Working Paper #4

Emergency Management and Response Plan for Ratnapura, Sri Lanka

July 2000

Prepared by the

Sri Lanka Urban Multi-Hazard Disaster Mitigation Project

under the

Asian Urban Disaster Mitigation Program

adpc

Asian Disaster Preparedness Center

Bangkok, Thailand www.adpc.ait.ac.th

The **Sri Lanka Urban Multi-Hazard Disaster Mitigation Project** was launched in September 1997 under the Asian Urban Disaster Mitigation Program. The objective of the Sri Lanka national demonstration project is to reduce the vulnerability of the Ratnapura municipality. The project, implemented by the Centre for Housing, Planning and Building in partnership with the National Building Research Organisation and the Urban Development Authority, demonstrated a methodology for identifying hazards and for selecting appropriate strategies to avoid or reduce hazard related losses. The project assisted municipal officials to develop improved tools and skills in development planning and risk management. Activities under the demonstration phase of the project included hazard and vulnerability mapping, risk analysis, strategic planning, policy and procedural changes, training and professional development, and networking.

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AUDMP Working Paper #4

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Centre for Housing, Planning and Building
National Building Research Organisation
Urban Development Authority

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Sri Lanka Urban Multi-Hazard
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Acknowledgements

It is with pleasure that ADPC distributes the Emergency Management and Response Plan for Ratnapura. This plan was prepared under the Sri Lanka Urban Multi-Hazard Disaster Mitigation Project (SLUMDMP). The SLUMDMP is one of the national demonstration projects under the Asian Urban Disaster Mitigation Program (AUDMP) managed by the ADPC. The AUDMP being implemented in Bangladesh, Cambodia, Laos, India, Indonesia, Nepal, Philippines, Sri Lanka, has demonstrated successful methodologies and approaches in mitigating the impact of the disasters in the region. During implementation of the national demonstration projects, there has been continuous building of knowledge and experience emanating from the country projects. The national demonstration projects have produced wealth of knowledge in the form of hazard maps, reports, proceedings, review of policies, documentation of various events and activities, etc.

Although Asia is one of the most vulnerable region of the world, well developed Emergency Management and Response Plans for cities are rare. With increasing concentration of population and economic activities in urban centers, the loss of lives and damage of properties is severe. Preparation of such plans and their integration in development plans of the cities will go a long way in saving lives.

ADPC congratulates the Centre for Housing, Planning and Building (CHPB) and its partner institutions, including National Building Research Organisation (NBRO) and Urban Development Authority (UDA) for successfully implementing the demonstration project. The project demonstrated methodology for identifying hazards and for selecting appropriate strategies to avoid or reduce hazard related losses.

I also take this opportunity to thank CHPB, NBRO and UDA for successfully implementing the project. The work done by the project is further being replicated in other parts of Sri Lanka to reduce loss of lives and damage of properties from devastating disasters.

We sincerely hope that this Emergency Management and Response plan will provide an example to others to help them develop similar plans for their cities.

Dr. Suvit Yodmani
Executive Director
Asian Disaster Preparedness Center
Bangkok, Thailand

July 2000

Organization of this Working Paper

This plan was originally written in three parts. In the present publication, all the three parts have been merged together. Each part has a separate table of contents.

Part I

Emergency Management and Response Mechanism

PART I

EMERGENCY MANAGEMENT AND RESPONSE MECHANISM

TABLE OF CONTENTS

	FOREWORD	v
	HOW TO USE THE DOCUMENT	vi
	ACRONYMS	viii
1	INTRODUCTION	1
	1.1 Policies and Objectives	1
	1.2 Operational Priorities	1
	1.3 Planning Process	1
	1.4 Main Disaster Types Affecting Ratnapura M.C.	2
	1.5 Activities Identified for Emergency Response	2
2	LETTER OF PROMULGATION	3
3	AUTHORITIES FOR FUTURE DEVELOPMENT OF THE EMERGENCY MANAGEMENT PLAN AND INSTITUTIONAL ARRANGEMENTS	4
	3.1 Authorities for Future Development of the Plan	4
	3.2 Institutional Arrangements for Emergency Operations	4
	3.3 Co-ordination Structure	5
	3.4 Flow of Information between EOC, DCR & SOC	6
	3.5 Standard Emergency Management System (SEMS)	7
	3.6 Activation Steps	7
4	STANDARD EMERGENCY MANAGEMENT SYSTEM (SEMS)	8
	4.1 Purpose and Scope of the SEMS	8
	4.2 Ratnapura MC EOC Functional Areas Under SEMS	9
	4.3 Desk Officers	9
	4.3.1 Structure Plan	9
	4.3.2 The Responsibilities and Functions of the Emergency Operations Director	9
	4.3.3 Responsibilities and Functions of Planning & Intelligence Desk	10
	4.3.4 Responsibilities and Functions of Services Desk	11
	4.3.5 Responsibilities and Functions of Infrastructure Desk	12
	4.3.6 Responsibilities and Functions of Health Desk	12
	4.3.7 Responsibilities and Functions of Logistics Desk	13
	4.3.8 Responsibilities and Functions of Communication and Information Management Desk (Communication Room)	14
	4.3.9 Staff of the EOC	15

4.3.10 Stall of Minimising of Social Services (Emergency Dept.) 15
4.3.11 Contact Telephone Numbers of EMC Members and other Relevant Institutions 16

4.4 Response Structure 16
4.4.1 Response structure during warning stage 17
4.4.2 Response structure on occurrence of a disaster 18

5 MUTUAL AID 19
5.1 Mutual Aid and Flow of Resource Requests 19

6 STANDARD OPERATING PROCEDURES (SOP) DEVELOPMENT 20

7 HAZARD ANALYSIS (NATURAL HAZARDS) FOR RATNAPURA MC 20

8 IDENTIFICATION OF NATURAL HAZARDS WITHIN THE RATNAPURA MC AREA 28

9 OTHER HAZARDS 33
9.1 Road Accidents 33
9.2 Industrial Accidents 33
9.3 Gem Mining and Associated Hazards 33

10 VITAL RECORD RETENTION & EMERGENCY PLAN MAINTENANCE & DISTRIBUTION 34
10.1 Record Retention & Maintenance of EMRP by the MC 34
10.2 Dissemination of EMRP 35

11 PLAN EVALUATION 36
11.1 Pre-Disaster Evaluation 36
11.2 Post-Disaster Evaluation 36

12 PLAN UPDATE 37

13 TRAINING AND EXERCISES 37
13.1 City Employees 37
13.2 Department Specific Training 38
13.3 EOO Specific Training 40
13.4 City-wide Exercises 41
13.5 Departmental EOO Responsibilities 41
13.6 Information Technology - Telecommunication Dept. (Telecom) 43
13.7 Table of Training Requirements and Responsibilities 44

14 PLAN CONCURRENCE 45

5 INITIAL RESPONSE FEATURES 45

15.1 Field Incident Command System (ICS) / Emergency Operations Centre (EOC) Interface 45

15.2 Use of Incident Command System 46

15.3 Emergency Preparedness Division (EPD) 46

15.4 Involvement of Other Governmental Agencies and Non-Governmental Organisations 46

15.4.1 Non-Governmental Organisation (NGO) and Voluntary Agencies 46

15.4.2 List of NGOs and other Support Agencies 47

15.4.3 Community Emergency Response Teams 49

15.4.4 Officers village where CERTs are Planned to be Established 49

15.5 Areas of Community Participation 50

15.6 Encouraging Family Level Preparedness 51

15.7 Emergency Planning and Checklists 51

15.7.1 Emergency Checklist 51

15.7.2 Create an Emergency Plan 51

15.7.3 Disaster Supplies Kit 52

15.8 Evacuation Preparedness 52

15.9 Shelter 52

15.9.1 Living in Designated Emergency Shelters 52

15.9.2. Helping after disaster 53

EMERGENCY OPERATIONS CENTRE (EOC) - RATNAPURA: ACTIVATION / DEACTIVATION OF EOC 54

16.1 EOC Activation Matrix 54

16.2 EOC Operations 54

16.3 Key Actions Necessary in Coordination and Information Management by the Focal Point - Ratnapura M.C. - Emergency Management Board 55

16.4 Roles and Responsibilities of Divisional Secretariat/District Secretariat 55

16.5 Roles and Responsibilities of Office of the Municipal Commissioner 56

16.6 Roles and Responsibilities of Police Division 59

16.7 Roles and Responsibilities of the Other Departments 59

16.7.1 Cooperative Department 59

16.7.2 Food Controller's Department and Cooperative Wholesale Establishment (CWE) 60

16.7.3 Education Department 60

16.7.4 Aurvedic Department 60

16.7.5 Health Services Department 61

16.7.6 Provincial Hospital - Ratnapura 61

16.7.7 National Water Supply and Drainage Board 61

16.7.8 Ceylon Electricity Board 62

16.7.9 Emergency Telephone Use/Information 62

17 MITIGATION MEASURES 63
17.1 Structural 63
17.2 Non-Structural 63
17.3 Disaster Specific Mitigation Measures Suggested 63
17.3.1 Landslides 63
17.3.2 Floods 63
17.3.3 Fires 63
17.3.4 Road Accidents 64
17.3.5 Epidemics 64

18 IMPLEMENTATION OF MITIGATION STRATEGIES 65
18.1 Landslides 65
18.1.1 Planning Assumptions 65
18.1.2 Lead Agencies 65
18.1.3 Nature of Damages 65
18.1.4 Possible Impacts 65
18.2 Floods 69
18.2.1 Planning Assumptions 69
18.2.2 Lead Agencies 69
18.2.3 Possible Impacts 69
18.3. Epidemics 73
18.3.1 Planning Assumptions 73
18.3.2 Lead agencies 73
18.3.3 Possible Impacts 75
18.4 Road Accidents 75
18.4.1 Planning assumptions 75
18.4.2 Lead Agencies 75
18.4.3 Possible Impacts 75
18.5 Fires 77
18.5.1 Lead Agencies 77
18.5.2 Possible Impacts 77

ATTACHMENT A - REGULATION AND DIRECTIVE ORDERING CURFEW AND OTHER SPECIFIED RESTRICTIONS DURING EXISTENCE OF A LOCAL EMERGENCY 80

ATTACHMENT B - DECLARATION OF LOCAL EMERGENCY 81

FOREWORD

Every year we see that the magnitude and intensities of natural disasters are increasing and adversely affecting the life and property of the people along with obstructing various development projects. Apart from many man made disasters observed by us at present in Sri Lanka (ethnic conflicts, bomb explosions, accidents, fifes, insurgency, displacement of persons and refugee, etc.), common natural disasters are Floods, Droughts, Cyclones, Landslides, Epidemics and Sea erosion. Recent reports show that on an overage both from man made as well as natural disasters about 5000 people are killed and 2-3 million peoples get affected annually. In the present decade Sri Lanka faced several major and severe calamities, i.e. ethnic conflict, in North and East, several bomb explosions in Colombo, Kandy etc., floods in city of Colombo and Hambantota area, oil spillage in western province coastal area near Colombo, massive fire in Sapugaskanda and Orugodawatta oil storage, landslides at Naketiya - Koslanda roads, breach of the Kanthale dam, Droughts in Hambantota and Vauniya Districts etc.

As we see, disasters are non-routine events that demands non-routine responses. It is a common fact that we see several kinds of disasters that occur annually, e.g. floods in Ratnapura, sea erosions on Western coastal belt, etc.. But the Central Govt., Local Govt. and other Govt. and non Govt. institutions in general cannot rely on normal procedures to implement appropriate responses in a case of emergency. It becomes worse when mass destruction, lots of casualties, blockade of roads, interruption to power and water supply, disconnection of telecommunication facilities etc. happen suddenly, as a result of a calamity that was mentioned above. Therefore, all those who are involved in emergency response need to learn and practice special skill and attitudes, know the roles and responsibilities and have a pre defined procedure to manage the situation and to recover from the consequences of disasters, as well as to reinstate the normalcy within a shortest possible time.

The main objective of this emergency response plan is to highlight the combination of actions that are needed to be taken by the authorities for the benefit of the community to restore the normalcy within a very short period and to define the priority and actions, roles and responsibilities of the main control bodies for constant learning, upgrading and demonstration, so that it can be put in to operations without disruption to the chain of procedures identified before hand to manage an emergency situation.

This plan may not elaborate the ideal situation that can be put in to practice without any new developments or experiences. This plan has to be modified annually or updated. The authorities should identify key personnel, who can critically evaluate the procedural set backs mentioned in this document during an emergency situation. The modification or revision will have to be made after an emergency situation with a critical evaluation of the chain of actions to face the next emergency situation in a more effective and efficient manner.

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HOW TO USE THE DOCUMENT

This document is a part of the activities undertaken by Sri Lanka Urban Multi-Hazard Disaster Mitigatio Project to establish public and private sector mechanisms for disaster mitigation in Ratnapura Demonstratio Project area. This is prepared with a view to provide uniform directives from the central government to th district administration and establish a uniform response to any disaster situation by the municipal authorities The document attempts to evolve a multi-disaster response structure which can adapt itself to any specifi disaster situation by any other local government institution in Sri Lanka.

Certain parts of the document therefore are disaster specific whereas the others deal with uniform respons procedures. The complex dimensions of a response situation have been dealt with at the central governmen district authority and local government level. A comprehensive understanding of the multi-hazard respons structure with accompanying directives can therefore be best appreciated only when seen in their totality However, the separation of the parts of the Emergency Management and Response Plan (EMRP) is don with a view to allow functioning of the plan smoothly. Therefore, some of the parts would need continuou updating whereas, others would need to be reviewed after several years. The following description of th different parts of the EMRP publication would assist the reader in terms of selection of the part required fc immediate reference.

Part I of the EMRP is the **Emergency Management and Response Mechanism-Organisation Structure** It outlines the institutional arrangements, inter-department linkages, role of NGOs, voluntary agencies an local communities. The procedure and mechanisms for plan dissemination and plan update are also reflectec The inventory of resources forms an integral part of this document, but has to be included after carrying ou an assessment on requirements and availability. That is yet to be carried out.

Part II of the EMRP is the **Multi-Disaster Response and Mitigation Strategy** at Central governmen provincial, district and local government levels.

Part III of the EMRP is the **Operating Procedure Guidelines and Standards.** This document presents th guidelines for various departments during different stages of the disaster cycle. The standards of services fc food, water, shelter and health services have been elaborated extensively in this document. Informatio Reporting and Monitoring Tools suggested in this document gives the reporting institutions, necessary. format for preparedness, immediate response and damage assessment.

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Previously published **Ratnapura Disaster Management Action Plan** discusses various technology options and dimensions of training research and community participation. Therefore generic mitigation measures for specific disasters have also been discussed in this report.

This EMRP has been prepared with the consultation of the Ratnapura Disaster Management Committee and the cooperation and guidance of all who contributed in preparation of this document are acknowledged with gratitude.

I wish to acknowledge with gratitude the assistance provided by ADPC management, specially the contributions made by Mrs. Shirely Mattingly - ADPC Consultant, in bringing this document to this standard

Mrs. G Karunaratne
Project Director
Sri Lanka Urban Multi-Hazard Disaster Mitigation Project

April 1999

ACRONYMS

ADPC	-	Asian Disaster Preparedness Centre
CAO	-	Office of the Municipal Commissioner
CERTs	-	Community Emergency Response Teams
CWO	-	Cooperative Wholesale Establishment
DAC	-	Disaster AssistanceCentre
DCR	-	District Control Room
DDM	-	District Disaster Management
DIDM	-	Divisional Disaster Management
DIV.Sec	-	Divisional Secretary
DMSC	-	Disaster Management Steering Committee
DOCS	-	Departmental Operating Centres
EMB	-	Emergency Management Board
EMC	-	Emergency Management Committee
EMRP	-	Emergency Management and Response Plan
EOB	-	Emergency Operation Board
EOC	-	Emergency Operation Centre
EOCIMS	-	EOC Information Management System
EOD	-	Emergency Operation Director
EOO	-	Emergency Operation Organisation
EOP	-	Emergency Operational Priorities
EPD	-	Emergency Preparedness Division
ICS	-	Incident Command System
LAN	-	Local Area Network
MC	-	Municipal Council
MM	-	Municipal Member
MP	-	Member of Parliament
NDMC	-	National Disaster Management Centre
NGO	-	Non-Governmental Organisation
NWS&DB	-	National Water and Supply Drainage Board
PC	-	Provincial Council
PDM	-	Provincial Disaster Management
RDMSC	-	Ratnapura Disaster Management Steering Committee
RMC	-	Ratnapura Municipal Council
SAR	-	Search and Rescue
SEMS	-	Standard Emergency Management System
SLCTB	-	Sri Lanka Central Transport Board
SLRC	-	Sri Lanka Red Cross
SOC	-	Site Operation Centre
SOP	-	Standard Operating Procedure
TDMC	-	Training Department of MC
USAR	-	Urban Search and Rescue

1 INTRODUCTION

1.1 Policies and Objectives

Disaster response is a combination of actions that are needed to be taken by people and institutions in the face of a disaster to ensure the minimum losses due to the disaster. Disaster response mainly includes the implementation of disaster preparedness plans and procedures, early warning and disaster rehabilitation programmes. These have to be prepared under the common objective of ensuring the minimum losses and all the plans should be directed towards the following Policies and Objectives;

- Protection of life and property from disaster is a core responsibility of government and of the community at large
- Government will partner with non-governmental organisations and community groups in all phases of disaster management
- Public awareness and education is an integral component of a comprehensive disaster management program
- Disaster operations rely on the normal authority and responsibilities of government, plus additional authorities that may be invoked under certain conditions. Government at all levels must work together and coordinate their cooperation to meet disaster's challenges.

1.2 Operational Priorities

- Protecting human life (the highest priority)
- Meeting the immediate emergency needs of people, including rescue, medical care, food, shelter and clothing
- Restoring facilities that are essential to the health, safety and welfare of people (medical, sanitation, water, electricity and emergency road repair)
- Meeting the rehabilitation needs of people, including temporary housing and employment
- Mitigating hazards that pose a threat to life, property and the environment

1.3 Planning Process

This plan was developed in consultation with users who are responsible for updatement and review periodically.

