the study it was observed that there is a concentration in tubewells in some of the pockets in the village. In a particular case it was found that there are 3 tubewells in the vicinity of a house, which

belonged to a person close to the former sabhapati (chairperson) of the Panchayat Samiti, who is also a resident of the village. While inquiring about the installation of the tubewells from the BDO, he replied that such installations were made on the recommendation by the village committee. One of the village committee member (case report no.1) revealed that, though the committee was involved in the decision making for the selection of the sites for new tubewells, was more a decision of the sabhapati. Case report no.7 said that despite repeated request for the installation of a tubewell near her house with an argument that 10 more houses would benefited, but the request was not entertained because of the political enmity between the family and the ruling party. The sabhapati too could not provide a reasonable explanation for such haphazard installations and defended himself saying it as propaganda made by the people of other political ideologies against him.

It shows that there was political motivation behind choosing the sites for installation of tubewells and they were not uniformly distributed all over the village.

(C) Primary School

The primary school, which was situated in the adjacent hamlet, was completely destroyed in the tornado. Government gave the priority on reconstructing a pucca structure of the school building, and accordingly fund was sanctioned. At the time of final data collection the construction of the school building was almost completed.

(D) Health Services

In the disaster the number of casualties were very high. In the study village there were cases of instant death, about 50 people were severely injured and other 300 people sustained minor to moderate injuries. As a result, the district as well the state administration had to take immediate actions to deal with this uncalled situation. Two control rooms were set up, one at district headquarters and other one at the office of the state administration at Calcutta for proper transaction of information regarding casualty and the activities of relief. Instructions came from the state administration to keep the emergency ward open for 24 hours in the hospitals of Belda, Nekurseni, Kharagpur and Midnapore with the arrangement of additional doctors. Arrangements were made to meet the requirement of medicines by the wounded and suffering. Special care was taken for old women and children. A medical team consisting of 5 doctors and 20 nurses was sent to the disaster-hit area who were to attend the victims at their house itself.

According to the victims the treatment given by the visiting medical team was of a great help at the time of severe mental stress. Two case studies (no.5, 8) can be referred to over here to throw light on the issue. According to no. 8, after the tornado struck his house, 6 members were injured and wife was died and 3 of them were taken to different hospitals. Back at home he was quite shocked was facing severe mental stress. The next day, when the medical team arrived, he received medical as well as psychological help. The next case, study no.5, was a tribal who had always reluctantly reached for a doctor only when his condition became severe. It was because his poverty did not

allow paying a doctor for minor illness but this time he was happy and contended by the service provided by the visiting medical team. His one-year-old child suffering from diarrhea got the treatment although it was an effect of the disaster.

In table 3.10 we can see that of all the respondents who had received the various services of the medical team at home, more than 80% got some psychological support after consulting the medical team; about 30% received treatment which was not related to the tornado.

Table 3.10
Service received from visiting medical team

Service received	No.	%
Treatment with medicine	50	62.50
Only injury treatment	07	8.75
Psychological advice	65	81.25
Treatment of suffering not related to disaster	24	30.00
Not received any service	--	0.0
Door to door service	80	100.0

Source: Data Collected from Field.

In almost all the cases of minor injury medicines were distributed free of cost. Apart from this all the people of the village were supplied with water purifying tablet, bleaching and lime powder to prevent the outbreak of an epidemic.

In a case study no.11 both, the respondent and her husband were severely injured. The respondent had her left eye damaged and scalp fractured. Her husband had received injury in his right hand, which is not yet in a workable condition. About the treatment of his right hand a specialist doctor in Calcutta had suggested that he should under go an operation which

would cost about Rs. 8000-10000/-. However, the respondent is unable to bear such huge expenses. As a result of disabled right hand his rice business is being affected. At that point the respondent had strongly argued for the physical rehabilitation of the severely injured people particularly those who are the sole bread earners of the family. The case studies done in the tornado hit village shows that, when the health services are offered by the government, which are accessible to the people, all walks of life make use of such services. About 30% of total respondents and those, who were severely injured and had to undergo special treatment, used government offered health services at various hospitals. On the other hand only 5% people approached private hospitals and nursing homes. The table 3.11 shown below reflects this trend.

Table 3.11
Treatment Accepted From Various Sources After Tornado

Treatment taken from	No.	%
RMP + Homeopath	--	0.0
PHC Dantan Or Baragaria	2	2.5
Govt. Hospital Midnapore, Belda, Raniswari, Chandmari (Kharagpur)	22	27.5
Local Nursing Home	3	3.75
Hospital Or Nursing Home , Calcutta	1	1.25
Nil	52	65.0
Visiting Medical Team	80	100.0

Source: Data Collected from Field.

Almost all the respondents of the village asked for the establishment of a health center near to or within the village which could have facilitated them with an easy and quick approach, but the officials of the government did not heed to their appeal. In turn the village is provided with a community hall spending more than Rs. 200,000/-, which is of not much use. This shows that the preferences of the disaster victims were

not given much importance, but the decisions were taken as per bureaucratic whims.

Change in Housing pattern

Rehabilitation of housing was viewed as the most serious problem after the disaster. As mentioned earlier more than 50% (84 out of 161) of the total houses in the village was fully destroyed. The people felt that solving this problem would help them to return to normal way life. From table **3.7** we can deduce that 96.25% people were staying in either single or double storied mud wall houses before the disaster. Rest 3.75% had either single or double storied pucca houses. After being hit by the tornado, there has been a sudden shift in the housing pattern in the study area.

From table **3.12** we find that before the tornado out of 55 people of Fully Destroyed (FD) category, 54 (98.18%) were staying in Kutcha houses. After the tornado a sudden shift in the housing pattern from kutcha to pucca houses can be observed. About 69.1% people tried to construct pucca houses of different patterns. However, most prominent feature towards this shift is that 61.82% could not complete the construction of their houses. At the time of the final collection of the data, that is about 11 months after the disaster had hit the village all occupants of such houses were living in small, lowly build thatched houses as temporary arrangements.



PIC : 3-C. INCOMPLETE HOUSE.

Table 3.12.
Comparison between Earlier and Present Housing Condition of the
FD Category People

Old	No.	%	Present	No.	%
Thatched House	--	0.0	Permanent Thatched House	--	0.0
			Mud wall Single Storied With Tin/Tiles Roof	--	0.0
			Temporary Thatched And Incomplete Pucca	--	0.0
			Completed Pucca	--	0.0
Single Storied Mud Wall With Straw/Tin/Tiles/Asbestos Roof	54	98.18	Permanent Thatched House	03	5.45
			Mud wall Single Storied With Tin/Tiles Roof	14	25.45
			Temporary Thatched And Incomplete Pucca	34	61.81
			Completed Pucca	03	5.45
Single Storied Pucca House With Tin/Tiles/Asbestos Roof	01	1.81	Permanent Thatched House	--	0.0
			Mud wall Single Storied With Tin/Tiles Roof	--	0.0
			Temporary Thatched And Incomplete Pucca	01	1.82
			Completed Pucca	--	0.0
Single Storied Pucca House With Concrete Roof	--	0.0	Permanent Thatched House	--	0.0
			Mud wall Single Storied With Tin/Tiles Roof	--	0.0
			Temporary Thatched And Incomplete Pucca	--	0.0
			Completed Pucca	--	0.0

Source: Data Collected from Field.