It is designed to

- Reflect the organisational structure for emergency management
- Ensure commitment to the policies and concepts contained in the National Disaster Management Plan
- Reflect the needs of the community
- Incorporate various agencies' roles and responsibilities
- Maximise the efficient use of resources

The main users of the document will be the political leadership and officials of the municipality and associated service departments under the provincial and central govt. operating within the Ratnapura district, community based organisations and NGOs.

The emergency response has to be carried out in a manner that contributes to long-term development goals and reduce the vulnerability to any future occurrence of potentially damaging events of similar nature.

1.4 Main disaster types affecting Ratnapura M C

The main disaster types that has brought considerable losses to economy and social structure of Ratnapura M.C. area in the past in the order of significance are;

- floods;
- landslides and subsidence;
- epidemics;
- landslides;
- erosion

These events can be categorized into two groups when we view them as events of a series of associated phases on a time continuum.

Floods, landslides, subsidence	-	rapid onset disasters
Epidemics, landslides erosions	-	slow onset disasters

This plan will deal primarily with the cases of rapid onset disasters such as floods and landslides and most of the activities connected with slow onset disasters is expected to be handled under normal circumstances without extra efforts.

1.5 The Activities identified for Emergency Response are;

- early warning
- evacuation
- search and rescue
- post disaster assessment
- emergency relief
- logistics and supply
- communication and information management
- survivor responses and coping
- security
- emergency operation management
- rehabilitation and reconstruction.

The Ratnapura Municipality, recognizing the needs of an emergency response plan for the operational area of the municipality, has established the following Emergency Operational Priorities (EOP) in a disaster situation.

- Save lives and protect property
- Repair and restore essential systems and services
- Provide a basis for direction and contract of emergency operation
- Provide for the protection, use and distribution of remaining resources
- Provide for continuity of Govt.
- Coordinate operations with other jurisdictions and outside emergency service organizations

2. LETTER OF PROMULGATION

Everyone is responsible for emergency preparedness.

In Ratnapura it is not a matter of if another disaster will strike soon. But when! Remember the floods in the fifties and the Helauda landslide that killed about 30 people in 1992. These are only a few examples.

In 1997 with the initiative of Sri Lanka Urban Multi-Hazard Disaster Mitigation Project (SLUMDMP), the municipality established its Disaster Mitigation Steering Committee (DMSC). This was established to facilitate interdepartmental and interagency coordination during a disaster for emergency preparedness, response and recovery. The DMSC has proven itself to be one of the first of its kind among the local govt. institutions ever developed for the purpose of Disaster Management.

This Emergency Management Response Plan is designed to help you better understand how the DMSC is organized to respond to future emergencies. The safety of every one who lives and works in Ratnapura depends on each of us understanding.our role and how our efforts contribute to the municipality's emergency response.

Let us wish for our own success to achieve the common goal to make the city of Ratnapura an area free of Natural Disasters with safe and conductive environment for our future generations to live.

Asoka Jayawardene
Mayor
Ratnapura M.C.

3. AUTHORITIES FOR FUTURE DEVELOPMENT OF THE EMERGENCY MANAGEMENT PLAN AND INSTITUTIONAL ARRANGEMENTS

3.1 Authorities for future developments of the plan

This plan was prepared with the initiative of the Sri Lanka Urban Multi-Hazard Disaster Mitigation Projec (SLUMDMP) implemented under Asian Urban Disaster Mitigation Program. When the Disaster Managemer steering committee (DMSC) was established in Ratnapura, the DMSC felt the urgent need for a sustainabl mechanism to combat natural disasters. The DMSC realized the necessity for the establishment of procedure for disaster management. This Emergency Management Plan is one such procedural requirement, an municipal council will take the responsibility of implementation of the same.

The municipal commissioner will take the responsibility of making this a live document. He will take charg of looking after the responsibility of implementation of the emergency plan, updatement, revision and introductio of necessary amendment to the same under the guidance of the mayor with the approval of the municipa council.

The heads of departments listed in this plan will have to play a major role in improving this document i addition to the roles and responsibilities mentioned in case of a disaster. After adaptation of the plan, they wi have to see the plus and minus points, after testing it in a disaster situations. Appropriate measures have t be taken to analyse it periodically and evaluate the functions and bring to the notice of the municipa commissioner on the requirements of any changes to this documents.

The NGO community also has a responsibility for critical evaluation of the procedures mentioned here. The know the difficulties, implications and response of the community. It is their duty to show the short comings fc effecting necessary changes.

3.2 Institutional Arrangements for Emergency Operations

Disaster Management involves many layers of participating organizations. The three focal layers are Centra Govt., Provincial Govt. and Local Govt.. The national level agencies are involved in policy decisions, resource allocation, prioritization of activities, budget allocation and monitoring through the National Disaster Managemer Centre. The District Disaster Management Committee under the provincial govt. is an apex planning bod and plays a major role in preparedness and mitigation.

The district level response is coordinated under the guidance of the district secretary who acts as the Distric Disaster Manager.

Under the District Disaster Manager, the Divisional level response is coordinated by the Divisional Secretar who will act as the Divisional Disaster Manager. Divisional Disaster Manager is responsible for establishme of Divisional Level Emergency Operations Centres for the jurisdictions area of the local govt. authority unde the chairmanship of the political leadership of the respective local authorities. It will have one or more Emergenc Operation Centres (EOC) depending on the status of the emergency situation.

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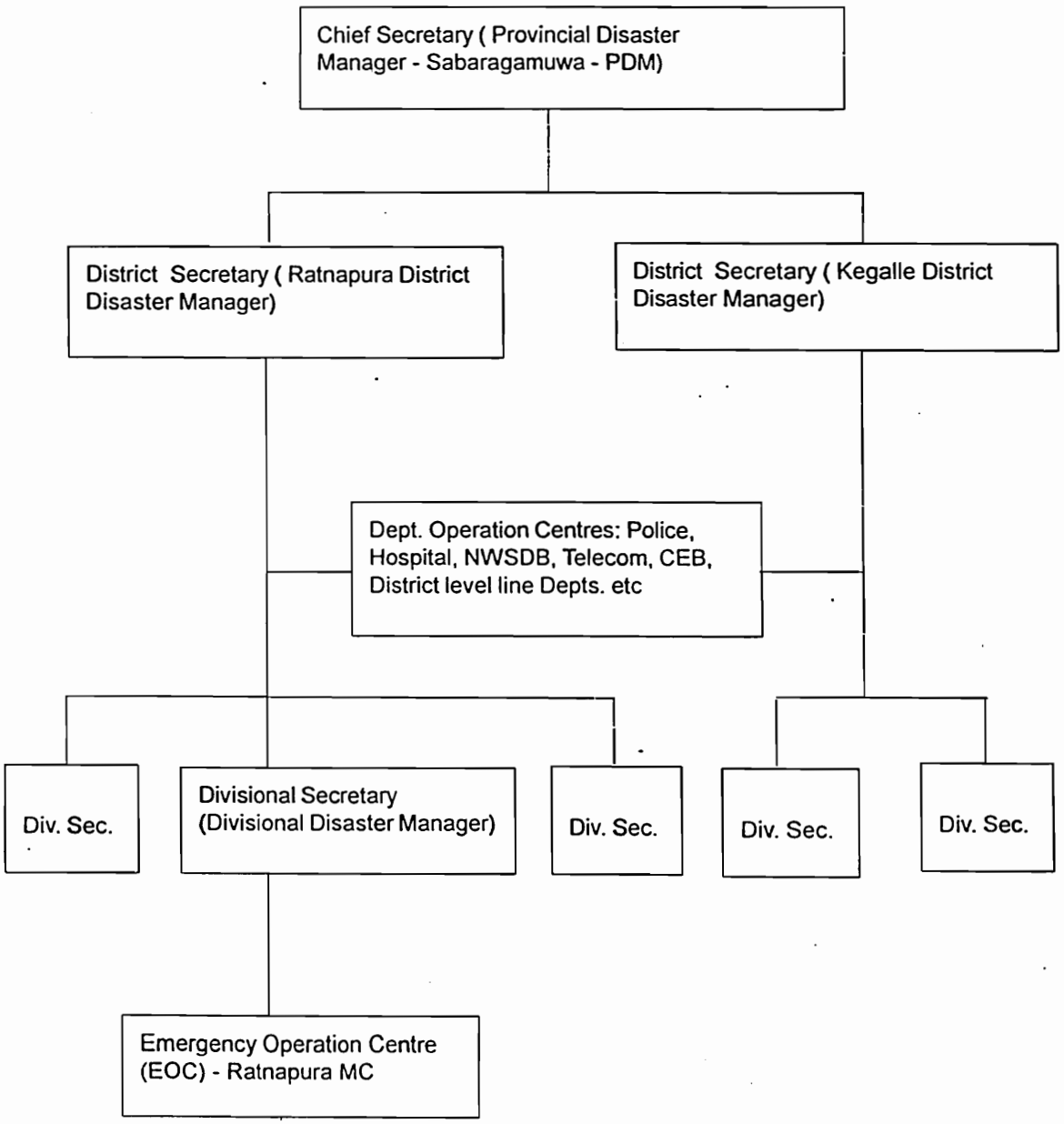
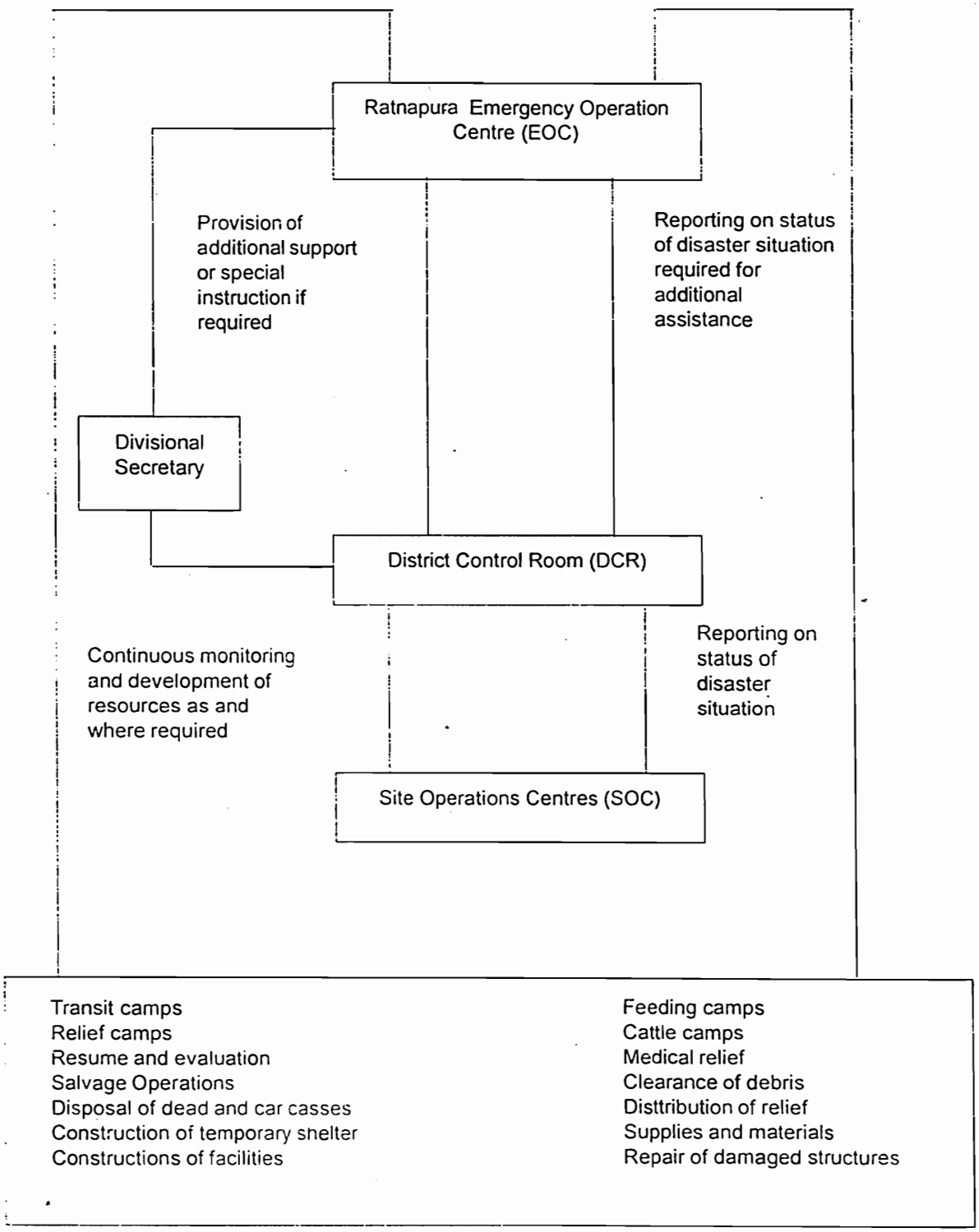
3.3 CORDINATION STRUCTURE

EMERGENCY OPERATIONS ORGANISATION
Standard Emergency Management System (SEMS)

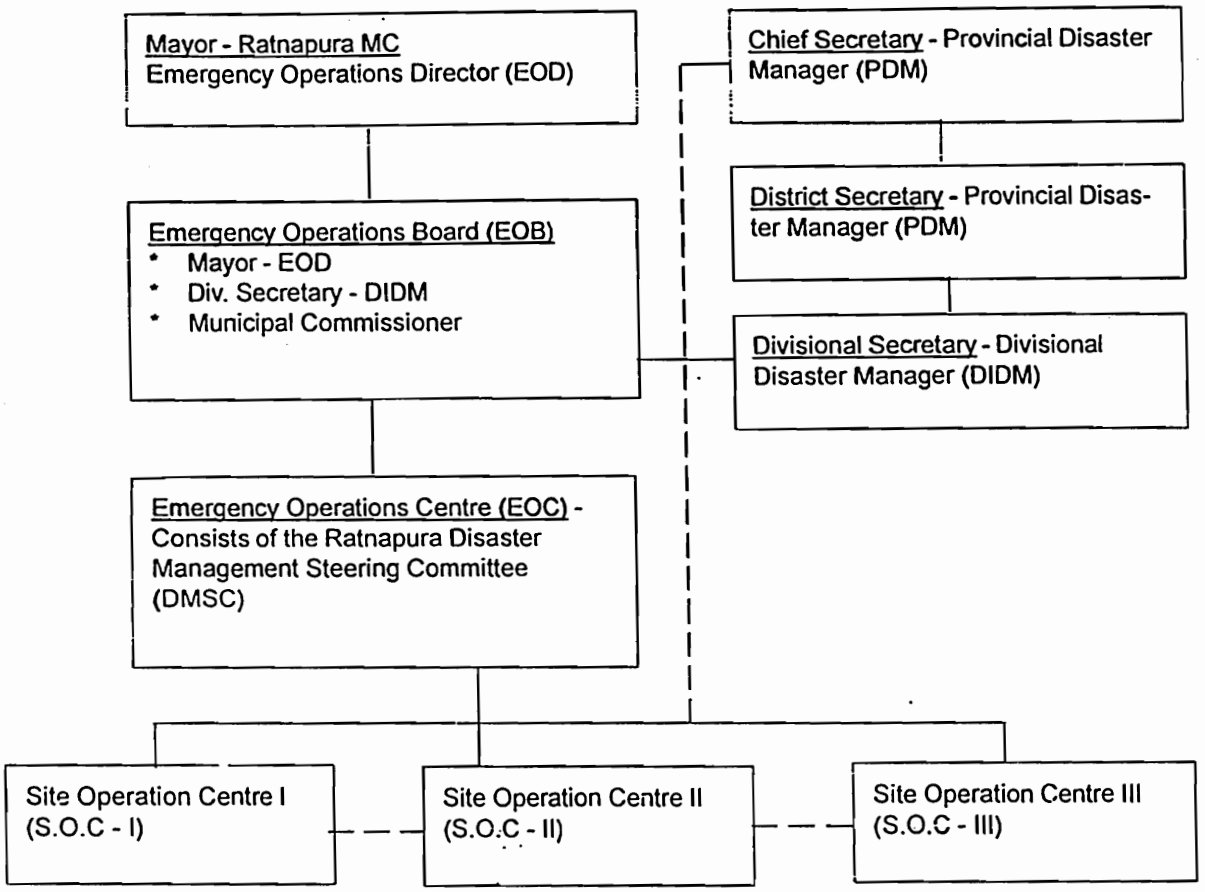


3.4 FLOW OF INFORMATION BETWEEN EOC, DCR & SOC



3.5 STANDARD EMERGENCY MANAGEMENT SYSTEM (SEMS)

Emergency Operations Organisation



Operations ————————
Coordination — — — — — —

3.6 ACTIVATION STEPS

Step 1. On declaration of a local emergency situation the EOC and appropriate SOCC are opened. Departmental and officers manage their respective resources and field operations from their DOCs. DOCs are connected to Ratnapura EOC via variety of communication systems (telephone, fax, radio, cellular phones etc)

Step 2. DOCs pass appropriate damage assessments and other information to the EOC and coordinate their respective interdepartmental and interagency resource requests through the EOC. The EOC is the SEMS local govt. component for an emergency occurring within Ratnapura MC.

Step 3. If Ratnapura cannot supply the requested resources, the EOC will work with the Sabaragamuwa Provincial SEMS to secure the needed resources from a neighboring jurisdiction of the Central govt. through the Natural Disaster Mitigation Centre (NDMC).

4. STANDARD EMERGENCY MANAGEMENT SYSTEM (SEMS)

4.1 Purpose and Scope of the SEMS

SEMS is a management system. It is based on the Incident Command System (IC S), a proven system that has been used in developed countries for many years. SESM provide for a five level (Central Govt., Provincial, District and Local Govt. levels) emergency response organizations as given in the draft National Disaster Management Action Plan, which is yet to be passed. This will be activated as needed to provide an effective response to multi-agency and multi-jurisdiction emergencies.

SEMS provides a management framework and guidance operation at each of the country's five levels of emergency response. The persons in-charge at each level (e.g. incident Commander, EOC Director etc.) must address each functional responsibilities; management; operations; planning / intelligence; logistics, and finance / administration. SEMS provides the umbrella under which all response agencies can function in an integrated fashion.

4.2 Ratnapura MC Emergency Operations Centre (EOC)

Functional Areas Under SEMS

Primary EOC / SEMS Functions	EOC responsibilities
Management (EOC Director Coordinator) Mayor of Ratnapura MC	Responsible for overall emergency policy and coordination through the joint efforts of the municipality, govt. agencies and private organizations and community
Operations (Section Coordinator) Divisional Secretary	Responsible for coordinating city wide operations in support of the response to the emergency through implementation of the organizational level action plan
Planning / Intelligence (Section Coordinator) Divisional Secretary	Responsible for collecting, evaluating and disseminating informations, developing the organizational level action plan in coordination with other EOC functions and maintaining documentation
Logistics (Section Coordination) Divisional Secretary	Responsible for providing facilities, services, personnel, equipment and materials
Finance & Resource Admin (Section Coordinator) Municipal Commissioner	Responsible for financial activities and administrative aspects not assigned to the other functions
Information and public affairs (Section coordinator) Mayor of the Ratnapura MC	Responsible for the development of information about the emergency to be provided to the public through the print and broadcast media. This section will be the principal location of contact for municipality wide public service announcements and emergency broadcast coordination
Liaison (Section Coordinator) Municipal Commissioner	Responsible for coordinating the agencies within the MC area and outsides the MC area that may have a temporary role and / or representation in the EOC

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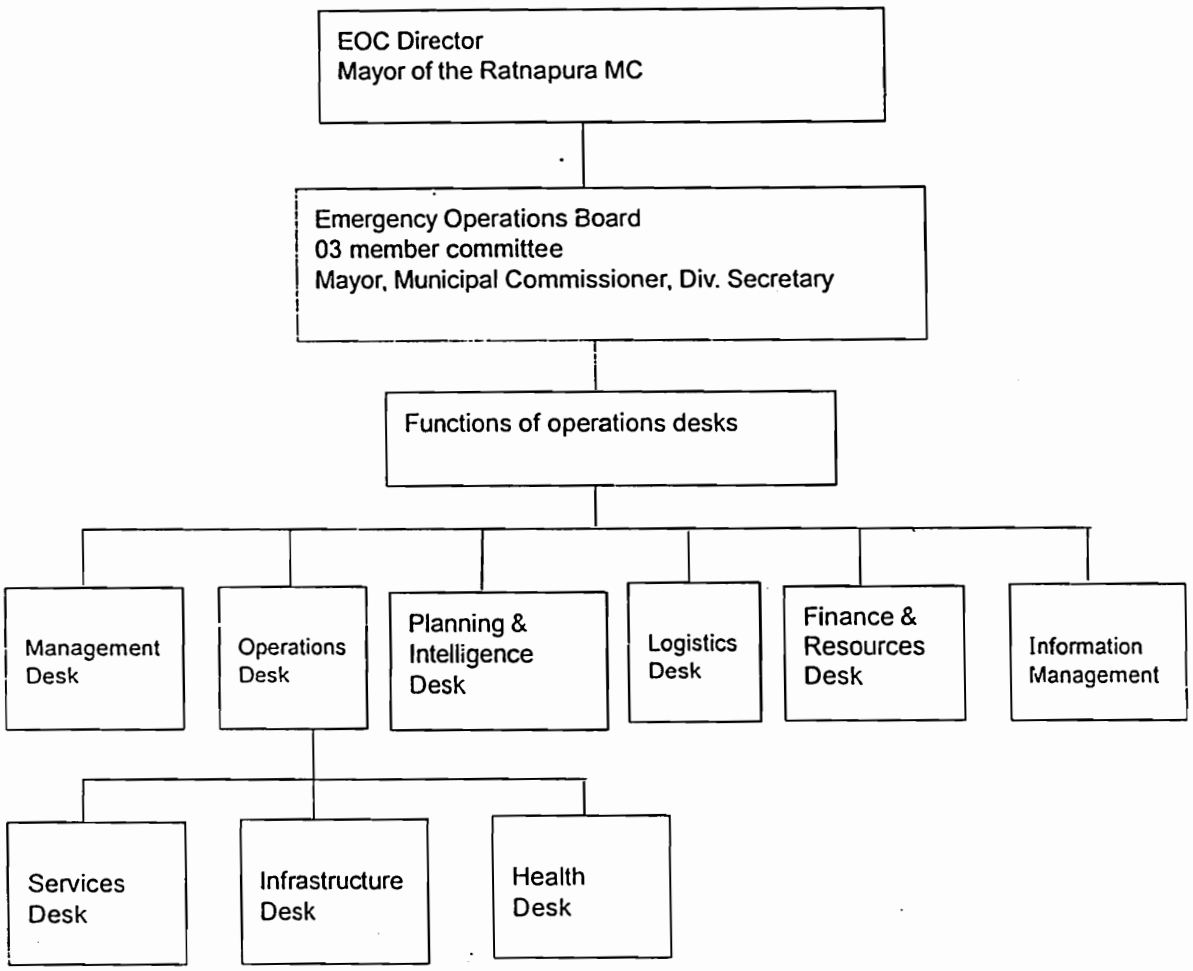
4.3 Desk Officers

The desk arrangements provides for division of tasks, information gathering and record keeping and accountability of the desk officers of the EOC under EOB for specific functions.
Desk officers will function under the direction of the EOD.

4.3.1 Structure Plan

Desk arrangements for emergency operations



4.3.2 The responsibilities and functions of the Emergency Operations Director/Management coordinator (Mayor of the Ratnapura MC)

A *Response action for*

- Overall emergency policy
- Appointment of SEMS coordinators for different functions with the advice of the EOB
- Appointment of Desk officers and assignments (operation desk, planning and intelligence desk, logistics desk, Finance and administration desk, Infrastructure Management desk) in consultation with the EOB.

Planning intelligence desk

i. Operation desk
The operation desk has 3 separate functions
(a) Service desk
(b) Infrastructure desk
(c) Health desk
ii Logistics Desk
iii Finance / Admin. - Resources Desk

B. Asst. operations desk to procure necessary resource.
C. Information collection and dissemination
D. Reporting to EOC members
E. Supervision and monitory of disaster management and relief activities
F Liaison between EOC - SEMS and desk officers

1.3.3 Responsibilities and Functions of Planning and Intelligence Desk

A. Response action for

- Emergency supplies of water and cooked food
- Water, medicines, first-aid, cooked food for marooned persons
- Rescue and evacuation
- Salvage Operations
- Disposal of dead
- Transfer of marooned persons to transit camps at the earliest possible time
- Emergency transport for the seriously injured
- Transit camps in accordance with standards laid down
- Feeding Centres in accordance to the Checklist

B. Implement procurement / purchase / hire / requisition plans of materials available at the district level

C. Establishing communication links

- EOC - Ratnapura MC
- Office of Divisional Secretary
- Police, Fire Brigade, Defense Services, Civil Defense, RDA, NWS&DB, CEB, Telecom, CWE, Coop, Irrigation, and Inter- departmental relief activities within the district
- Mutual Aid and Response Group
- NGOs and NGO coordinating committee
- Private donors

D. Reporting

- Dispatch of Preliminary Information Report and Action Taken Report to emergency Operations Centre and Divisional Secretary's office
- Dispatch of all information and any other as asked for by Emergency Operations Centre and Divisional Secretary's office

- Report to Emergency Operations Centre and Divisional secretary's office on deployment.

- Identify specific items for follow-up actions on the directives of the District Disaster Manager (District Secretary)

E. ***Supervision and monitoring of disaster management and relief activities within the Division***

F ***Market intervention***

- Promote and encourage revitalisation of local economic activities for speedy recovery
- Prevent price hiking, corruption and unauthorized sale of relief materials with the assistance of police and Grama Sevakas
- Initiate legal action on those engaged in hoarding, price hiking, corruption and unauthorised sale of relief materials with the assistance of police and Grama Sevakas

G ***General***

- Disseminate details about legal and official procedures, eligibility criteria with respect to relief and compensation for loss of life, injuries, livestock, crop, houses, required to be adopted as received from EOC to District Secretary (District Disaster Manager)
- Maintenance of records (date of joining, period of service, leave record, overtime, etc) for all the persons deployed for relief work within the Division
- Obtaining orders, instructions, clearances, clarifications from state and District headquarters
- Ensure implementation of orders, instructions, from EOC and District headquarters at the disaster site
- Requisition of accommodation, structure, vehicles and equipments for relief duty
- Issue of passes and identification stickers for vehicles on relief duty
- Issue of passes and identity cards to relief personnel including the persons from NGOs
- Sanctioning expenses for reimbursement with the approval of the District Disaster Manager. (District Secretary) and Director - Dept. of Social Services

1.3.4 Responsibilities and Functions of Services Desk

A. ***Assess***

- Search and rescue requirements
- Relief requirements
- Cash Compensation requirements

B. ***Organize and coordinate***

- Relief camps in accordance with standards laid down to be set-up at the earliest
- Arrangements for dry rations and family kits for cooking
- Cattle camps
- Relief supplies to Transit and Relief camps or to Site Operations Centre
- Supplies of fodder and cattle-feed to cattle camps
- Supply of seeds, agriculture inputs and services to Site Operations Centre
- Welfare Services
- Law and order (e.g. prevent looting and theft)

C. *Coordinate NGO activities through necessary support to ensure community participation*

- Establishing coordination mechanisms among district level NGOs and other state level NGO
- identification of NGOs to serve on committees, task force
- assign well-defined area of operations and report to EOC
- assigning specific response function to specialized NGOs and report to EOC
- reporting upon procurement and disbursement of relief materials received through governmer and non-government channels
- Mobilise and coordinate work of volunteers ensuring community participation

4.3.5 Responsibilities and Functions of Infrastructure Desk

A. *Organize and coordinate clearance of debris*

B. *Temporary Repairs to damaged infrastructure*

- power
- transport
- telecommunication
- roads
- bridges
- canals and drains
- public buildings

C. *Construction of facilities*

- shelters with sanitation and recreation facilities as per the standards
- provision of hand-pumps and brewers where necessary
- temporary structures for storage
- educational facilities
- medical facilities
- postal facilities
- help aids when required

4.3.6 Responsibilities and Function of Health Desk

A. *Organize and maintain records on*

- treatment of the injured and sick
- disposal of dead bodies
- disposal of carcasses
- preventive medicine and anti-epidemic actions
- Reports on food, water supplies, sanitation and disposal of waste

3. *Assess, supply and supervise*

- Medical relief for the injured
- Number of ambulances required and hospitals where they could be sent (public and private)
- Medical equipment and medicines required
- Special information required regarding treatment as for epidemics etc.

3. *Supervision of maintenance of standards*

- Identification of source for supply of drinking water through tankers, bowsers and other means of transport
- Transit and relief camps for cooking arrangements. sanitation. water supply, disposal of waste, water stagnation and health services
- Communities for storage of rations, sanitation, water supply, disposal of waste, water stagnation and health services
- Standards in cattle camps with arrangements for water, fodder, disposal of solid waste, veterinary services

1.3.7 Responsibilities and Functions of Logistics Desk

4. *General*

- Assessment of reinforcement needs including manpower and deployment of resources per information
- Assignments for corner inquires
- Requirement, availability and location of depots, and transportation of wood to the locations for mass cremation
- Identification of location where mass cremation / burial can be carried out and Manpower and transport that would be required for this work;
- Identification of location where carcasses can be disposed of and Manpower and transport that would be required for this work;
- Requesting for additional resources from other districts / divisions / EOC. Arrangements with patrol pumps for supply of fuel for authorised relief vehicles (credit coupons, fuel orders etc)
- Coordinating and supervising issuing of relief tickets to affected families
- Ensuring safe storage, and transport of relief supplies
- Coordinate supplies distributed directly by NGOs and other organizations including private donors
- Ensure proper maintenance of vehicles and equipment

3. *Coordination of transport - with*

- SLCTB and cluster companies
- Railways
- Security forces
- Private transporters, bus owners
- Boat Operators
- Government Helicopters

C. *Organising transport for*

- Rescue parties
- Relief personnel
- Marooned persons
- Water, medicines, first aid and cooked food for marooned persons volunteers
- Relief materials
- Seriously injured and sick

4.3.8 Responsibilities and Functions of Communication and Information Management Des (Communication Room)

A. ***Set-up an information centre in DCR to organise sharing of information with mass media ar community***

B. ***Monitor disaster warnings and weather conditions in coordination with and on the advise***

- Met. Dept., Irrigation Dept., NBRO etc.

C *General*

- Send Out-Messages on behalf of District Disaster Manager
- Maintaining In - Message and Out - Message Register
- Collect information from Site Operations Centre
- Organise information for EOC and information on demand from Divisional Secretary
- Emergency operations Director / EOC
- Serve as data bank required for managing operational aspects of disaster situations

D *Keep readily available all the information including*

- Office and residence telephone numbers, fax numbers, and mobile numbers where applicable of Chief Secretary and other District Secretaries including Divisional Secretaries
- Phone numbers, names addresses and pager numbers where applicable of the officers and staff of the district and Emergency Operations Centre
- List of people on the spot who can organise and co-ordinate the relief activities
- Phone numbers, fax numbers, wireless, etc. of the other control desks officers
- Phone numbers, names, and addresses of the field officers
- Phone numbers, names, and addresses of Non-officials (like MPs, MMS, PC Members e in the District
- Planning information required includind maps incorporated in Emergency Response Plans
- Disaster Site Map and indication on extent to which other areas may be affected, etc. Information regarding alternate routes, water sources, layout of essential services which may be affected etc.

4.3.9 STAFF OF THE EMERGENCY OPERATIONS CENTRE (EOC)

(General membership particulars)

1.	Mr. K. K. Gunarathna Municipal Engineer Municipal Council Ratnapura	Tel. 045-22275	8	Mr. E.R. Perera Deputy Director of Education Zonel Education Office Ratnapura	Tel. 045-2735
2.	Mr. G.S. Amarasinghe Engineer Engineering Services Office Sabaragamuwa Province Bandaranayake Mw. Ratnapura	Tel. 045-226 17 Fax 045-22349	9	Mr. K.P. Silva Divisional Asst. Irrigation Dept. Hidellane Ratnapura	Tel. 045-22466
3.	Mr. S.D.I. Lionel Enforcement Officer Gem & Jewelry Authority Regional Office Ratnapura	Tel. 045-22 159 Fax 045-3139	10	Mr. K.V.P.M.J. Gamage Asst. Commissioner Municipal Council Ratnapura	Tel. 045-22086
4.	Mr. M. Somaratna Deputy General Manager Sri Lanka Telecom Deputy GM Office Ratnapura	Tel. 045-23231 Fax 045-23243	11	Mr. R.M. Somaratna Deputy Director Urban Devt. Authoirity Ratnapura	Tel. 045-22732 Tel 07 1-25024
5.	Dr. Nimal Edirisinghe Prov. Director of Health Services Office of the Provincial Director of Health Dharmapala Mw. Ratnapura	Tel. 045-22434	12	Mr. A. W. Athula Commissioner Municipal Council Ratnapura	Tel. 045-22275
6.	Dr. E.S. Liyanage M.O.H - MC M.O.H. Office Municipality Ratnapura	Tel. 045-2275 Tel. 045-2278	13	Mr. W.A. Shantha de Silva Wickramarachchi Public Health Inspector Municipal Council Ratnapura	Tel. 045-22275
7	Divisional Secretary Ratnapura	Tel. 045-22237	14	Mr. M. Wimalasundara Asst. Manager National Hou. Dev. Au. Ratnapura	Tel. 045-2496
			15	Mr. A N. Premathilake Public Health Inspector Municipal Council Ratnapura	Tel. 045-22275

4.3.10 MINISTRY OF SOCIAL SERVICES (EMERGENCY DEPT.)

Mr. W.B.J. Fernando Director Ministry of Social Services 5th Floor, Sethsiripaya Battaramulla Tel. -877130	Mrs. N.J. Pathirana Director Dept. of Social Services Tel. Off. 686191 Res. 865900 Mr. N.D. Hettiarachchi DD-Dept. of Social Services No.98, D.S. Senanayake Mw. Colombo 08 Tel. Off.686126, 686200

4.3.11 Contact Telephone numbers of Emergency Management Committee (EMC) members and other relevant institutions

The telephone lines that should be included in the emergency telecommunication systems are:

- H.W. the Mayor of Ratnapura MC - 045-2732
- Municipal Commissioner - 045-2759
- Municipal Engineer - 045-2275
- District Secretary - 045-223 7
- Food Control Department - 01 -686200
- Ratnapura Hospital - 045-2261, 045-2262
- Ratnapura MPCS - 045-2261
- Bambarakotuwa MPCS - 045-2332
- CEB - 045-22456
- SHS - 045-2278
- NWS&DB - 045-2400
- Education Department - 045-2403
- Ganepola MPCS Filling Station - 045-2025
- Postal Service DPMC - 045-3256

Other facilities

- Jagathsiri Bakery - 045-2058
- Janaranjana - 045-2042
- Jayasiri - 045-2057
- Impala - 045-3056