From the earlier table 3.5 we saw that more than 72% people in the village were living below the line of poverty. The sudden shift in the housing pattern and high expenditure in this account proved to be detrimental for the people with such low income. Data provided by the government officials reveals that 80 houses falling in the category of fully destroyed houses (out of 85 houses) were given assistance under Indira Awas Yojna (IAY) for the reconstruction of their houses. It is to be noted that all the 55 people, which made the sample size of the fully destroyed category do not lie in BPL (Below Poverty Line) and therefore, did not get the assistance under this scheme. Only 48 people of this



PIC : 3-D .
NEWLY CONSTRUCTED HOUSE OF A
RESPONDENT (CASE STUDY NO. 5)

category, who received such assistance under IAY, are included in the sample for this present study. When we look at the table 3.13 we find that about 71% people of the same group had spent more than Rs. 20,000 for the reconstruction of their houses. In 6 cases (10.91%), the extent of expenditure went even well over Rs. 60,000.

TABLE 3.13.
Table Showing Expenditure on Repairing/ Reconstructing House and Loan Taken By The Households Fully Destroyed In Tornado (Amt. In Rs.).

Expenditure	No.	%	Loan taken	No.	%
Nil	--	--	Nil	18	32.73
Upto 5000	7	12.73	Upto 5000	8	14.54
5001-10000	1	1.82	5001-10000	8	14.54
10001-20000	8	14.54	10001-20000	10	18.18
20001-40000	25	45.45	20001-40000	9	16.36
40001-60000	8	14.54	40001-60000	1	1.82
60000>	6	10.91	60000>	1	1.82

Source: Data Collected from Field.

On the other hand in partially destroyed category, 84% people have spent below Rs. 5000 for the repair of their houses. The expenditure of repairing house in one case has gone up to Rs.30000 because the respondent was interested to replace his partially damaged tiles and asbestos roof fully with the tin sheets.

TABLE 3.14.
Table showing expenditure on repairing/ reconstructing house and loan taken by the partially destroyed households in tornado (Amt. In Rs.)

Expenditure	No.	%	Loan Taken	No.	%
Nil	02	8.0	Nil	18	72.0
Upto 5000	19	76.0	Upto 5000	06	24.0
5001-10000	2	8.0	5001-10000	--	0.0
10001-20000	1	4.0	10001-20000	01	4.0
20001-40000	1	4.0	20001-40000	--	0.0
40001-60000	--	0.0	40001-60000	--	0.0
60000>	--	0.0	60000>	--	0.0

Source: Data Collected from Field.

With an absence of bank balance and any other rich source of income under the present condition the only option left for them was to take loans from private moneylenders. From the same table we can see that more than 67% people of the fully destroyed category have accepted loan ranging from Rs. 4000 to Rs. 70,000. Almost all the respondents who had submerged themselves under such big debts revealed that they were facing severe mental stress. The exit ways found by them were either selling off cultivable land or any other asset available with them. Yet another solution viewed by them is to make their children to drop out of the school. The girl child was more a victim of this situation because before a boy it is a girl who is dropped out from the school and sent to work somewhere as a housemaid (case study no.3)

It is an interesting fact at this point of time when the people were facing a severe mental stress and monetary crisis, they were keen on constructing pucca houses. The factors correlated with this sudden shift from kutcha to pucca houses can be attributed to a number of factors. One such important factor was the immediate relief offered by various NGOs as well as government undertakings. CARE promised Rs. 7000 ex-gratia for all the houses destroyed fully; CASA promised housing materials like twisted rods, cement sacks, etc.; HUDCO was interested in giving loans to economically weaker sections for the completion of their houses. So, people anticipated from these quarters and had hoped to complete the construction of pucca houses with support of such helps.

Another major factor which had motivated the people to go in for building permanent was the assurance given by the then

Sabhapati of Panchayat Samiti who had in turn been encouraged by such institutions as mentioned above and others as IAY. IAY suggests people to construct permanent construction of houses with the permanent tin or asbestos roofing. However, the decision regarding the material to be used for the walls depends on the beneficiary. The loan amount was proposed to be given in two installments. Second installment could be given only on producing the proof of purchase of raw materials for house building from the sum obtained under the first installment.

The third important factor which motivated the disaster victims to shift towards building pucca houses can be called as development of fear of staying in a kutchha house. From the table no.3.15 we can find that about 53% respondents had suffered injuries due to collapse of mud walls of their houses. The study area is prone to repeated cyclones and floods. As a result, the people those who have suffered such devastation did not want to again fall prey to such natural disasters.

Table 3.15
Table Showing the Causes of Injury during Tornado.

Cause Of Injury	No.	%
Wall fall	43	53.75
Dragged by wind	3	3.75
Fall of branches of tree	1	1.25
High speed flying objects	1	1.25
Any other cause	1	1.25
Nil	31	38.75
Total	80	100.00

Source: Data Collected from Field.

As the construction of houses hasn't been completed so far, people are unable to use the new houses. Number of rooms per family has been decreased and the quality of accommodation became inferior. The analysis of table no. **3.16** shows that earlier all the households with family size upto 4, 5-6, 7-8 and above 8 were not staying in single room accommodation. After the tornado 66.67% families of family size upto 4 have been forced to acquire single room accommodation. In the next higher categories, a shift is visible towards single room accommodation-66.67%, 11.11%, 25% and 25% in family size of 5, 6, 7 and 8 respectively. In the category of family size more than 8 no such shift is observed. However, from this table a general trend can be found in all the above mentioned categories of shifting from superior to inferior housing accommodation. The superiority/inferiority of the accommodation can be assessed by taking into account such characteristics as less spacious rooms and decrease in the availability of rooms resulting in congestion of in-house environment. Case study no.1 & 10 presents the acuteness of this situation where the domesticated animals as the goat, cows, fowls, etc. are also being accommodated in the same single room due to non-availability of separate space for this purpose.

Table No.3.16
Family Size and Rooms Available to Fully Destroyed
Households Prior To Tornado.

Family Size	No.	%	Rooms Available (Previously)			Rooms Available (Now)		
			ROOMS	NO.	%	ROOMS	NO.	%
UPTO 4	12	21.83	1	--	0.0	1	08	66.67
			2	09	75.0	2	03	25.0
			3	01	8.33	3	01	8.33
			4 & above	02	16.66	4 & above	--	0.0
5	15	27.27	1	--	0.0	1	10	66.67
			2	07	46.67	2	2	13.33
			3	03	20.0	3	1	6.67
			4 & above	05	33.33	4 & above	2	13.33
6	09	16.36	1	--	0.0	1	01	11.11
			2	04	44.44	2	06	66.67
			3	03	33.33	3	01	11.11
			4 & above	02	22.22	4 & above	01	11.11
7	08	14.54	1	--	0.0	1	02	25.0
			2	03	37.5	2	05	62.5
			3	03	37.5	3	--	0.0
			4 & above	02	25.0	4 & above	01	12.5
8	04	7.27	1	--	0.0	1	01	25.0
			2	01	25.0	2	03	75.0
			3	01	25.0	3	--	0.0
			4 & above	02	50.0	4 & above	--	0.0
ABOVE 8	07	12.73	1	--	0.0	1	--	0.0
			2	02	28.57	2	06	85.72
			3	02	28.57	3	01	14.28
			4 & above	03	42.86	4 & above	--	0.0

Source: Data Collected from Field.

The villagers' perceptions about various rehabilitation measure taken up by the government. According to the people of disaster mitigation, economic, physical and housing rehabilitation acquires an important dimension. Here one thing is to be kept in mind that any kind of rehabilitative measure taken up for the sake of disaster victims has to be fitting to the need of the people concerned. The people must define rehabilitation not the government. If the people are unable to

make the full use of rehabilitative measures taken by the government, these certainly cannot be called as sufficient rehabilitation effort.

From the following table no.3.17 we can find that out of fully destroyed houses category consisting of 68.75% of the total sample about 58% want housing loan to complete the reconstruction of their houses, about 33% of the respondents wanted wider employment opportunities through business or self employment loan or getting the provision of water supply and electricity for agricultural purposes throughout the year. More of employment opportunities was believed to provide a source of income which would enable the people to construct houses from their own resources and would thus, obviate the need of government or any other organization.