SP Police Sabaragamuwa - 645-2228, 2223
Residence - 045-2229

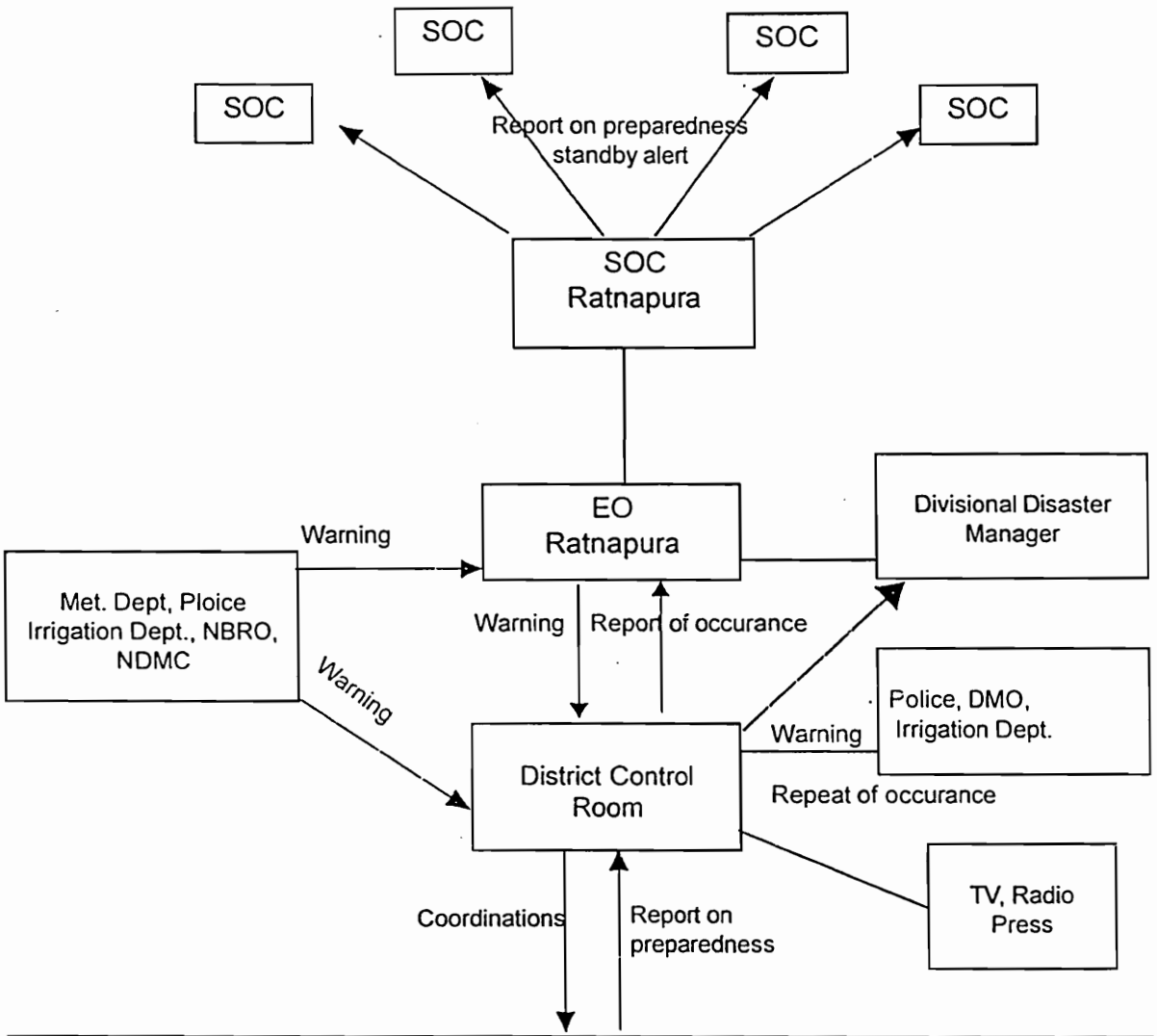
Ratnapura Police Station - 045-2222

4.4 Response structure

The map work book for Ratnapura MC and the mitigation options report will give details of the type of damage and possible impacts of major disasters to community and information facility as well as the mitigation options available to EOC to reduce the impact of disasters

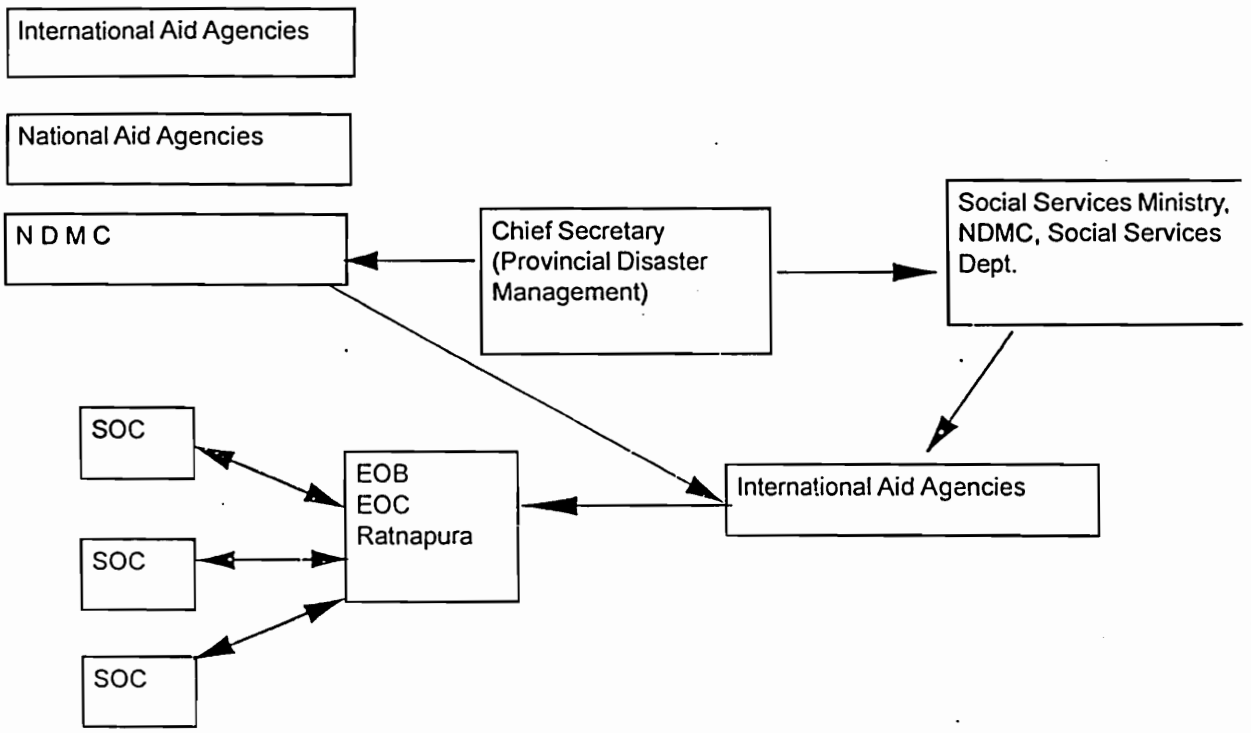
The emergency response structure for EOC is given in a diagrammatic format to facilitate, quick and effective response. It helps in identifying relevant departments that need to be mobilized immediately and the flow of information as well as the levels.

4.4.1 RESPONSE STRUCTURE DURING WARNING STAGE



Municipal Council Divisional Secretary Office	Superintendent of Police civil defence	Dept. Operation Centre	NGO CBO	Hospital staff Surgeons, Pharmacy, Health Dept., Ayurvedic Dept.	Groceries Bakeries CWE Cooperative	Service org. Fire brigade
Standby	Standby	Standby	Standby	Standby	Standby	Standby
Alert	Cordoning of area	Alert		Alert		Ready with operation crews
Evacuation	Evacuation					
	Traffic					
	Traffic Management					
	Law and Order					
	Local area warning					

4.4.2 RESPONSE STRUCTURE ON OCCURRENCE OF A DISASTER

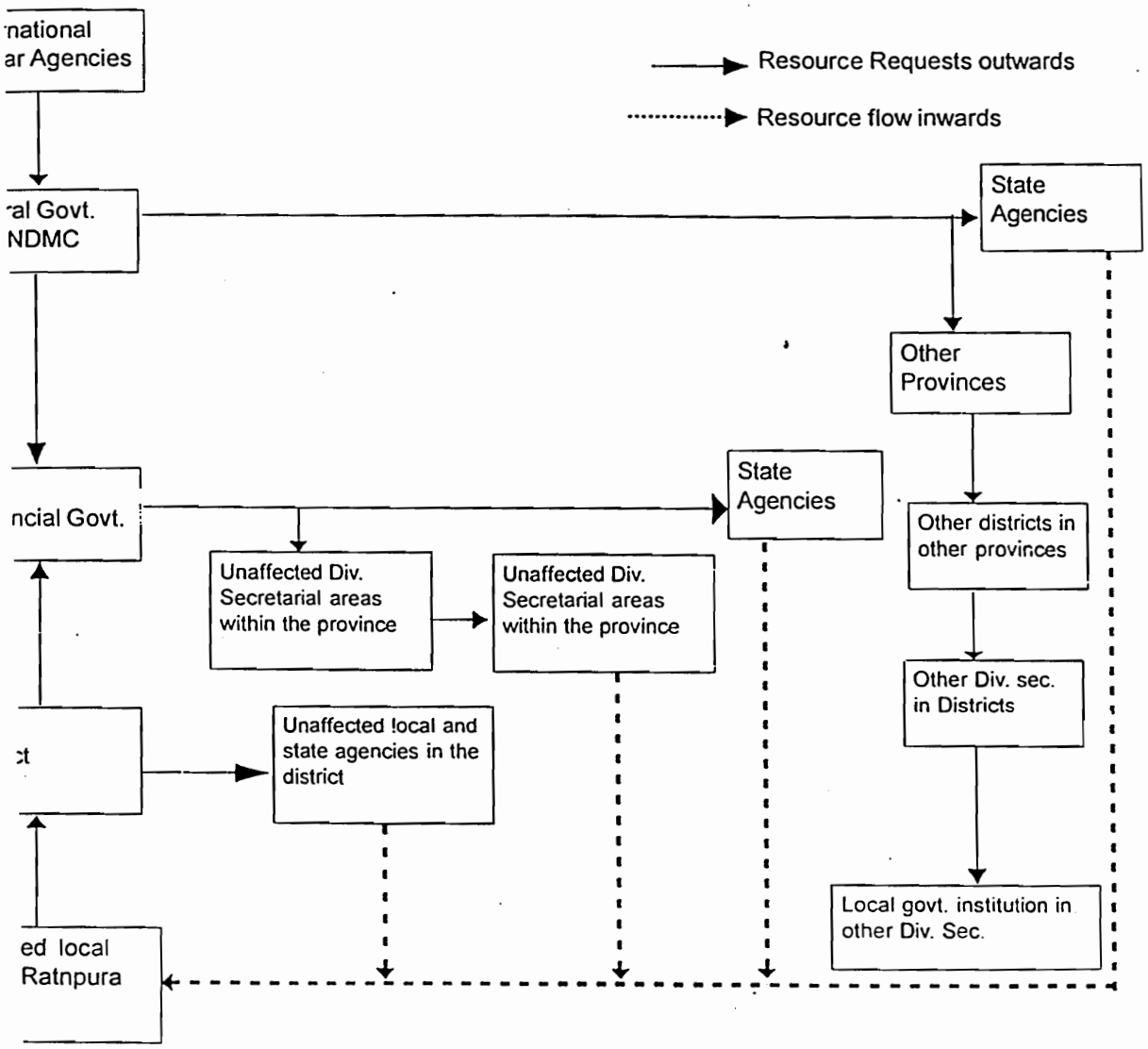


Activity	Police, Judiciary, Defense service, fire brigade	Departmental Operations Centre (DOC)									
		Province Eng. Services	Health Hospital	CWE, Co.op, Food Dept.	Telecom	Water Board	CEB	Edu. Dept.	Dept. of SS		NGO and CBO
1. Search and rescue	√								√		√
2. Medical aid			√					√	√		√
3. Disposal of dead bodies	√		√						√		√
4. Temporary shelters		√			√	√	√	√	√		√
5. Relief activities, cooked food gratuitous, relief, dry ration				√				√			√
6. Health and sanitation, preventive measures preventive measures			√								√
7. Carcasses disposal		√									√
8. Infrastructure restoration					√	√	√			√	√
9. Cattle camps									√		√
10. First aid			√								√

MUTUAL AID

localized system designed to ensure that adequate resources, facilities and other support are provided thin an identified jurisdiction whenever individual units resources prove to be inadequate to cope with a ven emergency situation.

1 MUTUAL AID FLOW OF RESOURCE REQUESTS



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6 STANDARD OPERATING PROCEDURES (SOP) DEVELOPMENT

In most disaster situations experience has shown that loss of life and property could be significantly reducec due to preparedness measures established as per the standard operating procedure guidelines and stan dards developed according to the internationally acceptable norms which have been modified to suit the loca conditions.

Therefore the attempt has been made to include operating procedure guidelines (see Part III) and for mon toring in following areas,

- Procedure for warning
- Operating procedure for evacuation
- Comprehensive operating procedure Guidelines for the departments,
  - Relief and recovery
  - the standards for services
  - checklists for monitoring
- Monitoring Relief and Rehabilitation
- Standard arrangement, for transit camps
- Relief camps
- Cattle camps
- Feeding centres
- Standard of services

The SOP for the respective organisation is given in Part III of the EMRP and is subject to constant revisio updatement and revalidation by the respective head of the department, service division or the organisatic as given in part III.

7. HAZARD ANALYSIS (NATURAL HAZARDS) FOR RATNAPURA MC

Ratnapura experiences multi-hazard problems which have resulted in significant changes to natural ar human environment. The type of hazardous events affecting Ratnapura MC Area are,

(a) Floods
(b) Landslides and bank failures
(c) Epidemics
(d) Subsidence and erosion

The landform and landscape diversity is the most important criteria for most of the natural hazards. The Ka Ganga basin is a physiographycally distinct area which is around 2700 sq. km.. The primary drainage directed Kalu Ganga, which rises in the Central Highlands and flows west in to sea at Kalutara. The Ka Ganga has a fairly wide flat valley mostly covered up with the built up areas. The adjoining highland is dee dissected with step valley side slopes and narrow valley floors.

The highlands rapidly give way to the west to a less dissected relief with upstanding ridges (800 m to 1500r Isolated landslides were recorded from Kolodagala and Ruwanpedesa in Aug 1996.

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ne of the major practices that contributes to the increase of cutting and bank failures is the non-engineered nstruction practices seen during the last decade. With the increase of the population of migrants in to atnapura the community started settling down in the slopes which are prone to landslides. It is reported not ly the less affluent people but also the main contractors, road and highway authorities and state agencies volved in city development are engaged in such practices. The best example is the construction of the new ay ground area. Therefore all slopes around the town area are susceptible to landslides and bank Failures. e rough estimate is that about 35% of the land area are not suitable for development and should be used reforestation and other environmentally friendly land use practices which will not subject to slope instability oblems Yet another 23% of the land is developable (Kospelawinna, Galkaduwa, Angammana, riwanaketiya, etc.), but appropriate measures by habituating broad valleys beyond the Kalu Ganga where change to the normal pattern must be observed. Elevation of the area vary from 10 m to 350 m in the mediate surrounding of Kalu Ganga and its major tributary of Way Ganga. All low lying areas of both Kalu anga and Way Ganga are subjected to floods. The identified areas susceptible to floods are;

Ward	Extent (ha)
Dewalagama	102.3
Pulungupitiya	46.1
Kotuwa	21.2
Kadaweediya	21.3
Waraketiya	18.2

rts of Mudduwa, Muwegama, Bulugedara, Angammana and Godigamuwa are also prone to floods.

ajor floods have been recorded in the years of 1857, 1893, 1913, 1947, 1957, 1969 and 1975. Major floods 1947 inundated an area of 905 ha which is about 40% of the MC area.

e landslides intensity has increased with the population growth. One of the major landslides occurred in 93 at Helauda where about 30 deaths were recorded and about 10-15 houses were completely destroyed. these areas measures have to be taken to control development activities using engineered construction thods and practices.

e subsidence and erosion is mainly connected to Gem mining. All flood plains, are popular gem bearing eas. In this respect Kospelawinna, Mudduwa and Waraketiya are famous for sessional operations by sident community. Mainly the low lying areas and paddy fields are subjected to mining, and in surrounding eas subsidence and erosion are observed due to excessive pumping and haphazard dumping of excavated aterial.

alth hazards are also observed to have increased in the past few years. In the years of 1996 water born eases such as Diarrhea, Malaria, Typhoid, Hepatitis, Rabies and Tuberculosis have spread. Most of them water born diseases and the epidemic situations cannot be controlled with the increase of flood situations. ring monsoon periods high number of victims are recorded and preventive measures are taken by the alth authorities to control the number of victims and to control the growth of the situation to epidemic els.

. 7.1 gives the population details of the Ratnapura MC Area and Fig. 7.2 gives the details of direct health ilities provided in 1997.

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Fig. 7.1 POPULATION IN RATNAPURA MC AREA (1971 - 2012) AND POPULATION DENSITY

Ward	Extent (Ha.)	Population								Density Persons/Ha.	
		1971	1981	1991	1994	1997	2002	2007	2012	1997	2002
Hidellana	280.9	3272	2420	2667	2746	2911	2969	3117	3272	10.36	10.59
Kospalawinna	415.3	2252	2645	2915	3002	3182	3245	3406	3576	07.66	07.81
Weralupe	190.9	3418	2651	2922	3008	3189	3252	3414	3584	16.71	17.03
Pompakele	93.5	1962	2487	2741	2822	2992	3051	3203	3362	31.36	32.63
Godigamuwa	136.2	2221	4135	4557	4692	4975	5072	5325	5591	36.53	37.26
Angammana	296.6	1777	2246	2475	2549	2702	2755	2892	3037	09.11	09.29
Tiriwanaketiya	167.5	1515	1818	2004	2063	2187	2230	2341	2458	13.06	13.31
Batugedara	153.1	1622	2048	2257	2324	2464	2512	2637	2769	16.01	16.41
Warakatota	18.2	1720	1948	2147	2211	2344	2390	2509	2634	128.80	131.32
Kadaweediya	21.3	1117	1876	2068	2129	2257	2301	2416	2536	105.96	108.09
Kotuwa	21.2	785	1447	1595	1642	1741	1775	1863	1956	82.12	83.73
Pulungupitiya	46.1	770	1123	1238	1274	1351	1378	1446	1518	29.31	27.72
Devalegama	102.3	2162	2789	3074	3165	3355	3421	3592	3771	32.79	33.44
Muwagama	138.1	4011	4852	5348	5506	5387	5952	6248	6560	39.01	43.09
Mudduwa	137.2	3037	2869	3162	3256	3451	3519	3695	3879	25.15	25.65
Total	2218.4	31541	37354	41170	42389	44488	45822	48104	50503	20.05	20.80

Source - Demographic Survey (S G) - 1994, Dept of Census & Statistics, Sri Lanka

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Fig. 7.2 DIRECT HEALTH FACILITIES - 1997

Resources	General Hospital	Ayurvedic Hospital	Gilimale Rural Hospital
Health Staff - Doctors - Nurses - Other	84 233 354	6 10 54	3 6 9
No. of Beds	866	101	51
No. of Wards	24	04	04
Indoor Patients per year	61883	2532	4471
OPD Patients per day	685	206	98

Ratnapura General Hospital has provided services to 260,402 out patients in the year of 1997, clinical services to 197,634 patients and 390,809 indoor patients. Indirect health services are provided by the Medical Officer of Health attached to the Municipal Council Ratnapura.

Following facilities are available.