Table 3.17
Community Preference on Rehabilitation

Nature Of Rehabilitation	No.	%	Preference Of Rehabilitation	No.	%
Fully	55	68.75	Housing Loan	32	58.2
			Water And Electricity For Irrigation	10	18.18
			Business/Self Employment	08	14.55
			Assistance For Injury Treatment	01	1.81
			Others(Govt. Loan To Pay Back Loan From Private Sources)	04	7.25
Partially	25	31.25	Housing Loan	12	48.00
			Water And Electricity For Irrigation	12	48.00
			Business/Self Employment	--	0.0
			Assistance For Injury Treatment	--	0.0
			Others(Govt. Loan To Pay Back Loan From Private Sources)	01	4.00

Source: Data Collected from Field.

In the partially destroyed category, an equal percentage of population (48%) asked for housing loan and greater employment opportunities. An interesting fact that emerges from the analysis

of table no.3.18 is that when the district administration invited applications for housing loans from the villagers, all respondents in the fully destroyed category and as large as 92% of the partially destroyed category had applied for housing loan irrespective of the damage occurred to the houses. The Sabhapati forwarded all these applications to the BDO's office. A political motive played a definite role, as he did not want to antagonize any of his fellow villagers by refusing to forward such applications. From the villagers point of view it is evident that they wanted some hard cash and there was every chance that this loan will be misused. It is also true that terms and conditions of government loans are always easier than the private loans and at times people can escape for a long time by not repaying the debt.

Table 3.18

Category of People Applied for HUDCO Loan

Category	No.	%
FD	55	100.0
PD	23	92.0

At the time of physical rehabilitation again there was a lack of initiative from the administration. Though at least 13 people were severely injured and sustained permanent disability, they were not given much assistance for rehabilitation except for the assistance of Rs. 1000-2000 to 10 people.

Looking at this analysis we can find that economic, physical and housing rehabilitation measures were not taken according to the wishes of the people. As such, many social problems like economic hardship, physical sufferings and above all housing problems acquired gigantic proportions.

¹ Office of the District Magistrate, Midnapore, "Relief and Rehabilitation measures: A Report", Cyclone in Midnapore, 24th March 1998.

² Ibid.

CHAPTER IV

SUMMARY AND CONCLUSION

The main objective of the study was to analyze the dynamics and effectiveness of a natural disaster management process as in the disaster management policies at its different levels of administration. For conducting such a study a disaster hit village in Midnapore district of West Bengal was selected.

The whole study has been divided into 4 chapters. Chapter 1 is an introductory chapter that deals with the concept part of natural disaster-> definition, magnitude, nature and types of disaster. Here the vulnerability of India to such disasters particularly in case of West Bengal has been explained backed by data from authentic sources. The main emphasis in this regard has been placed on the natural disasters with rapid onset, which provide little or no prior identification of their occurrence.

Chapter 2 elaborates the disaster management policies at the national, state and district levels with the defined functionary who are responsible for dealing with such disasters.

All the data collected during the final phase of the study has been tabulated in chapter 3. Various dimensions of disaster management viz. political, social, economical, etc. have been highlighted in this chapter.

In the present chapter a summary of all the previous three chapters is being done. Along with it, a wider discussion about the disaster management as laid down in the government policies will be taken up. While doing so, an attempt will be made to test the validity of various hypotheses that were proposed in the first chapter in the light of the findings derived from the analysis of data collected. Simultaneously, such a discussion would also involve a

comparison with the findings from the study done by the department of PSM, AIIH & PH, Calcutta that was conducted in four states of eastern India including West Bengal. This study like the present study was particularly interested in knowing about the people's perceptions about the response mechanism of the disaster management. As such, the comparison between the two would inform the reader regarding the changes in the overall scenario.

Village Sarta was hit by the tornado, last year on 24th March. Among all the natural disasters the tornado is the most unpredictable phenomenon that leaves clear devastation marks in the places it passes through. Similar situation was witnessed in the case of the village Sarta where destruction was quite evident in terms of material damage as well as loss of lives. In addition a large number of the victims have sustained major to minor injuries and were under much mental stress.

The study was conducted in two phases. In the pilot phase a small sample of 15 people were interviewed. The interview schedule that was used for this purpose was prepared after reviewing the relevant literature and newspapers reports. After the pilot study the interview schedule was restructured and was made more specific so as to enable the study achieve its desired goal. As mentioned earlier, this study tried to find the effectiveness of various disaster management programmes. The qualitative data on perceptions of the beneficiaries was emphasized in the interview schedule.

For the final phase of data collection about 50 percent of the total houses in the village were taken up randomly. Out of the total sample size of 80 about 69 percent belonged to the FD category houses and about 31 percent from PD category houses. This was done intentionally as the people of FD category houses were in acute

need of larger quantity of relief and were also facing greater rehabilitation problems than the other category.

Interview schedule, participant observation after rapport building with the respondents, use of key informants and case study method were the tools and techniques employed for the purpose of this study.

India, being a country which is highly vulnerable to natural disasters needed a comprehensive disaster management policy to build infrastructure facilities and trained manpower to handle the emergency situations. With the declaration of the present decade as 'International Decade For Natural Disaster Reduction' (IDNDR) by United Nations, our country has received the thrust in this direction. As it was already discussed that the primary responsibility of managing the disasters lies with the state governments but at the national level a policy has been carved out considering various aspects. State governments are instructed to formulate their own disaster management policies according to the local need. However, the state policies must be towing the line of basic policies formulated at the national level.

The department of agriculture and cooperation (DSE) in the agriculture ministry is the nodal department for all the matters concerning natural disaster relief at the center. In the DSE, the relief commissioner functions as the nodal officer to coordinate relief operations for all natural disasters. He receives information from IMD and CWC regularly and gives feedback to minister of agriculture, Prime Minister and the Cabinet. Various committees work at the national level for disaster management, they are namely Cabinet Committee, National Crisis Management Committee (NCMC) and Crisis Management Group (CMG). Cabinet Committee is set up

by the cabinet and looks after the proper implementation of the relief measures in the wake of a natural calamity. NCMC gives direction to the CMG as deemed necessary. CMG reviews the contingency plan every year and also review the measures required for dealing with a natural disaster.

The expenditure on relief and other mitigation activities are shared by the central and state governments in the ratio of 3:1.

The trend shows the countries of developing economies share the major burden of natural disasters and the losses as a percentage of national wealth are higher in these countries. This led all such countries to shift their attention from response to mitigation. In our country also the same trend can be observed. In the policy of disaster management more emphasis is placed on the preparedness (by strengthening the infrastructure facilities like hospitals, drinking water, etc.), empowering the local level administrative setup (by decentralizing the authority) and giving more financial and decision making power; above all prioritizing the awareness promotion of the community by providing training and education about natural disasters. This would in turn help greater community participation in the programmes of disaster mitigation. At the same time the policy recognizes the importance of science and technology to assist at the preparedness as well as the emergency management phase. The other important components of the policy are risk assessment and vulnerability analysis, which may enable to identify the potential victims of natural disasters and care needed for their protection.

A plan for handling the emergency situation is recorded in the contingency plan. The contingency plans are available at all the three levels of administrative hierarchy. At the lowest level, i.e.,

district level the contingency plan is drawn up for specific disaster. This plan elaborates the specific action points, key personnel and contact points in relation to all the aspects¹.

The plan also discusses the health problems and the needs of the disaster victims. In the contingency plan, for different disasters the possible health problems and diseases have been identified. To deal with such situations the preventive measures are also suggested, in which using of safe drinking water, cleanliness of the environment, propagating health education and surveillance of further spread of epidemics have been given importance.