Clinical Centres	-	05
Public Health Officers	-	02
Family Health Officers	-	05

Epidemic control devices implemented by the MC

1. Public awareness programmes
2. Investigation of patients
3. Search of contacted persons
4. Chlorination of wells
5. Construction of Public Toilets
6. Provision of pure potable water
7. Provision of safety foods and drinks
8. Conducting clinics

Recorded epidemic cases are given in table 7.3

Fig. 7.3 RECORDED EPIDEMIC CASES

Epidamic	90	91	92	93	94	95	96
Diarrhea	37	42	16	18	12	22	36
Malaria	06	04	08	02	02	06	18
Typhoid	-	02	-	03	01	02	04
Hepatitis	01	02	01	04	02	04	01
Rabies	-	-	01	01	02	02	01
Tuberculosis	18	11	06	32	18	28	42

Lightning is another natural hazard that has recorded few incidents of deaths but a lesser number of lives losses have been recorded in the recent past. The major areas that are prone to such incidents are;

(i) Muwagamakanda
(ii) New play ground area near Met Dept. office

Damages to property as well as electricity and telecom facilities has been recorded near Met Dept. office and in the adjoining premises where Water Supply and Drainage Board quarters are located.

The hazard assessment carried out by the members of the Ratnapura District Disaster Management Steering committee is given in tables under Fig. 7.4.

Fig 7.4 Hazard Assessment - Elements at Risk

Elements at Risk - Wardwise

.Vard I : Hiddelanna

Elements at risk	Floods			Landslides	Other
	L	M	H		
Office of the Asst. Director of Excise	√				
Meteorology Department					√
Hiddelena Kanista Vidyalaya	√				

Ward 2 : Kospelewinna

Elements at risk	Floods			Landslides	Other
	L	M	H		
Library			√		
Playground			√		

Ward 3 : Weralupe

Elements at risk	Floods			Landslides	Other
	L	M	H		
Along the Colombo - Ratnapura Main Road	√				√
Weralupe Main Road	√				
Transformer		√			

Word 4 : Pompakele

Elements at risk	Floods			Landslides	Other
	L	M	H		

Ward 5 : Godigamuwa

Elements at risk	Floods			Landslides	Other
	L	M	H		
Godigamuwa Maha Vidyalaya		√			

Ward 6 : Anganmana

Elements at risk	Floods			Landslides	Other
	L	M	H		
Angamana Rajamaha Vidyalaya		√			
Thiriwanketiya Maha Vidyalaya		√			
Batugedara Main Road	√				
Kovil			√		
Transformer			√		
Ehelepola Road	√				
Anganmana Road		√			

Ward 7 : Thiriwanketiya

Elements at risk	Floods			Landslides	Other
	L	M	H		
Thiriwanaketiya Temple and Pirivena	√				
Mosque	√				

Ward 8 : Batugedara

Elements at risk	Floods			Landslides	Other
	L	M	H		
Batugedara Maha Vidyalaya		√			
Playground	√				
Mahawela Temple	√				
Batugedara Old Road		√			

Ward 9 : Warakathota

Elements at risk	Floods			Landslides	Other
	L	M	H		
Artigala Mawatha		√			
Transformer and Substation			√		
Muslim Maha Vidyalaya			√		
Bodiramaya			√		
CWE			√		
Kovil		√			
Mosque		√			

Ward 10 : Bazar

Elements at risk	Floods			Landslides	Other
	L	M	H		
Main Road			√		
Goodshed Road			√		

Ward 11 : Fort

Elements at risk	Floods			Landslides	Other
	L	M	H		
Fair	√				
Market	√				
Seeweli Playgroung	√				
Seeweli Maha Vidyalaya	√				

Ward 12 : Polugupitiya

Elements at risk	Floods			Landslides	Other
	L	M	H		
Mahinada Vidyalaya	√				
Museum	√				
Aurvedic Hospital		√			
Power Distribution Centre			√		
Bandaranayale Mawatha		√			

Ward 13 : Dewalegawa

Elements at risk	Floods			Landslides	Other
	L	M	H		
Saman Devala	√				
Sri Sumanaramaya		√			
Weralupe Old Road	√				
Panadura Road	√				

Ward 14 : Muwagama

Elements at risk	Floods			Landslides	Other
	L	M	H		
Muwagama Mountain					√
Kemananda Mawatha		√			
Water Tank			√		

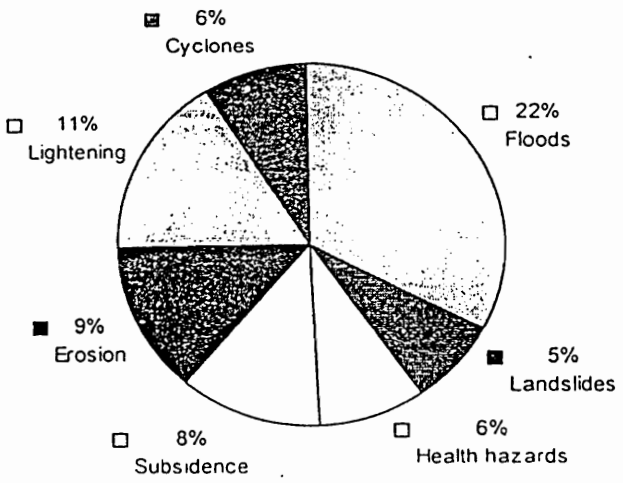
Ward 15 : Mudduwa

Elements at risk	Floods			Landslides	Other
	L	M	H		
Plaground	√				
Sri Sumana Vdyalaya			√		
Temple and Piriwena			√		
Sri Sumana Mawatha	√				
No. of residential building					
No. of commercial building					

8. IDENTIFICATION OF NATURAL HAZARDS WITHIN THE RATNAPURA MC AREA

Analysis of the Natural Hazard Vulnerability by the survey carried out with the participation of members of the Ratnapura Disaster Management Steering Committee are given in the following section.

8.1 Types of Natural Disasters



Percentage of organisations that are dealing with the following types of disasters (out of the organisatior represented at the workshop)

Floods	60%	Erosion	13%
Landslides	33%	Cyclones	7%
Epidemics.	33%	Industrial	7%
Subsidence	13%		

8.2 Characteristic features and order of importance of occurrence according to the participants understanding (order of priority)

a) Frequency of occurrence

Order of Disaster Priority		%
I	Floods	93%
2	Landslides	60%
	Epidemics	20%
	Erosion	7%
3	Erosion	13%
	Landslides	13%
	Drought	13%
	Lightening.	13%
	Subsidence	7%

Order of Disaster Priority		%
4	Epidemics	7%
	Subsidence	7%
	Erosion	13%
	Landslides	7%
	Industry	7%
5	Drought	7%
	Other	7%

b) Probability of occurrence annually

Order of Disaster Priority		%
1	Floods	87%
2	Landslides	73%
	Erosion	13%
	Epidemics	13%
	Drought	13%
	Cyclone	7%

Order of Disaster Priority.		%
3	Landslide	7%
	Lightening	7%

8.3 Opinion about the adequacy of facilities within the Ratnapura MC Area

c) Intensity and effect to the socio-economic status of the MC area

Order of Disaster Priority		%
I	Floods	93%
2	Landslide	87%
	Epidemics	13%
	Droughts	13%
	Erosion	7%
3	Cyclone	60%
	Epidemics	13%
	Landslide	7%
	Erosion	7%
	Lightening	7%
	Subsidence	7%

Order of Disaster Priority		%
4	Drought	7%
	Erosion	7%
5	Epidemics	7%
	Other	7%

d) Area coverage

Order of Disaster Priority		%
I	Floods	93%
	Epidemics	7%
2	Subsidence	7%
	Landslide	33%
	Cyclone	13%
	Epidemics	7%
	Floods	7%
	Drought	13%
	Erosion	7%

Order of Disaster Priority		%
3	Landslide	20%
	Epidemics	13%
	Cyclone	7%
	Industrial	7%
4	Landslides	13%
	Drought	7%

8.4 Capability assessment (capacity to handle emergency situation)

	Adequacy to cater to disaster events when number of effected people are			
	<100	100-1,00	1,000-10,000	10.000>
(a) Equipment to handle disaster situations	33%	47%	-	-
(b) First aid facilities/Emergency services	20%	27%	-	-
(c) Hospital facilities	20%	67%	-	-
(d) Schools and other community buildings for temporary evacuation of people	13%	33%	33%	-
(c) Fire fighting facilities	27%	13%	-	-
(f) Police and armed forces to provide protection	7%	13%	47%	-
(g) Trained people to handle disaster situation	10%	20%	-	-

8.5 Opinion about the damages to following infrastructures which can be expected in a major disaster event of more frequent nature

Facilities

	Yes	No	No idea
(a) Water supply lines	93%		
(b) Bridges	73%	7%	7%
(c) Roads and access to city	93%	7%	
(d) Sewerage systems which are liable to floods	60%	13%	13%
(c) Electrical supply	93%	7%	
(f) Communication facilities	87%	7%	7%
(g) Solid waste disposal	93%	7%	
(h) Other (please specify)			

Public Places

(a) Schools	73%	20%	7%
(b) Temples, Church, Mosques	67%	20%	13%
(c) Playgrounds	100%		
(d) Community Centres	67%	20%	75%
(c) Other (please specify)			

8.6 Interdependence of lifelines (facilities) with the city community in the event of a major disaster

	High	Moderate	Low	None
(a) Water supply	53%	20%	13%	71%
(b) Gas and fuel supply	7%	33%	60%	
(c) Sanitary drainage	73%	20%	7%	
(d) Storm drainage	40%	33%	20%	
(e) Telecom services	33%	33%	33%	
(f) Highways	60%	27%	13%	
(g) Media	7%	40%	27%	13%
(h) Fire fighting	7%	13%	40%	7%
(I) Building	40%	33%	27%	
(j) Building service	27%	27%	33%	
(k) Health facilities	20%	47%	33%	
(l) Food supply	47%	33%	20%	

HAZARD ANALYSIS (OTHER HAZARDS)

1 Road Accidents

According to the Traffic OIC, Ratnapura, most of the road accident records are due to narrow and poor road conditions. Hidellana, Devaleagama, Muwagama New Town, Thiriwanaketiya, Pelwadiya, Kotamulla, Gonakumbura, Moragahayata and Veralupe are famous for road accidents.

Road Accidents

Type of Accidents	1994	1995	1996	1997	1998
Road Accidents	10	13		14	
Major Damages	18	21		14	
Minor Damages	62	44		86	
Hit & Run Cases	16	14		-	
Vehicle Damages	234	173		200	
Drunken Driving	05	08		21	03
Total	345	273	200	335	19

Following junctions have been identified as traffic congested points

1. Pulungupitiya
2. St. Luke's Junction
3. Sidurupitiya Roundabout
4. Private Bus-stand (entrance & exit pints)
5. Main Street Warakatota Road (Kinkini Junction) to Malwala Road Junction
6. In front of the Old CTB Bus-stand
7. In front of "Heli" clinic
8. Muwagama Bridge (very narrow bridge)

2 Industrial Accidents

Only few incidents of industrial accidents, bush fires, were recorded as a result of careless practices. But high losses have been recorded due to civil disturbance in 1972 and 1988 - 1989, civil disorder in 1997 following a death of a District MP and also ethnic conflicts in 1957 and 1983. In these incidents losses and damages to the property and loss of lives have been reported but the correct figures are not available with the police due to various reasons.

3 Gem Mining and Associated Hazards

Four accidents due to gem mining have been reported due to collapse of the shafts, emission of poisonous gases, etc. In addition property damage has been reported as a result of subsidence in the neighborhood due to excessive pumping of water. But losses and damage to the property and losses of lives have not been recorded by the authorities for presentation.

10 VITAL RECORD RETENTION AND EMERGENCY PLAN MAINTENANCE AND DISTRIBUTION

For the above functions the officer responsible is the Municipal Commissioner in his capacity as the section coordinator for SEMS function of EOC Resource Management (Finance and Ad ministration).

Therefore all section coordinators must use this document as a live document as this manual gives guidelines in order to avoid any delays / confusions /default in the performance of tasks by each coordinator.

A well coordinated and unified response of various departments and agencies appropriate to the demands of the EOC administration as well as district administration in the management of disasters will minimize the hardships and improve the process of recovery. The process of confidence building and self reliance at the district level can be best promoted through timely, supportive and well thought of instructions by the administration.

9.1 Record Retention and Maintenance of EMRP by the Municipal Council

Emergency management is a round the clock operation and certain positions must be manned continuously specially for record maintenance. All the data files are important and therefore should be handled with sufficient care. All the officers under the charge of SEMS coordinator get thoroughly acquainted with the procedures for assessing the data or modifying the data before they start handling these files. If the officer does not feel confident he/she should report the same to the SEMS - EOC coordinator and get assistance for carrying out the duties assigned to the officer. No data should be added modified or deleted from the files unless there is explicit written permission from the EOC coordinator to do so. Efforts have to be made for the cleanliness of the premises and cooperation should be sought to maintain standards.

Normal times activities

- Receive information as a routine basis from various wards on the vulnerability and impacts
- Receive reports on preparedness from the relevant district level departments, divisional secretary, officers and other departments, regularly as per the formats. Based on such reports the EOC will forward the details of preparedness measures to District Disaster Manager, Provincial District Manager and the Central Govt. through NDMC
- upgrade and update the emergency response plan according to changing scenarios in the updated database and maintain an inventory of resources
- Update all information in the GIS data base. Inform all EOC in the district under District Disaster Manager if any changes including updating of database
- Monitor preparedness measures undertaken by various departments
- Ensure proper dissemination of the Emergency Management Response Plan (EMRP) at the district, local level and disaster prone wards
- Identify appropriate NGOs, / private sector organizations which can be assigned the task of community level preparedness
- Organize post-disaster evaluation and update the EMRP accordingly.
- Prepare reports and documents on disaster events within EOC and submit the same to EOC

1.2 Dissemination of EMRP

The responsibility for dissemination of the plan is vested with the Municipal Commissioner in his capacity as the SEMS coordinator on Resource Management.

In order for the EMRP to be effective it must be disseminated at two levels;

- to the district authorities, government departments, NGO's and other agencies and institutions within the EOC
- to the general public

Effective dissemination of plan requires a well designed and focused training. Training activities are carried out under the guidance and direction of Training Dept. of the Municipality.

The training programmes are organized for different levels of functionaries, from Municipality officials, identified NGOs and private sector organizations in order to equip them to extend training facilities to functionaries at ward level as well as organize simulation exercises within the community.

The EOC should involve NGOs in preparing suitable public awareness material to be distributed to the public. The materials for awareness programmes at community level should be prepared in the local language to ensure widespread dissemination.

Media should be extensively used for public awareness programmes. These will include,

- newspapers including local ones TV
- television channels
- radio
- folk media
- publicity material

Schools, colleges and other public institutions should be specifically targeted.

It is also desirable to include mutual aid organizations and public emergency response organizations in disaster preparedness drills.

The objectives of a full scale drill include evaluation of the following:

- practicality of the plan (structure and organization)
- adequacy of communications and interactions among agencies and the public
- emergency equipment effectiveness
- adequacy of first aid and rescue procedures
- adequacy of emergency personnel, response and training
- public relations skills
- evacuation and count procedures

11 PLAN EVALUATION

11.1 Pre-Disaster Evaluation

- the purpose of evaluation of the EMRP is to determine
- the adequacy of resources
- coordination between various agencies
- community participation
- partnership with NGOs

The ease of understanding and using the plan will also be important considerations. The plan will be updated when shortcomings are observed in

- organisational structures
- available technology
- response mechanism following reports on drills or exercises;

11.2 Post-Disaster Evaluation

A post-disaster evaluation should be done after the withdrawal of relief and rehabilitation activities in order to assess

- the nature of state intervention and support,
- suitability of the organization structure,
- institutional arrangements,
- adequacy of Operating Procedures,
- monitoring mechanisms.
- information tools,
- equipment,
- communication system, etc.,

The impact studies on the above operations for long-term preventive and mitigation efforts are to be undertaken.

Evaluation exercises may be undertaken to understand the perceptions about disaster response in terms of,

- adequacy of training,
- alert and warning systems,
- control room functions,
- communication plans,
- security,
- containment,
- recovery procedures,
- monitoring

(b) Departmental Management / Support Staff

Depending on the role of the employee, a department's training responsibility to its management / support staff will vary (e.g.. Police, Fire, Water, Power, Information Technology Agencies, General Services, City Clerk, City Administrative Officer., City Attorneys etc.)

- **First Responder**

Staff whose responsibilities could require them to be dispatched as first responders to the EOC, or to incidents that pose a threat to employees and / or citizens should be properly trained.

- **Intra- Departmental Training**

Intra-departmental drills and exercises provide management an opportunity to evaluate the effectiveness of departmental plans, procedures and training.

- **SEMS Courses**

A more specific level of SEMS training is necessary for department management / support staff who may have an EOO related assignment during an emergency. Supervisors require more detailed and lengthy SEMS courses than do their subordinates. The length and content of SEMS courses will also vary depending on the employee's role. SEMS training assistance can be obtained from the municipality training Dept.

(c) EOC Operations

EOC responders will require specific departmental training.

- **First Responder**

EOC responders require department specific training that will enable them to communicate within their department and be able to coordinate the use of those resources and/or other requests through the use of the EOC Information Management System (EOCIMS). EOC effectiveness depends on regular EOCIMS and EOC operational training.

- **Intra-Departmental Exercises**

Intra-departmental drills / exercises provide EOC personnel an opportunity to evaluate the effectiveness of departmental plans, procedures and training.

- **SEMS Courses**

Specialized and recurrent SEMS training is necessary for all EOC personnel. SEMS training assistance can be obtained from Training Dept. of the Ratnapura MC.

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13.3 EOO Specific Training

EOO specific training relates to those personnel whose duties include specific EOO responsibilities. EOO specific training enables personnel to appropriately respond in the fulfillment of departmental responsibilities as established by the Administrative Code policy of the MC.
Participants receiving EOO specific training:

- Elected Officials, Disaster Management Committee, newly assigned staff;
- Emergency Operations Centre (EOC) Responders; and
- Inter-Department Training participants.

Depending on the participant's EOO role, training may be department specific, EOC specific or may require a more global knowledge of emergency operations, as is required of the Fire or Police Departments when they have lead responsibility for EOC activations.

a. Elected Officials, Disaster Management Steering Committee Members, Newly Assigned Staff

Depending on the office / position, training may take various forms, from prepared materials to personal briefings. SEMS training may vary from a brief orientation to executive level courses.

b. EOC Responders

Employees whose role within the EOO requires them to respond and staff of the EOC will require specific department related training, EOOIMS training, EOC functional training and a level of SEMS training relative to their responsibilities.

c. Inter-Departmental Training

Inter-departmental training is essential for effective EOC operations. This type training will be coordinated by Training Dept. of MC (TDMC) and may be in the form of tabletop, functional or full scale exercises. Inter-departmental exercises are not limited to TDMC coordination and departments are encouraged to interact in an effort to improve EOC operations.

13.4 City-wide Exercises

City-wide Exercises provide the EOO an opportunity to exercise various components of the emergency response process. The goal of EOO City-wide exercises is to improve operational readiness. Exercises are designed to improve coordination, clarify roles, improve individual performance, reveal planning/ training weaknesses and identify resource gaps.

a. Annual Landslide Preparedness Exercise

The City conducts an annual landslide preparedness exercise to commemorate the 1992 Helauda landslide. This City-wide exercise involves all departments / agencies that have major or support functions as a result of a significant event.

b. Annual Emergency Preparedness Exercise

Exercises with the District/Operational Area provide opportunities to evaluate inter-agency planning efforts. District-wide exercises should be designed to test mutual and automatic aid agreements, reporting and communications systems and SEMS at the local government and operational area levels. City personnel participate by exercising inter-agency coordination and mutual aid functions within the district.

13.5 Departmental EOO Responsibilities

The EOO is composed of the operational forces deemed necessary to successfully meet the conditions of a local emergency and is comprised of several divisions.

The following City officers, offices and divisions each have EOO responsibilities established by the Administrative Code policy of RMC. The officers, offices and divisions and their respective responsibilities follow.

Mayor

- Give instructions to police chief in Ratnapura to declare local emergency or disaster
- Director of the Emergency Operations Organization

Municipal Commissioner

- Emergency Operations Organization Coordinator
- Manage the EOO's non-emergency affairs
- Coordinate the authorities, powers, duties and responsibilities of the RMC and EOO during periods of preparation for and recover from emergencies
- Coordinate inter-department preparedness planning, training and recovery activities of EOO division
- Establish and maintain liaison with other governmental agencies
- Prepare and process emergency operations programme papers and applications for funds from Central Govt. and Provincial Council.
- Prepare and submit to the RMC for approval the annual EOO proposed budget
- Coordinate and approve expenditures from the Emergency Operations Fund of RMC

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City Attorney (to be appointed by the EOB)

- Legal advisor of the Emergency Operations Board

The RMC should name a city attorney with the assistance of Attorney General to take the responsibility of city attorney

Police (Police Department)

- Maintain peace and order
- Enforce district and local laws
- Preserve life and property
- Declare local emergency on the instructions of the Mayor during an emergency situation

Fire Suppression and Rescue (Fire Dept.)

- Direct and control all fire suppression, rescue operations, emergency medical services etc.
- Direct the use and control of all explosives and hazardous materials
- Control the demolition of buildings and structures
- Control all petroleum, chemicals and respective pipelines

Transportation Traffic OIC of Police

- Plan the maintenance of traffic control devices
- Develop emergency travel routes
- Plan barricade placement
- Direct and control traffic
- Coordinate with other agencies supplying common carrier services

Public Works (Engineers Division, RMC)

- Maintain and repair streets
- Place barricades, cones and delineations as necessary
- Manage street lighting, sewers, storm drains, channels, bridges and removal of wastes and debris
- Conduct engineering investigations
- Develop plans for and supervise personnel assisting fire in rescue work

Utilities (NWS&DB and CEB)

- Cooperate with and arrange for emergency services by municipal and private utilities

General Services (Department of General Services of the RMC)

Supplies Section

- Procure and control special equipment and property as needed
- Maintain information of available governmental and privately owned equipment and operators

Maintenance Section under Municipal Engineer of RMC

- Develop plans for maintenance of all City owned equipment and facilities
- Develop plans and arrange for the safety of occupants of City owned and leased buildings, and maintain liaison with other public and private counterparts which supply such services
- Maintain inventory of City transportation vehicles used for movement of heavy equipment

13.6 Information Technology (Telecommunication Dept. - Telecom)

(The Telecommunication Regulatory Authority specifications for Emergency telecommunication systems has to be followed)

- Provide, restore and maintain emergency communications for Council controlled departments and offices
- Maintain liaison with other city departments providing their own communications services, volunteer radio emergency services to the City and its citizens

Information Processing Section of the RMC with the assistance of Telecom:

- Design, install, maintain and/or restore the City's data communications networks (including the provisions of training as necessary)
- Design, install, maintain and/or restore the City's "in facility" telephone network and provide related voice communications services such as pagers, voice mail, cellular telephones, and provision of command post telephone lines (including the provision of training as necessary)
- Design and maintain critical application systems requirements
- Restore critical applications at the City's computer centre, and/or resume applications at the off-site recovery computer centre
- Facilitate communication between users of the City's computer centre applications and Disaster Response and Recovery Teams
- Manage the maintenance and retrieval of data and materials stored at the computer recovery site and off-site storage locations
- Coordinate the repair and replacement of personal computers and related equipment damaged during an emergency.

13.7 Table of Training Requirements and Responsibilities

TRAINING CATEGORIES	TYPE OF TRAINING	AUTHORITY	FREQUENCY	Employee's Department	EPD	Fire	GSD	Pers	Other Comments
1 City Employees	a. Fire Life Safty	RMC Policy							
	- Personal/Family Preparedness		Annually (4)	P		A		A	
	- Workplace/Home/Auto		Annually (4)	P		A		A	
	b SEMS Orientation		As needed	P	A				
	c BEC		Annually	P			A/C		
	- Floor Wardens, etc.		Annually	P		A/C	A/C		
	- CPR/First (as designated)		As needed	P				A/C	SLRC
	- Emergency Response Team		As Needed	A		P/C	A		
	- Hazard Mitigation		Annually	P		A	A		
2 Department Specific	a Field Personnel	RMC Policy							
	- SEMS Cources		As needed	P	A	A			Police -A
	- Bomb explosion		As needed	P	A	A			Police - A
	- Intra Departmental Exercises		As needed	P	A	A			
	- Urban Search and Rescue (USAR)		As needed	A	A	P			SLRC
	b Support Staff								
	- First Responder		Annually	P	A	A			
	- Intra Departmental Exercise		Annually	P	A	A			
	- SEMS Courses		As needed	P		A			
	c DOC/EOCIMS Operations								
	- First Responder		Annually	P					
	- Intra Departmental Exercises		As needed	P	A	A			
	- SEMS Course		As needed	P	A	A			
3 EOO Specific	a Elected Officials, Members of the RDMSC Newly Assigned Staff	RMC Policy	As needed	A	P				
	b EOC/EOCIMS Operations	RMC Policy	Annually	A	P				
	c Inter Dipartmental Training	RMC Policy	As needed	A	P				
4 City-wide Exercises	a Annual Landslide Preparedness Exercise	RM Counsil Action	As needed	A	P(3)	A	A	A	
	b Annual Emergency Preparedness Exercise	RMC Policy	Annualy	A	P(3)	A	A	A	

Legend A= Assist P= Primary C= Coordinator EPD= Emergency Prepared Division
GSD= General Service Dept. Pers = Personnel Dept;

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14 PLAN CONCURRENCE

All members of the Disaster Management Steering Committee should be assigned the tasks that they have to perform as institutional functions identified under the EMRP. They should in the form of a letter of concurrence submit a sign off sheet expressing their willingness to undertake such functions to the EOC - Director the Mayor of the Ratnapura Municipality. This undertaking they should take not as individuals but as representative of the departments or agencies and the responsibilities will automatically transfer to the next senior officer/nominee. in the absence of the officer the successor to the post in case of his retirement or transfer to another duty situation.

Note: **All the members of the DMSC have to issue letters of concurrence/agreement undertaking functions and responsibilities listed in this document after adaptation of this plan.**

15 INITIAL RESPONSE FEATURES

15.1 Field Incident Command System (ICS) / Emergency Operations Centre (EOC) interface

SEMS is a management system. It is based on the Incident Command System (ICS) a proven system that has been in use in other countries for many years. SEMS, provide for a five level, i.e., National, Provincial, District, local govt. (EOC) and field emergency response organisation activities as needed to provide an effective response to multi-agency at multi-jurisdiction user agencies.

SEMS provide a management frame work and guidance operations at each of the stated five levels, of emergency responses. The persons in charge of each level must address each ICS functional responsibility, management, operations, planning / intelligence, logistics, finance / administration, SEMS provides the umbrella under which all response agencies can function in an integrated fashion.

Emergency Responder Notification

As the Emergency operation Director the Mayor of Ratnapura MC is responsible for notification within the operational area (within the MC area). He is responsible for the notification of the field and local govt. levels of SEMS for emergencies occurring within its boundaries.

The responsibilities are;

- The flow of emergency information and resources within and between the organisational level
- Coordination between responding agencies,
- The rapid mobilization, deployment, and tracking of resources.

A list of people to whom the emergency notification should be conveyed immediately are given under 6.3.10

15.2 Use of the Incident Command System

Emergency Management Committee

An emergency Management Committee (EMC) form the working arms of the Emergency Operation board (EOB). The members of the EOB are;

- Mayor
- Divisional Secretary
- Municipal Commissioner

All departments and other govt. and private agencies are encouraged to participate in EMC. The EMC and its main sub committee, serve as a vehicle for the development of interdepartmental plans and training programmes to promote the city's integral disaster response and recovery efforts. EMC meetings are open to any govt. or private sector group or individual involved with emergency preparedness. Use of the ICS system See use of the ICS system in section 3 and 4 (SEMS).

SEMS is designed to be flexible and to meet the emergency management needs of all responders. Therefore, SEMS, must be used when responding to emergency situation only. The mechanism should be adopted by the RMC to use SEMS, for state or provincial council funding.

15.3 Emergency Preparedness Division (EPD)

The mayor and the council of RMC has the responsibility to establish an EPD in RMC by consolidating personnel and EOC functions into the offices of the Municipal commissioner (MC). The MC is responsible for coordinating the interdepartmental training and recovery activity of EOC Divisions, participating departments, units or groups under the direction of EOB.

15.4 Involvement of other govt. agencies and non govt. organisations

The involvement mechanism of other govt. organizations, is given in the coordinating structure (section 4.4) as well as in the Standard Emergency Management System (SEMS). Emergency Operations Organisations.

15.4.1 Non-Government Organisation (NGOs) and Voluntary Agencies

The non-governmental organisations and voluntary organisations play an important role in Disaster Management and provide a strong band of committed volunteers with experience in managing the disasters. Their strength lies in the choice of their man power, the informality in operations and flexibility in procedure. These organisations, enjoy a fair degree of autonomy and hence can respond to changing needs, immediately. These NGOs would work in close coordination with the city administration and maintaining the standards, of services, information exchange and reporting requirements to have a total picture of resources availability, when required NGOs may also be able to improve the quality of delivery of welfare services.

15.4.2 List of NGOs and other support agencies

1. Lions Club

2. Saukyadana Movement

3. Samurdi

4. Sumithuro Organisation

   Contact Address — Mr. P. A. Bandusena
   7/3 Sewana Pedesa
   Ratnapura.

5. Human Resources Development Movement

   Contact Address — Mr. N. N. Shantha Critoper
   Secretary
   Bandaranayake Mawatha
   Ratnapura.

6. Sri Lanka Red Cross (SLRC)

   Mrs. Prema Kelawana
   Secretary - SLRC
   Yehiya Building
   Ratnapura.

7. UNESCO Social Development Agency

   Ven. Pattiyapola Mahinda Thero
   UNESCO Social Development Agency
   Hunuwala
   Opanayaka

8. Ratnapura People's Foundation

   President
   Ratnapura Janatha Padanama
   267, Parawatte
   Nivithigala

9. Amadyapa Yowun Samajaya

   President
   Amadyapa Yowun Samajaya
   Aswedduma, Henawatte
   Millawatte, Kuruwita

10. Govi Jana Pubuduwa

    Mr. Gamini Pinnawalawatta
    Seethalena
    Awissawelle

Centers identified for evacuation of victims, storage and relief supplies

Town Area (West)	-	Dharmapala College
	-	St. Lucas College
	-	Labour Department Office and premises
	-	Office of Director of Health (DHS) and premises
	-	Ratnapura Town Hall
Town Area (Center)	-	Muslim mosque
Godigamuwa	-	Godigamuwa Temple
Muwagama	-	Muwagama Temple
Mudduwa, Mudduwa (East)	-	Sirisumana Temple
Batugedera	-	Batugedera School
	-	Batugedera Shalikaramaya Temple
Angammana	-	Angammana Temple

Bakeries

Jayasiri Hotel and Bakery
Jinasiri Hotel and Bakery
Janaranj ana Hotel and Bakery
Impala Hotel and Bakery

Filling Stations

Ratnapura MPCS Filling Station, Ratnapura

Provision of emergency relief supply will be handled by the Social Services Department and present arrangement is to supply emergency relief.

Cooked meals	-	3 days
Dry rations	-	7 days (Rs. 84/= - Rs.315/=) per family Max. 5 members per family

The supply and distribution of relief supply will be coordinated through the Divisional Secretary.

Emergency service desk at Social Services Dept.

The address of the Social Services Department for application of emergency relief in an event of a disaster.

Director Mrs. N. J. Pathirana
Tel. No. Office: 686191, Residence: 865900

Deputy Director Mr. N. D. Hettiarachchi
Tel. No. Office : 686126
General Nos. : 686200, 686201
Address : No. 98, D. S. Senanayake Mawatha Colombo 8.

15.4.3 Community Emergency Response Teams (CERTs)

In most disasters, community members are the first to respond before any outside assistance can reach the disaster site. Therefore, in certain disaster prone areas a group of young volunteers or Community Emergency Response Teams are being formed and trained to undertake essential tasks which would reduce loss of life and property and at the same time build confidence in self-management. Essentially CERTs would contribute in the following areas:

1. Organizing training and preparedness exercises at the community level
2. Ensuring family preparedness on the receipt of warning
3. Ensuring communication links both within the community and with administrating
4. Controlling rumors and panic behavior and undertaking confidence building activities
5. Mobilizing youth and able-bodied persons from the community to provide volunteers support, wherever required.
6. Organizing local work teams for immediate rescue and relief e.g. cooked food, first aid, assistance in law and order etc.
7. Assisting the handicapped, the elderly, children and women who need special help
8. Facilitating movement of relief teams during evacuation and relief and ensuring appropriate tagging as and when necessary
9. Guarding major installations and evacuated properties till the administration takes over

These CERTs are expected to support the efforts of the Grama Niladari and Samurdi officers

15.4.4 Officers/Villages where CERTs are Planned to be Established

It is proposed to promote and form "Community Emergency Response Teams" in the following wards:

Name of the ward	Extent (Ha)
Hiddellana	280.9
Kospelawinna	415.3
Weralupe	190.9
Pompekele	93.5
Godigamuwa	136.2
Angamuwa	296.6
Thirirewanketiya	167.5
Batugedara	153.1
Warakatota	18.2
Bazzar	21.3
Fort	21.2
Polungupitiya	46.1
Dewalegawa	102.3
Muwagama	138.1
Mudduwa	137.2
Total	**2218.4**

Please see the RMC Planning Workbook for details.

15.5 Areas of Community Participation

Administration and NGOs at the disaster site should ensure maximum community participation in all stages of operation in order to maintain community morale and confidence, maximize the use of local resources, reduce costs of operation and promote a faster recovery. It is important to note that the so-called "victims" are not all that helpless but offer a tremendous manpower resource and ingenuity to overcome the crises. Disaster management situations offers a wide range of choice and demands immediate decision making. The participation of communities and their representatives would reduce the pressures on administration with regard to 'the choice and uncertainties of community's response to the decision-making process.

Based on local dynamics ethos and the experience of the previous disaster situations an appropriate strategy to ensure community support has been evolved. Such efforts to enlist community support and participation have gone a longway in reassuring the community about the administration's intent and seriousness about managing the disaster.

Community participation is being ensured by;

- Identifying situational, opinion and position leaders in the community and voicing administration's confidence in their capabilities to undertake the tasks.
- Consultations an dialogues expressly indicating the need for assistance would encourage the community and its leaders to come forward
- Regular feedback meetings and an open book approach to demonstrate transparency
- Involving community in decision making at local levels

The major areas of community participation are being identified and include the following

(Please refer hazard assessment section 7, 8 and 9)

- Encourage self-help in every activity of their day-do-day living
- Encourage assistance for location and identification of dead, disposal of dead bodies, disposal of carcasses and disposal of damaged food stocks
- Encourage contribution of labor. (loading, unloading distribution, temporary constructions, salvage and restoration of water supplies, Food distribution, relief camps cattle camps etc.
- Enlist assistance for updating records of damages and losses
- Enlist assistance in maintenance of law and order
- Enlist assistance in maintaining sanitation standards and disposal of waster
- Promote cultural and recreational activities in order to protect the mental health and sustain the ethical and moral values.

15.6 Encouraging Family Level Preparedness

In order to assist the families to prepare themselves, community education programme will be undertaken to acquaint members of the community with the nature of each disaster, the type of damage that can occur, the demands it would generate both at family and community level and the manner in which it will be responded to. Even with the best of planning, it is difficult to assess the exact impact of the disaster and the response time. Under the circumstances the, families have to prepare themselves for a prolonged period before the administration can reach them. Although collective efforts of the community can reduce the hardship to some extent, a large part of the burden would be on the family itself.

15.7 Emergency Planning and Checklists

Families need to prepare themselves for any kind of disaster. This would require specific information about emergency water and food and a recommended checklist of emergency supplies which enable the family to sustain itself till adequate facilities for relief reorganized.