To support the medical need of the victims, the plans for prior stock piling of life saving drugs, mobilizing the medical team, arrangement of transport facilities have been administered.

Reaching out to the remotest and inaccessible places at the disaster hit areas a plan for asking help of the armed forces has also been suggested.

Before conducting the study it was hypothesized that economically and socially weaker sections were the major victims of the disaster and they would have lesser access to the relief and rehabilitative measures. However, this assumption came out to be unrealistic as politics had played a more prominent role cutting across the caste and class divisions within the village. The other assumption was that the twin pressure of loan repayment and expenditure on incomplete housing would promote school dropouts and that the girl child would be in the most disadvantageous position under such circumstances. The study revealed that there had been some school drop out cases, particularly 4 cases of school dropout of female child have been reported.

For the purpose of analysing various aspects of disaster management programmes, it has been divided into three distinguished phases. They are viz. pre-disaster phase, emergency management phase and post disaster phase. Each of these phases comprises of three main components as given below:

DISASTER MANAGEMENT PROGRAMMES		
Pre-Disaster	Emergency Management	Post Disaster
(i) People's awareness	(i) Rescue	(i) Economic Rehab.
(ii) People's Representatives Training	(ii) Relief	(ii) Physical Rehab.
(iii) Training Of Govt. Functionaries	(iii) Temporary Rehab.	(iii) Housing Rehab.

As mentioned earlier that the focus of the disaster management programme is shifting from response to mitigation, in which preparedness for a disaster becomes very important. The policy laid down at the national level recognizes a number of vital issues and makes several useful recommendations. As community is the first and foremost to react to a disaster situation it becomes essential that it is well informed and has enough awareness so as to be able to respond in an appropriate manner. Working towards this aim the government of India has suggested a series of training and education programmes to develop the skills in order to bring change in their attitude, etc. through existing structure of formal education and adult & continuing education programmes at the level of community. It promotes the role of NGO's and media to impart such an education among the people susceptible to disasters.

The actual implementation of the national policy presents several contradictions. In the formal education system disaster

awareness components are not included. The study of AIH & PH has shown that in case of West Bengal only 11.1 percent of the community members expressed satisfaction regarding the preparedness programme of the government, even a lower percentage of community members (10.6) were aware of any preparedness programme of the Panchayat. The various case studies used in the present study in this respect highlight the lack of awareness among the people of Sarta regarding disasters in different phases. This gap in their knowledge is evident from their haphazard and irrational behaviour during the tornado as already described in previous chapters.

Moreover, the study found that the training of as large as about 75 percent of the community leaders was not done or was inadequate either due to non organization of such trainings or the inability to attend such trainings by the leaders due to their own personal reasons. Also so far they have not conducted any training or any such relevant programme to promote awareness among the community members. The study of AIH & PH has also revealed similar results where training received by the community leaders is Nil, hardly 20 percent of them have coordination at the village level.

In West Bengal within the administrative setup there is an existence of relief department that is responsible for stock piling necessary relief and related equipments to deal with the emergency situations. In chapter 2 we have seen that in the district, as a part of preparation, health service network & medical action plan, rescue and relief preparedness, keeping stock of food grains and essential commodities, identification of resource persons with country and mechanized boards are already existing. As a part of risk mapping and vulnerability analysis, vulnerable places and people towards

natural disaster have been identified. In order to strengthen this preparedness flood shelters have been made and places for relief camps are identified. The AIH & PH study reports a high degree of delayed response (after 48 hours) by the responsible authorities and the level of satisfaction in the respondents concerning the quantity of relief materials was very poor. The present study reports a better response by the authorities (within 4 hours) was able to reduce the suffering of the disaster victims considerably; also the degree of satisfaction with respect to quantity of relief was comparatively high among the community members. The disaster management worked in the present case in a better way, particularly during the emergency phase but again there has been a clear lack of planning in the post disaster phase particularly at the time of rehabilitating the victims physically and economically. There was much mismanagement in the implementation of various schemes of rehabilitation. The vested interests and prevalent corruption in a disfavoured political scenario led to much suffering of the people. Such government policy suggestions as cost effective disaster resistant housing was ignored and an indifferent attitude was shown towards economic and physical rehabilitation of the victims. In table no. 3.12 to 3.16 we have seen that though the people of the study area were economically poor, the people exhibited a marked shift in the pattern of housing from kutcha to pucca houses. In spite of low income of most households, the respondents were found to be using costly materials in reconstructing their houses. In this respect, despite knowing the fact, the community leaders and the government officials did not take any desired action. As a consequence, the victims came under much pressure of the private loans that they could not repay in the predefined time period.

Almost 64 percent respondents were not able to complete their house construction because of which they have been forced to live in substandard housing.

As opposed to the guidelines in the national disaster management policy, the perceptions of the people regarding their rehabilitation was ignored. From table 3.17 it becomes quite clear that the people's preference of rehabilitation was of housing loan and economic empowerment in the way of providing water and electricity for the irrigation of their farmlands. On the contrary they were provided with non-essential things like community hall which has least importance in the priority list of the disaster victims.

It is a well-known fact that any natural disaster is bound to leave its dreaded marks on the affected society and that this destruction could not be fully obviated. However, it is also equally true that prior preparedness by the people, community leaders and the responsible authorities and most importantly proper and justified management of the relief work for disaster mitigation can ameliorate the sufferings of the affected people to a great extent. The perceptions of the victims demand due consideration in this respect. The various measures and actions taken should comply with the felt needs of the people.

¹ Sharma V. K., 'Natural Disaster Management', 1994, pp: 79-85.

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Appendix I
Case Studies

CASE STUDY NO. 1

45 years old Mritunjay Sinha has a family of 5 members including him. Apart from his wife he has 2 sons and a daughter. They all are studying in high school. Mritunjay has basic education upto class 5th but his wife is illiterate. He is the only member in his family. Before tornado he had a provision store from which he was earning Rs. 60-70 per day. Unfortunately the shop was completely destroyed. At present he is working as a daily wage labourer to earn his livelihood. Now he earns about Rs. 1200 per month. Mritunjay has only three bighas of firming land as his asset.

His old house was a 4-room brick build cemented house with an asbestos roof over it in which his family is sharing 2 rooms with his younger brother. His house got completely damaged during the tornado. Now he has been forced to live in a very lowly build single room thatched house, half of which is covered by the tarpaulin sheet that he received as a relief material. Beside this temporary house he has started building pucca house consisting of 4 rooms with concrete pillars. So far the house has been completed upto the level of window. To reconstruct the new house he has spend Rs. 40000/- and on the process he has accepted a loan of Rs. 15000/- from a private moneylender. According to the information provided by him, still he needs about Rs. 50000/- more to make the house habitable.

After the disaster, Mritunjay and his family received the medical attention immediately. Person himself was taken to Dantan PHC on the first day and subsequently all his family members received treatment from the visiting medical team. Apart from getting medicines, he also received bleaching powder, lime and water purifying tablets and most importantly some psychological treatment, which he thinks, worked in a favourable way at the time when he was in great mental stress due to the source of his livelihood, house etc. He has received govt. Monitory assistance of Rs. 2000 as house building grant and Rs.18000 as IAY.

Generally the family members have suffered with ailments like fever, dysentery etc. Person prefers visiting PHC in Dantan as well as Baragaria.

However, as both the hospitals are far away from the village and non-availability of the medicines in those hospitals, he visits RMP of the locality during the minor cases of illness. For delivery of child and other serious episodes of sickness they prefer going to Baragaria (Orissa) PHC then Dantan as the latter offers better treatment in terms of cleaner hospital environment, well behaved hospital staff etc.