15.7.1 Emergency checklist:

- find out which disasters could occur in the area
- Ask how to prepare for each disaster
- Know the members of the CERT
- Ask how warnings are given in an emergency
- Learn about the community's evacuation routes
- Learn about designated shelters
- Ask about special assistance for elderly or disabled persons
- Learn about emergency plan at the workpiace
- Learn about emergency plans for the children's school or day-care center

15.7.2 Create an emergency plan:

- Meet with household members. Discuss with children the dangers of fire, severe weather, earthquakes and other emergencies
- Discuss how to respond to each disaster that could occur
- Talk to children about the likely disasters
- It is easier for children to understand what is happening during a disaster if they already know what can take place. Point out that some of the disasters are indeed natural events and although they are dangerous, they do not have to be life threatening if adequate precautions are taken. Try not to alarm the children in discussing possible disasters
- Teach children about the safety precautions for each disaster
- Learn how to turn off the water and electricity at main switches
- Create a network of relatives, friends or co-workers to assist the disabled in an emergency
- Provide for medical alert tags or bracelets to identify the handicapped persons

15.7.3 Disaster supplies kit

- For emergency evacuations, the families should be encouraged to take along adequate supply of water, food, clothing and emergency supplies.
- The families should be encouraged to assemble the disaster applies as described earlier.

15.8 Evacuation Preparedness

When community evacuation become necessary, local officials would provide information to the public through the media. Government agencies, and other disaster relief organizations would provide emergency shelter and supplies.

The amount of time the families have to evacuate will depend on the disaster. If the event can be monitored, like a cyclone, families could have a day or two to get ready. But many disaster offer no time for people to gather even the most basic necessities. This is why evacuation plan is necessary.
The checklist for emergency planning given above would be useful for evacuation planning as well. Additionally, families should also get their disaster supplies kit organised for evacuation and follow the steps for evacuation as outlined earlier.

15.9 Shelter

Taking shelter is critical in times of disaster. This may mean staying in an enclosed structure during a severe storm without electricity for days. In many emergencies, local authorities would set up public shelters in schools, municipal buildings and places of worship. While they often provide Water, food, medicine and basic sanitary facilities, families should plan to have their own supplies as well.

15.9.1 Living in Designated Emergency Shelters

1 Stay in the shelter until local authorities say it's okay to leave. The length of the stay can range from a few hours to few days.

2 Restrict smoking to well-ventilated areas. Ensure that smoking materials are disposed of safely.

3 Cooperate with local authorities and others staying in the shelter. Living with many families in a confined space can be difficult and unpleasant.

4 Listen to radio broadcasts.

5 Watch for fires

6 Assist local authorities as volunteers in the management of water cooked food and other relief supplies including medical care, if required

7 Make arrangements for pets and cattle before going to a public shelter. They are not allowed in a public shelter due to health reasons.

8 Organise recreation for children

9 Assist local authorities with the assistance of community members law and order

1 5.9.2 Helping after Disaster

When disaster strikes, people everywhere want to help those in need. To ensure that this compassion and generosity are put to good use, the media can highlight these facts:

- Financial aid is an immediate need of disaster victims. Financial contributions should be made through local administration or a well-known voluntary organisation to help ensure that contributions are put to their intended use.

- Before donating food or clothing, wait for instructions form local officials. Immediately after a disaster, relief workers usually do not have time or facilities to setup distribution channels and too often these items go to waste

- Volunteers should go through a well known voluntary agency since these agencies will know what is needed and are prepared to deal with the need. Local authorities also co-ordinate volunteer efforts for helping in disasters.

- Organizations and community groups wishing to donate items should first contact local officials, and voluntary agencies working on relief to find out what is needed and where to send it. Be prepared to deliver the items to different places, tell officials when you'll be there, but do not expect them to provide for transportation, driver and unloading.

16 EMERGENCY OPERATION CENTRE (EOC) - RATNAPURA: ACTIVATION / DEACTIVATION OF EOC

The activation and deactivation of the EOC shall be declared by the Mayor in his capacity as the Emergency Operation Director and Head of EOB with the concurrence of the Emergency Management Committee (EMC), up on the declaration of Curfew and Local Emergency Refer Attachment A and Attachment B.

The EOC coordination will be handled by

- **i Municipal Commissioner**
- **ii Administration and Institutional**
- **iii Police**
- **iv Field Operations under the direction of the Mayor**

16.1 EOC Activation Matrix

Event Examples	Risk	EOC Level	EOC Response Action
▪ Minor landslides Prediction/Advisory ▪ Severe storm & floods ▪ Localized incident - Bomb explosion involving two or more departments (Expected to be of short duration less than 24 hours)	LOW	1	▪ Activate level one staffing (8-10 personnel) ▪ Notify Mayor & council members ▪ Notify EOB and all city departments ▪ Notify PC
▪ Moderate floods ▪ Major fire/storm with widespread city impact (Duration expected to exceed 24 hours)	MED	2	▪ Activate level two staffing (30-40 personnel) ▪ Notify Mayor & council members ▪ Notify EOB and all city departments ▪ Notify PC
▪ City-wide/regional emergency ▪ Obviously exceeds capability of city resources ▪ Obvious need for mutual aid (Duration expected to exceed several days)	HIGH	3	▪ Activate level three staffing (70+personnel) ▪ Notify Mayor & Council members ▪ Notify EOB and all city departments ▪ Notify Sabaragamuwa PC/ central govt. ▪ NDMC

Note: The EOC Director may increase or decrease EOC staffing as deemed appropriate.

16.2 EOC Operations

The City's EOC is not a "Command centre". Command decisions on how to best solve tactical field problems (e.g. rescue, fire fighting , arrests etc.) are made by incident commanders in coordination with their respective department operations center (DOC).

The City's EOC facilitates and coordinates the interdepartmental and inter-agency:

- Collection and distribution of information (e.g., damage assessment etc.) and
- Management of resources.

Intra- departmental management and coordination of resources are the responsibility of the involved DOC.

EOC operations are organised around SEMS (seven functions are noted in section 4.2) and are supported by a variety of telecommunication equipment.

The flow of operational information into and out of the EOC is graphically depicted in section 4.4.2

16.3 Key Actions Necessary in Coordination and Information Management by the Focal Point - Ratnapura M.C. - Emergency Management Board

- Maintain frequent, direct contacts with District/Divisional Secretariat Disaster Management Steering Committee, Operational Departments, Police and NGOs

- Constantly review with the Emergency Management Committee to see whether help is required in

  - compiling and analysing information and preparing reports on needs and use of external assistance,
  - establishing and operating more comprehensive management information systems to support the responsible government authorities,
  - coordinating and conducting of meetings involving all the actors.

  Ensure the conveying of regular broad based coordination meetings encourage constructive discussions promote consensus on actions by all concerned parties. Provide necessary assistance.

- Specify the information management functions to be fulfilled and the resources (staff, equipment, office space, budget) required.
- Initiate the information systems and services using existing staff and facilities
- Disseminate information regularly to all concerned
- Encourage all concerned to be consistent in the use of agreed criteria to harmonize the activities
- Help to direct the attention of NGOs to areas and activities where they can make the greatest contributions.

16.4 Roles and Responsibilities of Divisional Secretariat/District Secretariat

- Provide all necessary assistance to the focal point in carrying out coordination of activities information dissemination to obtain assistance from outside organisations, mobilization of volunteer groups for identified activities.

- Declaration of the area as the disaster prone area and maintenance of records on development of hazardous situations and chronology of events.

- Issue instruction to departments/authorities active within the M.C. area to harmonize the activities of following personnel;

  * Grama Niladhari
  * Police
  * Cooperative (Department of Cooperation)
  * Food Content Department (maintenance of buffer stocks of food to be used in a disaster situation)
  * Education Department
  * Health Services Department
  * Water Supply and Drainage Board
  * Municipal Commission Department
  * Ceylon Electricity Board
  * Telecommunication
  * Aurveda Commission

  Coordinate with the National Government Institutions. (Social Service Department. Ministry of Reconstruction and Rehabilitation) for provision of emergency Relief measures, funds, for reconstruction and rehabilitation work etc.

  Coordinate with the UN Agencies and other international agencies.

I 6.5 Roles and Responsibilities of office of the Municipal Commissioner

I. Mission

In the event of a major disaster warning emergency, the Office of the Municipal Commissioner (CAO) is responsible to provide assistance to the Mayor, the Emergency Operations Board and City staff however possible to ensure that the mission of the Emergency Operations Organisation (EOO) is fulfilled. The CAO as the EOO coordinator carries out the instruction of the Emergency Operations Board (EOB) in the following functions, as appropriate:

II. Objectives

A Liaison with the Mayor/Council
B Staff support to Emergency Operations Centre (EOC)
C Provide staff support to the Emergency Operation Board (EOB)
D Liaison with the Natural Disaster Management Centre
E Liaison with other government agencies, employee unions, city departments and appropriate private agencies and businesses
F Conduct analysis of financial impact on city

III. Tasks

There are several tasks that need to be accomplished in reaching the above objectives. These tasks are prioritized in the following table under each objectives.

LIAISON TO THE MAYOR/ COUNCIL	Prevent	Response	Recovery
Keep the Mayor's office informed of developments	•	•	•
Perform council liaison, as necessary	•	•	•
Assist the Mayor's office and the need for and preparing a declaration of Local Emergency	•	•	
Upon the Mayor's signature, immediately send copies Of any declaration to the County and State		•	•
Prepare council resolution ratifying the existence of a Local emergency and every two weeks, continuing State of local emergency		•	•
Develop Mayor/ Council reports and Recommendations		•	•
Prepare City request for State and Federal disaster declarations		•	•
Prepare or coordinate preparation of EOO R&R reports to the Mayor and Council			•
Staff CAO-EOC position, as appropriate	•	•	•
Attend EOC briefings, as appropriate	•	•	•
Prepare EOC after action report			•
Serve as member of the EOB	•	•	•
Provide necessary EOB staff support, including EOB meeting the scheduling and notifications	•	•	•
Participate in briefings, coordinate oral presentations	•	•	•
Provide damage and casualty information to OES		•	•
Assist with the coordination of requests for mutual aid equipment and personnel from and for the City With OES (except Fire and Police Departments)		•	•
Ensure compliance with Emergency Operations-Director (Notification of Mayor regarding requests for aid from other jurisdiction)		•	•
Identify and support, with Dept; of General Services and Recreations and Parks, Disaster Application Centres (DAC) operated by Provincial and State Governments			•

BEST AVAILABLE COPY

LIAISON TO THE MAYOR/ COUNCIL	Prevent	Response	Recovery
Prepare / Arrange for DAC Public information announcement, as necessary			•
Prepare information bulletins regarding assistance programs, as necessary			•
Coordinate establishment of DAC sites			•
Inform Council Members regarding available assistance and establishment of DACs, as necessary			•
Establish and coordinate staffing for a telephone hotline for disaster assistance informations as necessary			•
Compile damage assessment data and report to the NDMC		•	•
Assist Departments in coordinating services, matching needs and suppliers, documenting financial transactions, tracking purchase orders as necessary			
Assist Mayor's Office with business community Liaison and assistance programs			•
Prepare proposed local and state legislations to meet special disaster needs, as necessary			•
Provide liaison with employee unions, as necessary		•	•
Try to ensure proper procedures are followed by City Agencies		•	•
Monitor documentation of damages by Departments		•	•
Maintain liaison as appropriate with private non-profit agencies and any non-city agencies which may be eligible for PC assistance			•
Prepare and process applications for PC and National Funds			•
Coordinate post-event VIP activities		•	•
FINANCIAL ANALYSIS			
Provide financial advice to Mayor/ Council		•	•
Assess City's cash situation		•	•
Develop and implement short and long term financial strategies		•	•
Monitor cash flow; identify available sources in Departmental and other funds, including independent Departments		•	•
Track extraordinary expenditure		•	•
Advise departments on availability of emergency funds and coordinate processing		•	•
Assist in preparation on availability of emergency funds and coordinate processing Indicate cost recovery program for city		•	•

I6.6 Roles and Responsibilities of Police Division

I. Mission

In the event of a major Disaster the Police Division's primary responsibility is to support the emergency operations Director (Manager). The police division's overall mission in the event of a major disaster will be to provide whatever support is necessary to recover from the effects of the disaster.

II. Objectives

A Receive and assess Disaster warnings from the Met. Dept.

B Activate the City's Emergency Operations Centre as for the disaster of EOB

C Liase with other involved departments

D Enforce emergency vehicle ingress/egress routes

F Establish perimeter and traffic control for closed areas.

16.7 Roles and Responsibilities of the other Department

16.7.1 Cooperative Department

(i) Strengthen the retail shops, in order to facilitate smooth distribution of food items during disaster situation.

(ii) Provide necessary storage facilities in sub stations and in the Head Office to store essential items such as rice, flower, dhal, kerosine, tin fish etc.;

(iii) See the alternative arrangements for the sub outlets/retail shops to be moved to safe areas (out of disaster prone area);

(iv) Contingency plan to be established for distribution of food items through mobile stations, temporary retail outlets;

(v) All filling stations run by the Cooperative to be shifted to safe areas out of disaster prone area and guarantee adequate stocks of fuel (buffer stock sufficient for two weeks minimum should be available);

(vi) Staff training in order to meet the requirements of disaster situations. (This training must include the system of distribution of foods, assessment of stock/needs during a disaster situation, management of food distributions, loan schemes /other relief supply schemes coordination of operations, stock verification etc.)

16.7.2 Food Controller's Department and Cooperative Wholesale Establishment (CWE)

(i) The food distribution during a disaster situation might be difficult due to poor access poor climatic conditions etc.

Therefore it is necessary to

(a) have buffer stocks of food (essential items) needed for two weeks for the whole M.C. area

(b) identification of items which can come under the category of essential items.

(c) methodology for distribution of food (it may be not possible to have banks open during flood situation and therefore credit schemes will be necessary)

(d) identification of critical areas and have a list of authorized dealers through which the scheme has to be operated. (Otherwise due to food shortage there might be unnecessary price hikes and artificial shortages of food etc.)

(e) Special distributions system involving cooperative societies will be necessary.

16.7.3 Education Department

(i) To facilitate temporarily accommodation of victims of disasters identify the school buildings given in the list of schools. A set of keys should be made available with a teacher/Education Department official. The details of the above should be made known to the Mayor and the Divisional Secretary with all handing over notes, list of inventories should be made available so that the buildings could be taken over for the purpose of housing the disaster victims

(ii) Toilets, water supply, drinking water tanks etc. should be repaired and kept in the best conditions

(iii) A check list should be prepared and routine checks should be conducted with the representatives of the coordinating committee before onset of monsoon.

I 6.7.4 Aurvedic Department

(i) Prepare a list of Aurvedic Doctors who will be available for services during the disaster situation.

(ii) A list of Aurvedic Dispensaries should be available to coordinating body. Addresses, Telephone numbers etc. should be collected.

(iii) Contingency plan has to be prepared and sufficient stocks of drugs should be stored for distribution during a hazardous event.

(iv) Coordinating mechanism should be prepared and released for implementation during the disaster situation

16.7.5 Health Services Department

(i) Check in advance the identified temporary evacuation centers for victims of disasters and recommend the numbers that can be housed in such locations to have at least minimum hygienic conditions/health norms

(ii) Train a set of Public Health Inspectors to place on duty on such centers for distribution of medicine. Look into the hygienic conditions/health norms

(iii) Design and implement immunization programmes vaccination programmes for community. Make necessary assessments for requirements in advance.

(iv) Look into the needs of post disasters phase (Disinfection of public places, cleaning of dug wells/drinking water sources. cleaning of debris after disasters etc.)

(v) Coordination with coordinating committee

16.7.6 Provincial Hospital - Ratnapura

(i) Analyse the data regarding the disaster situations and make necessary arrangements to cope up with such situations in future:

(ii) Store medicine, other necessary items, equipment to meet the requirements of a disaster situation

(iii) Provide necessary training to staff to handle such disaster situations;

(iv) Set up an emergency pan for mobilization of staff to handle disaster situation.

(v) Establish contingency plans to handle extra large scale emergency situation which has not been experienced by the MC up to date. (Bomb explosions, civil disturbance, industrial accidents etc.)

16.7.7 National Water Supply and Drainage Board (NWS&DB)

(i) Assess of the situation of normal water supply during disaster situation and take necessary actions to remedy adverse situations reported to date to guarantee the uninterrupted water supply even during the disaster situations.

(ii) Set up an emergency plan to supply water to identified temporary evacuation centers in case of a disaster.

(iii) Identification of equipment needs, staff requirements, needs of water bowsers etc.to handle disaster situations and have a mobilization strategy and strategic plan.

16.7.8 Ceylon Electricity Board (CEB)

(i) Asses the current supply system to guarantee uninterrupted electricity supply during the disaster situations (floods);

(ii) Setup contingency plans to supply electricity to community centers/temporary evacuation centers in case of disasters;

(iii) Have a tested mobilization plan to handle disaster situation to minimize accidents inconvenience due to disruptions of power supplies etc.

16.7.9 Emergency Telephone Use/Information

After a major emergency, such as bomb explosion, flood etc. DO NOT USE THE TELEPHONE UNLESS EMERGENCY HELP IS NEEDED. Wanting to use the telephone to learn the status of friends and loved ones is natural. Unfortunately, when many users pick up their telephones simultaneously, circuits become overloaded and log delays result.

Pay telephones will often continue to have dial tone even if home and office telephones do not. You do not need coins to dial 045 from a pay telephone. Coins will likely be necessary for non 045 from a pay telephone. Coins will likely be necessary for non - 045 calls as access to telephone credit card computers may be interrupted.

If you must use your home or office telephone following a disaster and you experience no dial tone, do not hang up.

If you wait long enough (60 to 90 seconds or more) you should eventually get a dial tone. Once you have a dial tone, you can probably normally complete an out-of-area call. You may still have trouble completing local calls. Families should have and out-of-distinct contact who will accept collect calls and messages.

Cellular telephone users may, or may not have trouble completing a call, depending on their location. For similar reasons, the ability to complete a cellular telephone call depends on the number of nearby cellular users attempting to do the same thing. As you physically move from one "cell site" to another, the number of users will change and consequently affect the ability to use the system.

To contact a city employee for whom you do not have the appropriate home or office telephone numbers, call the municipality operator at any of the following numbers. The MC Operator is on-duty 24 hours-a-day seven days-a-week, during emergency.

- 045-22732
  045-22275
  045-22086

Please see the telephone number of relevant agencies in section 4.3.11

17. MITIGATION MEASURES

17.1 Structural

- Strengthening of Government and Public Buildings
- Trauma care centres
- Establishment of fire brigade at RMC

17.2 Non Structural

- Modification in zoning for irrigation & building codes
- Modification in building application procedures
- Promotion of engineered practices in construction

17.3 Disaster Specific Mitigation Measures Suggested

13.3.1 Landslides

- Shifting of buildings from landslide high risk areas to safer zones
- The Municipal Council has to be suitably empowered to enforce new building regulations for all new constructions at the time of granting permission. Technical officers must be given adequate training in this respect.