Mritunjay was in the village committee, which did play a major role in the management of relief and rehabilitation of the village after the disaster. He felt that there were some irrational decisions like distribution of relief, ex-gratia, choosing the site of the new tube wells etc. Taken by the committee due to some influential people with in it. The partial decision of the committee was a result of not paying heeds to many members of the committee, which resulted in their resignations.

He himself thinks that due to the lack of communications by the people responsible in the emergency management resulted in the inability of the many NGOs to offer help to this village.

The housing problem has become acute as his whole family has now been forced to live in a single room accomodation. Mosquito is yet another problem as it is difficult to tie the net in such a lowly built house. He argues that the political leaders in the area are responsible for the problem of incomplete housing. According to him sabhapati of the Panchayat Samiti had insisted every head of the fully destroyed houses to carryon with the construction work of their houses from governmental and non-governmental sources. However, all these things did not materialise even after 11 months of the disaster.

CASE STUDY NO. 2

Ruhia Murmu, is a daily wage labourer, 50 years of age. His family consists of a total of 7 members, of which only eldest son (who is 16 years old) is studying. Ruhia himself is uneducated as are the rest of his family. He has

no major assets to his name, except for ten fowls. His monthly income is around Rs. 700 with only one earning member in the family, i.e., Ruhia himself.

His old house had consisted of a single storied, mud wall, two-room structure with a tin roof. This house had totally collapsed in the tornado. The present house he has reconstructed, consisted of single storied, concrete pillar, two-room structure that was yet to be completed, though there has a concrete roof existing already. He had already spent a total of Rs. 90,000 in the construction of the house. However, did not have to take any loan from any sources, as he had received Rs. 150,000 ex-gratia on account of deaths of his 60 years old mother and 3 years old daughter.

Ruhia had suffered a considerable damage due to the tornado losing his entire house hold items. Apart from those two demises, his elder daughter had received a grave injury to her right ankle, which is still badly swollen resulting in her inability to walk properly. Ruhia himself was injured in the hip joint due to the collapse of the wall and was admitted in the Midnapore hospital for 8 days. Again he is not fully fit as yet. After the disaster, the medical team had referred the injured members of his family to the hospital. Here he had to purchase all costly medicines from the open market, all he spent about Rs. 3000 on treatment. The total monetary assistance he got was Rs.170, 000.

Apart from the disaster related episodes of ill ness he and family suffer mainly from episodes of fever, dysentery, worms etc. The health services they use are the govt. Hospitals. Reasons for choosing the govt. Hospitals were because vaccinations are carried out in hospitals only and also because a few medicines are provided free of cost. His average expenditure on every episode of illness is around Rs. 15-20.

Ruhia was keen that rehabilitatory measures should be carried out by the govt., and wanted that the govt. Provides assistance for the treatment of his ailing daughter.

He opined that relief had been provide irrespective of the amount of damage occurred to the houses, which he thinks was an irrational decision.

CASE STUDY NO. 3

40 years old Srimanta Pradhan has a family consisting of 7 members including 3 daughters and 2 sons. By profession Srimanta is a cultivator and also seeks part time occupation of cow trading during the lean period of cultivation. Before suffering from a grave injury in his right leg in the tornado he used to earn about Rs. 1000 per month but at the present condition with a permanent disability his income has reduced to Rs. 300-400 per month.

Before tornado he had a two storied mud wall house with tiles and straw roof, consisting of 5 rooms. The house was destroyed fully in the disaster. At present he is living in a newly build 2 room kutcha house with tin roofing. All his family members were injured in the disaster; however, his injury was most serious. In the reconstruction of his house he had spend Rs. 24000, this forced him to take a loan of Rs. 20000. He received Rs. 20000 govt. Assistance on account of HB grant and IAY, still he had to take a loan of such big amount as he had spend about Rs. 12000 on the treatment of his injury.

Srimanta was rescued immediately after the tornado, and was taken to Midnapore district hospital, where he was admitted for more than 10 days. His family had received treatment from visiting medical team back at village, of which the psychological assistance considered by him was very helpful.

During the normal episodes of illness he and his family suffer from fever, stomach trouble, small wound etc. And the treatment of such sufferings he prefers visiting govt. PHC of Orissa, because they offer better facility of treatment than the PHC in west Bengal.

Presently Srimanta is undergoing a severe mental stress due to his poor monitory condition, this forced him to make his daughter dropped out of the school and send out to work as housemaid for small earning. Srimanta

preferred a long-term loan from the government to start a business for his survival.

Srimanta thinks the community leaders are responsible for the miserable housing conditions of the disaster victims. The encouragement to construct pucca houses had come from the community leaders only, where they assured the villagers about proper assistance. He himself did not build a pucca house because initially he lived about 10 months in a thatched house, and experiencing the miserable condition of the fellow villagers, found better to build a suitable kutcha house.

CASE STUDY NO. 4

Bhagvat and Sabitri Pradhan have a family consisting of 8 members. By profession Bhagvat is a cultivator but during the lean period of cultivation he switches to rice trading as supporting profession. His 19 years old son who studied upto class 8th does few private tutions which is some additional income for the family. The total income of the family is about Rs. 2000.

In the tornado both the husband and wife were severely injured. Bhagvat sustained injury in the thumb of his right hand while his wife Savitri got badly hurt in both the hands and the head. They were rescued from the debris and were taken to the Midnapore district hospital where they were admitted for 15 days. However their physical health is still not proper. They have so far already incurred an expenditure of Rs. 20000 for their treatment and are not in such a financial position to spend a sum of Rs. 10000 more for the operation being suggested by their doctor required to restore the normal functioning of Bhagvat's thumb.

Prior to tornado Bhagvat was living in a mud wall double storied house which had asbestos roofing. The house collapsed fully in the disaster. At present he is living in a very small single room thatched house beside his incomplete pucca house. The pucca house is built upto the level of foundation and in the process he has spent Rs. 70000 so far which he had taken as loan from private sources. The amount of Rs. 20000 given as grant by the

government under IAY and HB grant was solely consumed for the purpose of his and his family members medical treatment. Due to his prevailing poor financial condition he is unable to repay loan and is forced to live in an inferior house where in the same house cattle are also staying along with the human beings. To escape these, firstly he is planning to sell away 2 bighas of his 4 bighas land and would like to somehow complete his pucca house.

CASE STUDY NO. 5

Raghu Kishku is 30 years of age. His main occupation is cultivation. He takes to daily wage labour during the lean months. He owns 1 bigha land besides his animal asset that consists of 2 cows, 5 goats and 5 fowls. He lives in a joint family composed of his family (wife, 2 sons and 1 daughter), his mother and unmarried brother. The whole family is illiterate. The earning members are two-himself and his wife. The monthly income of the family is about Rs. 600 per month.

Raghu was staying in a single storied mud wall house before tornado; the house was fully destroyed. Presently he is living underneath a tin shade, which has all the four sides open. For this construction he has spent Rs. 18,000. This particular case can be cited as the kind of structure that can be possibly constructed by utilizing Rs. 18000 exactly. (Refer photograph no. 3-d). The structure comprises of wooden poles and required number of tin shades; the labour cost of building the structure could be met from the received fund. However, the cost of building four walls has to be met from his own pocket.

During the tornado his mother was severely injured as she was hit by the flying objects like stones and had to be admitted to the hospital. Other family members were also injured but theirs were only minor those were taken care of by the visiting medical team.

Regarding the relief received he was satisfied with the service of Ramkrishna mission, the kutchra latrine provided by them has also brought

convenience to their life. He preferred economic rehabilitation through the provision of small and long-term loans or cycle rickshaw.

CASE STUDY NO 6

Maheshwar Das is 50 years of age. His family consists of his wife, 2 sons and 1 daughter. He owns a provision shop, which is the main source of his income. Besides he takes tuitions and is an active member of the ruling party in that area. The monthly income of the respondent is about Rs. 3000. He has received education till class 10th while his wife is 8th passed, one son aged 21 years has passed 10th and is ITI trained but doing no job, the other son is studying in class 5th and helps his father in the provision store and daughter is 8th passed.

None of the family members was hurt physically in the tornado. During the tornado his two storied mud wall tiled roofed house did not sustain any major damage. However, his provision shop was completely destroyed. In spite of this fact the person managed to secure grant under IAY visibly due to his political influence.

CASE STUDY No. 7

Wife of Mr. Mahendra Jana (48 years) was interviewed. Mr. Jana is a graduate and was formerly a primary school head master, presently concentrating on his business of supplying rice. The family is consisted of 7 members. 3 elder sons are supporting Mr. Jana in his business and 18 years old youngest son is studying in class XI. Monthly income of the family as stated by the respondent was Rs. 5000.

Before tornado the family of Mr. Jana was living in a single storied kutcha house, which was covered by the roof of straw and tiles. The house was completely destroyed in the tornado. Presently they are living in a newly build kutcha house with a tin roof. The respondent said that they were planning to shift to Calcutta, as a result were not keen on building a pucca house.

The respondent had a severe complaint about the non-installation of even a single tubewell in the pocket of the village where her house is situated. As there were no tubewell existed and people had to walk a long way to collect drinking water from other parts of the village, the houses of this pocket urged to sink at least one tubewell in the area. This could have benefited 14 more houses. However, no tubewell was sunk in the area till 11 months after the tornado. She felt that as the people of that pocket of the village had political rivalry with the ruling party, so they had been deprived of the benefit.

CASE STUDY NO. 8

45 years old Kshetra Mohan Bag presently has 5 family members at his house. Apart from his mother and wife, he has 2 sons aged 20 and 18 years. By occupation he is a cultivator but during the lean period of cultivation he opts for make shift occupations like rice trading and singing rural folk songs in various rural festivals. He declared his monthly income to be Rs. 2500. Both his sons help him in his business and cultivation.

Before tornado Kshetra Mohan had a single storied kutcha house, which collapsed in the tornado. Presently he is living in a newly constructed 4-room pucca house covered with a tin roof. He has spent almost Rs. 1,00,000 for the construction of the house. However, in the process he did not incur any loan as he had received ex-gratia of Rs.80000 for the demise of one of his wife in tornado due to the house collapse and other government assistance like Rs. 18000 on account of IAY and Rs. 2000 as house building grant. He did not want to take any risk by building kutcha house once more as the 6 members of his family were injured in the tornado mainly due to collapse of mud wall as mentioned earlier.

The person and all his family members were mentally disturbed to a great extent. They received useful advice from the visiting medical team, which helped them to recover quickly from mental depression.

He also agreed to the point that the arrangements electrical lights for few nights following the disaster helped them much in recovering from the trauma of disaster.

The person's another wife who survived in the tornado had a severe injury in her left leg that had to be operated. Kshetra Mohan could not rely on government health services and took her to the private nursing home for the operation and the required treatment. In the process, he had spent Rs. 8000.

According to him the quantity of relief was sufficient but the decision of equal distribution of all the relief materials among the PD and FD category people was irrational as the FD category people were in need of more help. He complained that NGO's were not allowed to work freely in the area. As a result, many NGO's withdrew their relief materials and shifted back to Orissa where they found enough freedom and promotion to work.

CASE STUDY NO. 9

42 years old Abani Nandi, a graduate, was the former sabhapati (president) of Panchayat Samiti and he was the immediate and most important link between the people and the government administration. Being the representative of the people he played a dynamic role in the process of dealing with the various aspects of disaster.

Mr. Nandi lives in one of the very few well build pucca houses in the village. He has a business of rice trading, which has a good turnover per month. Apart from that he is involved in the politics. He was in the post of sabhapati for 5 years and prior to that he served as general Panchayat member for another 5 years.

According to him, neither he received any disaster management training nor he had come across any disaster management booklet circulated by the government. He had never attended any seminar or meeting on disaster or related topics organised by either governmental or non-governmental agencies. As a result of that he had never thought of propagating any such awareness among the fellow villagers.

On the day of the disaster he was not in the village, but after receiving the news he rushed back to the village. He worked to make immediate

arrangements for rescuing the people from the debris, cleaning the blocked roads and seeing to it that the injured were taken to the hospital as soon as possible. On the next day the dead bodies were cremated and carcasses of dead animals were removed and disposed off. He informed that sufficient relief materials were supplied to the person, which includes dhoti, sari, polythene sheets, dry foods, etc.

When inquired whether he had approached his community people to know about their viewpoints regarding the relief materials required by them he answered in confirmation. However, his answer was contradictory to the information as given by other respondents in this respect. It was found that he has promoted and was rather satisfied by the working of NGO's like CASA and care for these were working in co-operation with the Panchayat Samiti. Ramkrishna mission which distributed the cooked food from their own gruel kitchen and other small NGO's were discouraged or not allowed to work for relief materials distribution for they were not working in co-operation with the Panchayat Samiti.

Furthermore, he did not accept the fact that he was responsible for provoking the people to go for pucca construction inspite of the fact that this area is not particularly prone to heavy flood or other such natural disasters.

CASE STUDY NO. 10

35 years old Ratish Dutta is a cultivator who becomes a daily wage labour in the lean period of cultivation. He has a family of 6 people, including 2 daughters and 1 son. The daughters are 7 and 5 years old respectively and the age of the son is about 3 years. Ratish had received education upto class 6th. He is very eager to provide education to his children, and had sent the eldest daughter to the school at the proper age.

During the tornado Ratish had received an injury in head, right hand and legs due to the collapse of wall. The injury of the working hand, which is not healed fully yet, restricts him from doing rigorous physical work. As a

result it has become difficult for him to go for the daily wage labour jobs regularly. Presently the economic condition of Ratish is very poor. His monthly income is now about Rs. 500. Apart from that he has a burden of Rs. 20,000 loan over his head, which he incurred while reconstructing the fully destroyed house. Now the incomplete pucca house lying unused and he is living in a single room thatched house.

Ratish is satisfied with the service provided by the visiting medical team. He received very good treatment from them. Even his son received treatment for high fever following the tornado along with the medicines. However, he has many complaints against the decision of distribution of relief and installation of the tubewells. According to him the equal distribution of relief to all the houses in the village is only because of the inclusion of many members including the sabhapati of Panchayat Samiti within the village committee from the PD category houses.

To express about his preference of rehabilitation he said that a long-term housing loan would help him to complete his house, which will enable him to get relieved of a great mental tension of living in a poor housing condition.

CASE STUDY NO. 11

40 years old Gaur Hari Pal is a rice trader and earns about Rs. 800 per month. He has three more members in his family that includes his 34 years old wife and two sons of 12 and 10 years old respectively. In the tornado all the four members of the family of Gaur Hari were injured, among them Gaur Hari and his wife were severely injured. Gaur Hari had received injury in his chest and right hand. His wife had sustained more serious injuries. Her head was badly hurt and the left eye became nonfunctional. Even after the treatment her injuries have not healed up completely. Gaur Hari's right hand is also not healed up and therefore prevents him from doing even his daily business activities in a normal way. On consulting specialist doctors in Calcutta he was told that he would have to pay additional Rs. 8000 to 10000 for the treatment required to restore normal functioning of his right hand – a sum which is unaffordable for him at this point of time.

The housing condition of Gaur Hari is also pathetic, as they have to stay in a small thatched house beside an incomplete house, the construction of which was started 6 months back but had to be stopped owing to the paucity of funds. This construction has incurred a debt of Rs. 25000 over him.

To cope up with the situation he strongly argues in favour of economic rehabilitation in the form of long term business loans through which he can atleast survive.

Appendix II

Study conducted by All India Institute of hygiene and public health (AIH&PH), Calcutta on community perception about Disaster Preparedness and response Programme in four states of India.

TABLE 1**PERCEPTION OF COMMUNITY LEADERS REGARDING DISASTER PREPAREDNESS PROGRAMMES**

PERCEPTION	AFFIRMITIVE REPLY IN PERCENTAGE			
	ASSAM	BIHAR	ORISSA	WEST BENGAL
CO-ORDINATION WITH VILLAGE LEVEL	6.0	28.0	20.0	20.0
EXISTENCE OF LOCAL MONITORING CELL	0.0	0.0	0.0	10.0
ADVANCE WARNING SIGNAL	24.0	29.0	29.0	54.0
STOCK OF RELIEF MATERIAL	6.0	2.0	5.0	15.0
BUDGET PROVISION	0.0	3.0	6.0	10.0
TRAINING RECEIVED	0.0	0.0	0.0	0.0

TABLE 2**PERCEPTION OF COMMUNITY LEADERS ABOUT DISASTER RESPONSE ACTIVITIES**

PERCEPTION	AFFIRMITIVE REPLY IN PERCENTAGE			
	ASSAM	BIHAR	ORISSA	WEST BENGAL
DELAYED RESPONSE (AFTER 48 HOURS)	74.0	72.0	50.0	60.0
NON AVAILABILITY OF RELIEF MATERIAL IN TIME	50.0	54.0	50.0	80.0
DELAYED NEED ASSESSMENT	100.0	94.0	100.0	80.0
INADEQUATE RELIEF	100.0	85.0	70.0	80.0

TABLE 3
PERCEPTION OF COMMUNITY MEMBERS REGARDING DISASTER
PREPAREDNESS PROGRAMME

PERCEPTION	% OF RESPONDENTS			
	ASSAM	BIHAR	ORISSA	WEST BENGAL
ADEQUACY OF PREPAREDNESS PROGRAMME OF GOVERNMENT	1.3	1.6	2.8	11.1
PREPAREDNESS PROGRAMME OF PANCHAYAT	1.3	19.5	1.4	10.6
ADVANCE WARNING RECEIVED	17.6	16.4	7.4	27.3
RESPONSE TIME				
a) WITHIN 48 HOURS	23.7	19.7	38.7	30.8
b) AFTER 48 HOURS	76.3	69.3	51.6	48.9
c) NO RESPONSE	0.0	11.0	9.7	20.4

TABLE 4
PERCEPTION OF COMMUNITY MEMBERS REGARDING DISASTER RESPONSE
ACTIVITIES

PERCEPTION	% OF RESPONDENTS			
	ASSAM	BIHAR	ORISSA	WEST BENGAL
RESCUE AND RELIEF				
a) GOVT. PEOPLE	55.6	62.2	57.6	31.2
b) NGO	3.1	3.6	5.5	9.5
c) VILLAGERS	3.7	26.3	28.6	28.5
d) SELF-HELP	37.6	1.8	22.1	23.7
TIMELY MEDICAL RELIEF	75.0	53.4	77.4	40.9
COMPENSATION RECEIVED	39.6	64.1	65.0	60.0
INVOLVEMENT OF PANCHAYAT	7.6	45.3	10.1	32.2
COMMUNITY SATISFACTION	3.1	3.9	24.0	12.0

APPENDIX III

NATIONAL POLICIES ON NATURAL DISASTER REDUCTION

Natural Disaster Reduction

South Asian Regional Report

**Presented To: The World Conferences on the International Decade for
Natural Disaster Reduction (IDNDR)**

Yokohama, Japan. May 23-27, 1994

The recommendations made by this report under various heads are given below:

1. Preparedness:

- i) A review of existing legal and institutional arrangements of disaster management national, sub-national and community levels may be undertaken immediately.
- ii) An effective reorganisation of systems may be undertaken to overcome the inadequacies highlighted in the process of review.
- iii) Contingency action plans for disaster management may be prepared at national, sub-national and community levels, with separate action plans for critical infrastructures like hospitals, drinking water installations and power plants; the contingency action plans should be insisted upon as an integral part of any project having implications for natural disasters and mega cities near coastal areas may receive priority in these efforts;
- iv) The national capabilities for disaster reduction may provide for the following:
 - a) Strengthening the administrative set up at the local level where all emergency response to calamities takes place first;
 - b) Making available adequate financial, material and equipment support including stockpiling of essential articles in high risk disaster prone areas;

- c) Decentralisation of authority, delegation of adequate powers to the lowest unit of administration and flexibility in operating procedures;
- d) Transparency of operating procedures and accountability of action;
- e) Lying down standards/guidelines for disaster resistant construction and other measures.
- V) The preparedness at the community level may be enhanced through awareness creation, support to its own mitigation efforts and involvement of the community in various disaster reduction and management measures;
- VI) The on going financial and technical cooperation arrangements for disaster preparedness, such as the WMO/ESCAP Panel on tropical cyclones, should be continued and strengthened appropriately.

2. Disasters and Development:

- I) Effective institutional mechanisms may be solved for integrating concerns of disaster reduction on the process of planning at the national and sub-national levels.
- II) Development programmes which have a bearing on the natural disasters; should be required to incorporate disaster reduction components; with adequate care being taken to ensure that they do not contribute to making the concerned area disaster prone and increase the vulnerability of the poor and the disadvantaged groups to natural disasters;
- III) Specific projects; aiming at disaster reduction and preparedness, may be taken up for implementation on a priority basis in the most vulnerable areas;
- IV) Proper land use planning which is the key to disaster reduction shall be incorporated in development planning backed by appropriate legal and administrative measures for effective enforcement.

3.Application of Science and Technology:

- I) Available scientific and technological knowledge may be optimally used for vulnerability analysis, hazard evaluation, risk mapping and preparation of disaster reduction projects with some demonstration projects being taken up using these inputs, which would serve as model for suitable replication or adoption.
- II) Institutional capabilities for research in science and technology aspects of disaster reduction may be expanded and the facilities in respect of forecasting and warning systems may be upgraded.
- III) The essential scientific value of traditional disaster reduction techniques practised by communities may be brought out so that these low cost techniques may be adopted for wider application.
- IV) Research experience relevant to this field may be exchanged among the countries in the region and specific projects for transfer of technology within SAARC region may be implemented through bilateral/institutional agreements.

4.Community Participation:

- I) The local communities may be assisted in coping with disaster situations by such measures as dissemination of information and knowledge, development of skills, provision of material support etc.
- II) The capabilities of local self government institutions, elected bodies and co-operative organisations to effectively discharge their responsibilities in disaster reduction and management may be enhanced by allocation of resources, equipment support and extension technology.
- III) Community leaders, activists and social workers with potential for mobilising community efforts and resources may be identified and appropriately involved in various activities relating to disaster reduction and management.
- IV) Institutional arrangements may be made for involvement of the community in decision making in matters pertaining to development and disaster reduction and community may be

supported with access to information and facilities for skill development to make their participation effective.

5. Awareness Promotion:

- I) The level of awareness about the importance of disaster reduction among policy makers, disaster managers and professionals may be enhanced through seminars, workshops, demonstration projects, and exposure to real life situation and exchange of experience.
- II) Wide spread campaigns may be undertaken through mass media, as well as traditional and rural art form to improve awareness about disaster reduction measures at national, state and community levels.
- III) An autonomous body may be set up and supported with necessary resources to assume the leadership role and serve as umbrella Organisation for institutions engaged in awareness creation.

6. Education and Training:

- I) Appropriate programme may be designed to impart training, keeping in view the requirements of functionaries at various levels and training materials relevant to local conditions may be prepared in local language.
- II) National and state training institutes may set up separate centres for training in disaster management on a continuous basis.
- III) Skills for disaster resistant construction may be widely imparted or upgraded by expanding the network of institutions training artisans, craftsmen etc.
- IV) Textbooks at the school levels may incorporate information about the disaster causing phenomena and the precautionary steps to be taken to reduce their impact in order to generate awareness among children.

7. Role of NGOs':

- I) The NGOs may be increasingly involved in:
 - A) Building up awareness among the people about the impact of natural disaster, possibilities of disaster reduction, needed response to working and in strengthening the coping mechanism of the community.
 - B) Dealing with instances of trauma cases and in providing counselling to those emotionally disturbed by the impact of disasters.
 - C) Reaching relief and development assistance to the people and ensuring an equitable share of this to the most vulnerable section.
 - D) Dissemination of disaster reduction technologies, particularly in the area of house construction.
 - E) Facilitating people's participation and mobilising community efforts in the planning and implementation of disaster reduction and management programmes.
 - F) Preparing local communities for management of common property resources, such as grazing grounds and traditional water harvesting systems etc.
 - G) Promoting thrift groups of self-help.

- II) NGOs, who have varied skills and experience in dealing with disasters, may network among themselves and with the government, thereby creating a forum of interaction for effective sharing of their resources and experience.

- III) With view to bring about a greater transparency in their operations, the international donor agencies, funding NGOs may initiated to the concerned governments the details of their contributions to enable all concerned to appreciate their activities;

- IV) The NGOs who do not receive any international assistance or other donor assistance and face constraints in organising their activities may be assisted to establish the required essential facilities ;

8. Role of Private Business Sector:

- I. Business sector should take steps to commercialise technologies, which have a bearing on disaster reduction, create awareness about their benefits and promote research and development in this field.
- II. Financial institutions should promote investment in business activities related to disaster reduction.
- III. Banks and other financial institutions should provide credit to the families affected by natural calamities for repair and reconstruction, acquisition to productive assets for restarting activities and also consumption credit to cover periods of distress due to loss of income.
- IV. Insurance enterprises should expand the scope of their schemes to cover risks due to natural disaster.
- V. National government may initiate suitable schemes to share risk premium of insurance policies and interest burden of bank loans in respect of the disadvantaged groups.

9. Disaster Reduction and Sustainable Development:

- I. Sustainable development with poverty alleviation as integral part may be promoted as a strategy for natural disaster reduction.
- II. Development efforts may be suitably supplemented by regulatory measures to ensure equitable distribution of resources and benefits;
- III. Prescription for natural disaster reduction should accommodate the needs of the poor and the disadvantaged groups for survival as dignified members of the society and there should not be any compromise on their existing access to productive resources.

10. Differential Vulnerability:

- I. The heightened vulnerability of the poor, the socially disadvantaged, the disabled, the women, the children must be specially taken into account in disaster mitigation planning with special components reflecting their concerns the arrangements for protecting their interests build into the

plans and information on the disadvantaged section may be made an essential part of risk mapping;

- II. The development strategy should specifically focus on improving the social and economic status of these groups as a necessary condition for disaster reduction;
- III. Disaster reduction projects should necessarily in corporate components to reduce incidence of poverty and disabilities.

11. Risk Assessment and Vulnerability Analysis:

- I. The standard of risk assessment and vulnerability analysis to be up graded by fully applying the existing knowledge in the physical and social sciences and some pilot projects may be taken up in the region to demonstrate the utility of these techniques.
- II. Disaster reduction measures adopted on the basis of this assessment should adequately reflect the efficiency of low cost traditional technologies and the action needed for their wider sharing and reinforcement.

12. Documentation, Evaluation and Research:

The country may utilise and support institutions at national and state levels for undertaking documentation, evaluation and research activities. There is also a need of building co-operation among the countries situated in the same region to the same activities to have a greater understanding of the natural disasters generally faced by the region. The work of these institutions may be co-ordinated by the autonomous umbrella type of body, recommended to be set up for awareness creation, education and training.

13. International Co-operation

- I. International co-operation may specifically focus on strengthening national capabilities, creating or strengthening institutional infrastructure for training and education, facilitating transfer of technology and promoting bilateral and multilateral projects for disaster for disaster reduction and management.

- II. A global fund may also be set up under the UN system as additionally to the bilateral and multilateral co-operation arrangements for taking up these activities.

14. Media Support:

- I. Media should highlight accurate information about disaster events and their impact;
- II. Media should particularly highlight the communities' efforts in disaster reduction, besides covering the activities of the government and NGOs;
- III. Media should effectively spread the message about the significance of preparedness in disaster reduction;
- IV. Media may assist governments in mobilising resources for disaster reduction programmes, besides making its own contributions to the mitigation efforts in the event of major natural disasters;
- V. Media may undertake comprehensive documentation of natural disasters in view of its wide access to information and intimate knowledge of ground level situation.

15. Regional Co-operation

- I. Institutional arrangements under SAARC exclusively focussing on natural disasters may be established;
- II. Net working of research institutions for sharing fruits of research and undertaking of joint research project may be promoted;
- III. The SAARC Chairs, Fellowships And Scholarships Scheme may be utilised in the area of disaster reduction;
- IV. Countries in the region may undertake demonstration projects through bilateral and multilateral arrangements;
- V. The knowledge about traditional practices in disaster reduction and management with potential for replication may be shared;
- VI. Institutions having facilities for training in various aspects of disaster reduction management may provide increasing opportunities for its utilisations by countries of the region.

Appendix IV

Interview Schedule Used for Interviewing the Disaster Victims:

1. Sample No:
2. Name:
3. Age:
4. Education:
5. Occupation:
6. Land:
7. Other Assets:
8. Income:
9. Family Size:
10. Earning Members:
11. Housing Condition;
 Present:
 Old:
12. Expenditure On New House/Repairing:
13. Loan:
14. Source:
15. Damage Of Assets:
16. Loss In Monetary Terms:
17. Physical Injury:
18. Cause Of Injury:
19. Post Disaster Medical Assistance:
20. Expenditure On Treatment:
21. Total Monetary Assistance:
22. General Disease/Suffering:
23. Health Services Used:
24. Reason:
25. Expenditure On Every Episode of Disease:
26. Media Exposure:
27. Preference On Rehabilitation:
28. Other Relevant Information:

Interview Schedule Used in Interviewing the Community

Leaders and Government Officials:

1. Have you received any disaster management training?
2. Does government circulate any booklet about disaster management?
3. Did you attend any seminar or meeting on disaster management?
4. Did you arrange for any meeting or seminar at your locality as a preparation of disaster management?
5. * Do you keep of any stock of emergency materials under your jurisdiction in case of an emergency situation?
6. How did you deal with this particular disaster?
7. How do you prioritise your activities?
8. In the process did you seek any opinion from the people?
9. * If yes, then did you ask them directly or the people's representatives were the media of communication?
10. How NGOs worked in your area? Did they work independently or under the supervision of the authority?
11. Did you help them in distributing their relief materials to the deserving people?
12. Did you conduct any meeting or awareness programme in the disaster affected areas to educate the people about disaster after the happening?
13. Are you getting any feedback from the people about their problems of rehabilitation?
14. Did you take up any special initiative to get the fund allotted to complete the half way build houses in the area?
15. How did you help severely injured people with permanent disability to recover and become self-sufficient?
16. Why there is a delay in disbursing housing development loan to the people under BPL?

* Questions are applicable only for the government officials.