17.3.2 Floods

Flooding frequency high areas relocation of people into safer areas. Temporary shifting on onset of warning is necessary step required for which the safe sites have been identified. The names of the villages and the safe on village map have been included in the Action Plan prepared by the SLUMDMP.

17.3.3 Fires

- Fire tenders with hydraulic system to reach upto seven floors should be provided Ratnapura Municipal Council
- All fire tenders should be equipped with wireless sets
- The bye-laws with respect to fire safety for all installations/constructions must be framed by the Municipal Councils and enforced
- Adequate trained personnel for tackling fires must be available with the Municipal Councils

- The procedural delay for moving outside municipal limits must be removed. The co-ordination authority for this can be vested with the Assistant Municipal Commissioner of Municipal Administration, RMC

- Community education programmes for fire safety should be carried out regularly.

17.3.4 Road Accidents

There should be adequate signboards, speed-breakers and guard-stones on the accident prone areas

- Traffic Aid posts should be set up in critical areas

- The Ratnapura hospital must be upgraded to include a well-equipped trauma care centre

- Ambulances must be provided to Police Control Room

- Ratnapura city by-pass should be expedited.

- Most of the tar roads in Ratnapura district need resurfacing

17.3.5 Epidemics

- Water quality monitoring should be strictly enforced in all Grama Sevaka division by officers who are in-charge of the water supply schemes

- Bleaching powder should be adequately available with all Grama Sevakas

- Filtration plants are essential in many rural water supply schemes

- The source must be protected from contamination

- Improper laying of bores must be rectified so as to stop the direct supply of raw water

- The rural hospitals should be upgraded to include blood bank surgical facilities.

18 IMPLEMENTATION OF MITIGATION STRATEGIES

18.1 Landslides

18.1.1 Planning Assumptions

Landslides have large spatial and temporal impacts. Resource requirements are both intensive and extensive for management of landslides, in terms of the number of agencies involved and the nature of coordination required.

18.1.2 Lead Agencies

- The lead agencies involved in the management of landslides are NBRO. GSMB and UDA
- Due to extensive damage to infrastructure, Sri Lanka Telecom, CEB, NWS&DB and Public Works Department of the provincial council play an important role in the management of this disaster.
- As a result of floods and landslides an epidemics can also occur. Therefore stress is laid on measures taken to ensure coordination with health and irrigation departments

18.1.3 Nature of Damages

The impact of landslides differs for urban and rural areas, primarily because of the nature of infrastructure, quality of housing and occupational differences. In rural areas, it is primarily the housing and physical structures (including irrigation infrastructure) which may suffer extensive damage, without necessarily destroying the crops.

In urban areas, in addition to housing and physical infrastructures, it may also disturb the service infrastructure such as water supply, sewage, telephone, electricity, roads, etc. which are essentially underground as well as surface installations and hence exposed to a direct impact.

18.1.4 Possible Impacts

❖ **Effects on Landslides**

- Loss of life
- Injuries demanding surgical needs
- Family disruption

Specific demands raised or required

- Orthopedic surgery and fractures needing treatment
- Individuals trapped under debris need to be located and rescued which calls for not only earth moving equipments, but the services of sniffer dogs.

- Expertise of fire brigade and defence services may be essential in the rescue operations
- In case of separation of family members information counters play an important role
- In case of family disruption resulting from death of major earner, economic rehabilitation of the family may have to be planned as a long term strategy
- Loss of life, property and livestock may require damage assessment procedures to avoid litigations and delays in gratuitous relief and compensations.
- Damage caused
  - Houses
  - Personal belongings
  - Livestock

Specific demands raised or required

- Partially damaged houses needs technical inspection to decide the habitation worthiness and the extent of repairs required
- Certain partially damaged houses may require demolition
- As far as possible, reconstruction will take place on the selected sites to avoid delays, secure cultural continuity and avoid costly land purchase. In extreme situations, new sites for resettlement may have to be identified when removal of rubble and debris is non-viable.
- Salvaging personal belongings from the debris needs clearance from technical personnel to ensure safety of persons engaged
- As far as possible, family members only will be permitted to salvage their individual family belongings.

❖ Damage to infrastructure resulting in disruption of services

  - Buildings
  - Dams
  - Bridges
  - Road Surface
  - Power lines
  - Water pipelines and water tanks
  - Sewer lines
  - Underground cables

Specific demands raised or required

- Care needs to be taken to ensure that all electrical supplies to damaged area are disconnected promptly by CEB
- Underground cables need thorough inspection before power is restored
- Instrumentation is necessary for building sites (schools, hospitals, places of religious worships, etc) for early warning
- In case of damage to bridges, relief operations may require temporary bridges which can be put up with the assistance of army
- Certain roads needing resurfacing will need immediate action from PWD and RDA
- NWS&DB in consultations with health authorities should restore existing water supply with necessary repairs. This may call for replacement of pipelines or arrangements for storage in portable PVC water tanks
- In some cases, restoration of existing water supply may be time-consuming and therefore water tankers may have to be pressed into service
- Identification of nearby water sources and checking water's potability may also be required
- Damage to sewer lines is to be looked into. Alternate arrangements by way of temporary latrines may have to be constructed
- Extensive damage to residential buildings resulting in disruption of telecommunication facilities requires provision/installation of public telephones to facilitate communication.
- Damage to hospital, school buildings and other public facilities may disrupt the services. In such a case restoration of services through temporary arrangements is the first priority.
- PWD may have to take repairs or reconstruction of such public facilities on a priority basis.

❖ **Environmental Effects**

- Alteration in river and stream flow
- Debris accumulation and siltation

Specific demands raised or required

- Areas indicating signs for landslides and other mass movements (rockfalls) should be declared out of bounds and strict vigil should be kept by police to prohibit trespassing

- Foundations of the building in the area prone to landslides need technical assessment

- Alteration in river and stream flow particularly when it covers a settlement create immeo demands for evacuation and relief till such time that the areas for new settlement identified rehabilitation works are executed.

❖ **Economic and Social Consequences**

- Loss of livelihood
- Disruption of market and loss in production
- Migration
- Disruption of social structure including breakdown of social order and organisations
- Law and order problem
- Psychological after-effects such as individual trauma and depression

Specific demands raised or required

In addition to immediate relief requirements for effective and early recovery process, checking migra

- restoration of production units, and employment avenues

- provision of individual counseling and community counseling

- reconstruction of social structures and organisation of community requires participation of n governmental organisations. RMC administrations must invite or co-opt voluntary agencies ensure this aspect.

- For combating depression, engage people in all possible activities related to relief and rehabilitat through a deliberate strategy of community participation.

❖ **Secondary Effects**

- Fires
- Rains

Specific demands raised or required

- Fires resulting due to landsliding are essentially a result of damage to infrastructure such power supply

- Immediate service of fire brigade is essential to check further damage

- Immediate discontinuation of power would restrict the possibility of occurrence to a large exte

- Rains during monsoon periods essentially disrupt rescue and relief operations. Rescue a relief teams therefore must prepare themselves in anticipation and get community cooperati to overcome such difficulties

- Rains also have implications for storage of food, fuel for cooking (firewood or coal) and fodder for the cattle. Protective structures therefore for the storage of all relief material becomes essential. Plastic materials and water-proof containers are required

- Damage to road access due to landslides needs immediate clearing and PWD has to keep itself prepared for such an eventuality

- Settlements on the hill slope prone to landslides need to be shifted to safer places.

18.2 Floods

18.2.1 Planning Assumptions

- Floods occur with warning, while flash flood occur with very little warning

- Flood prone areas have to be demarcated as either blue or red lines depending on the frequency of occurrence. Blue lines are those areas where floods can occur once every five years whereas red lines are areas where floods can occur once every hundred years.

- The resource requirements for management of flood is extremely intensive involving large scale mobilisation of resources

18.2.2 Lead Agencies

- The lead agencies are the Met. Dept., police, irrigation, and medical services

- Extensive damage to infrastructure and public utilities is possible hence the role of supporting agencies such as CEB, Telecommunications and PWD is crucial

- The loss to crop or plantation demands involvement of Agriculture Department

- Loss of cattle will bring in the role for Animal Husbandary

- The assistance and intervention of the EOC is essential to support the district administration in the management of these disasters

- Additionally, secondary disasters such as epidemics may be caused due to floods and must be monitored by Public Health Department.

18.2.3 Possible Impacts

❖ **Effects on Individual**

- Loss of life
- Injuries demanding medical attention
- Water-borne infection

Specific demands raised or required

- In most cases, orthopedic surgery, fractures, cuts and bruises need immediate attention
- Cases of water-borne infection need medication
- Mass immunisation, when necessary, to protect individuals from water borne diseases
- Marooned individuals including those trapped on tree-tops and building terraces need to be located and rescued which calls for boats, or at times helicopter services
- Alternatively when large sections of community are marooned instead of evacuation it may be necessary to organise dispatch of relief supplies to marooned locations. This creates a special need for transport facility
- Expertise of fire brigade and defense services may be essential in the rescue operations.

❖ **Impact at family level**

- Separated families
- Missing persons
- Family disorganisation

Specific demands raised or required

- In case of separation of family members information counters would play an important role
- In case of family disruption resulting from death of major earner, economic rehabilitation of the family may have to be planned as a long-term strategy
- Loss of life, property and livestock may require damage assessment procedures to avoid litigations and delays in gratuitous relief and compensation

❖ **Damage caused**

- Houses
- Personnel belongings
- Livcstock
- Crops and plantations
- Land

Specific demands raised or required

- Partially damaged houses needs technical inspection to decide the habitation worthiness and the extent of repairs required
- Certain partially damaged houses may require demolition

- As far possible, reconstruction should take place on the same sits to avoid delays, secure cultural continuity and avoid costly land purchase. In extreme situation, new sites for resettlement may have to be identified when removal of rubble and debris is non-viable.
- Salvaging personal belongings from the debris needs clearance from technical personnel to ensure safety of persons engaged
- As far as possible family members only should be permitted to salvage their individual family belongings
- Damage to crops, plantations or agriculture land will need a long-term intervention
- Damage to transformers, electric poles and transmission lines needs restoration
- In case of damage to bridges; relief operations may require temporary bridges which can be put up with the assistance of army
- Certain roads needing resurfacing will need immediate action from PWD
- Roads blocked due to uprooting of trees and electric poles may need to be cleared on a priority basis
- NWS&DB in consultations with health authorities should restore existing water supply with necessary repairs. This may call for replacement of pipelines or arrangements for storage in portable PVC water tanks
- In some cases, restoration of existing water supply may be time-consuming and therefore water tankers may have to be pressed into service
- Identification of nearby water sources and checking the potability of the same may also be required
- Damage or choking of sewer lines is one of the most ticklish issue. Alternate arrangements by way of temporary latrines may have to be constructed
- Extensive damage to residential buildings resulting in disruption of telecommunication facilities requires provision of public telephones to facilitate communication
- Damage to hospital, school buildings and other public facilities may disrupt the services. In such a case restoration of services through temporary arrangements is the first priority
- PWD may have to take repairs or reconstruction of such public facilities on a priority basis.
- Disposal of damaged foodgrains is one of the major step and needs community cooperation.
- Provision for distribution of cooked food or dry rations may have to be made.

❖ **Environmental Effects**

- soil erosion
- silting
- water pollution
- denudation of land
- increase in salinity

Specific demands raised or required

- Silting in residential areas and buildings is one of the major problems requiring extensive community involvement.

- NGOs have demonstrated a tremendous capacity to mobilise community participation in desilting operations for reoccupancy of the residences and also the wells providing drinking water.

- Agriculture department may have to undertake soil-testing and propose appropriate measures for restoration of agriculture land.

❖ **Economic and Social consequences**

- Loss of livelihood
- Disruption of market and Loss in production
- Migration
- Disruption of social structure including breakdown of social order and community organisations
- Law and order problem
- Psychological after-effects like depression, trauma etc.

Specific demands raised or required

In addition to immediate relief requirements for effective and early recovery process and checking migration

- Restoration of production units, and employment avenues

- Provision of individual counselling and community counselling

- Reconstruction of social structures and organisation of community requires a professional intervention which can best come from non-governmental organisations. Voluntary agencies will have to be invited or coopted for relief activities to ensure this aspect.

- For combating depression, engage people in all possible activities related to relief and rehabilitation through a deliberate strategy of community participation.

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❖ **Secondary effects**

- Epidemics
- Landslides

Specific demands raised or required

- Rescue and relief teams must be alert to the possibility of outbreak of epidemics and therefore ensure standards of services with respect to storage, cooking, and handing of food materials, as also disposal of waste in relief camps, medical centres and feeding centres.
- Water-quality monitoring mechanisms will have to be set-up to prevent outbreak of epidemics
- Rains also have implication for storage of food, fuel for cooking (firewood or coal) and fodder for the cattle. Protective structures therefore for the storage of all relief material becomes essential. Plastic materials and water-proof containers are required
- Damage to road access due to landslides needs immediate clearing and PWD has to keep itself prepared for such an eventuality
- Settlements on the hill-slope prone to landslides need to be shifted to safer places.

18.3 Epidemics

18.3.1 Planning Assumptions

- The existing water quality monitoring and vector control programmes reduces the possibility of spread of epidemics to a considerable extent
- Efficient response from pathological and testing laboratories helps in early diagnosis of the possible epidemic.

18.3.2 Lead Agencies

- The health department including the medical service is the main agency involved in disaster management during epidemics
- In the case of epidemics accompanying floods the water supply and sanitation department, NWS&DB and irrigation department are the support agencies
- Apart from these support services, assistance is also sought from the police and home guards, public works department, state transport and the media.

18.3.3 Possible Impacts

❖ **Effects on Individual**

- Loss of Life
- Diseases needing Epidemiological Treatment

Specific demands raised or, required

- Mass immunisation, when necessary, to protect individuals.
- In some cases, existing water supply may be contaminated and therefore water tankers may have to be pressed into service.
- Identification of nearby water sources and checking the potability of the same may also be required.
- Rescue and relief teams must be alert to the possibility of spread of epidemics and therefore ensure standards of services with respect to storage, cooking and handling of food materials, as also disposal of waste in relief camps, medical centres and feeding centres
- Water-quality monitoring mechanisms will have to be set-up to prevent spread of epidemics
- In case of vector-borne diseases, the exact vector and related control methods will have to be followed. The required materials are to be listed
- Life-saving drugs including saline will be required in large quantities
- Disposable kits for treatment of affected people and arrangements for proper disposal of these
- Personal protection kits for medical personnel and volunteers assisting in treatment of patients
- Arrangements for disposal of personal belongings and other solid waste materials
- Monitoring arrangements including testing facilities with the help of laboratories and hospitals.

❖ **Economic and Social Consequences**

- Migration
- Evacuation
- Law and order problem
- Psychological after-effects, especially isolation

Specific demands raised or required

In addition to immediate medical relief requirements for effective and early recovery process and checking migration

- restoration of potable water supply

- provision of
  - quarantine of infected cases at family and hospital level
  - programme of immunisation
  - water quality monitoring
  - pathological testing laboratories
  - individual counselling
  - family counselling

- Involvement of NGOs in mobilising community efforts for the control of epidemics by ensuring standards of environmental sanitation. disposal of waste and personal hygiene.

18.4 Road Accidents

18.4.1 Planning Assumptions

- The major road accidents are highly localised.

- The response machinery that is to be activated is at a much more local level

- In case of road accidents involving toxic and highly inflammable materials, there is need for temporary evacuation.

18.4.2 Lead Agencies

- The lead agencies are the police and the regional transport office

- In major accidents involving loss of life and injuries to a large number of people, services of agencies such as fire services, health department will be needed

- In the case of a vehicle plunge in the river, services of divers for rescue operations are required.

18.4.3 Possible Impacts

❖ **Effects on Individuals**

- Loss of Life
- Trauma Care
- Burn
- Injuries demanding surgical treatment
- Poisoning or exposure to toxic material

Specific demands raised or required

- In most cases, orthopedic surgery and fractures need immediate attention

- Individuals trapped in the vehicles need to be rescued which at times calls for metal cutting devices

- Expertise of fire brigade and defence services may be essential when the accident involves vehicles carrying hazardous chemicals, toxic materials or explosives

- Divers may be required if the accident involves a vehicle falling off a bridge into water

- The police may require to cordon off the area

- Chemical accidents may generate a demand for treatment for burns and exposure to poisonous substances which may mean a specialised service not generally available along the highways

- Nature of injuries may demand immediate transfer of injured to centres offering trauma care

- Loss of life, property and goods may require damage assessment procedures to avoid litigations and delays in gratuitous relief and compensation including insurance.

❖ **Damage caused**

- Vehicles
- Goods

Specific demands raised or required

- Salvaging the goods from the accident site needs clearance from technical personnel to ensure safety of persons engaged.

❖ **Environmental Effects**

Air pollution if vehicle carrying hazardous chemicals are involved

❖ **Disruption of services**

- Road network
- Traffic

Specific demands raised or required

- The spills from vehicles carrying hazardous materials may require stoppage of traffic and cleaning of road surface. Various materials are recommended depending on the nature of spill. Also, specialised agencies may have to be called for undertaking spill cleaning operations

- Diversion of traffic resulting from such accidents may require traffic control to give information at various entry points located also far away (which need quick identification) from the site of accident so as to avoid inconvenience to the travellers

  Special cranes may be required for clearing the accident site.

❖ **Economic and Social Consequences**

- Law and order problem

Specific demands raised or required

Security of goods and materials in the vehicles involved in the accident needs protection. The details of goods need to be officially recorded.

❖ **Secondary Effects**

- Fires
- Gas leak affecting settlements near the accident site

Specific demands raised or required

- It may be necessary to inform the settlements around to take necessary precautionary measures, if the accident involves leakage of toxic gases.
- It may be advisable to send a team of medical personnel from poison centres to visit the settlements around the accident site when toxic leak is reported.

18.5 Fires

18.5.1 Lead Agencies

- The main agencies involved in disaster management are the local fire service (municipality), medical services (hospitals) and police (local police station)
- In the event of a major fire, the local fire service would need to co-ordinate with the CEB and the NWS&DB for assistance in containment of the fire.
- Major evacuation may call for support

18.5.2 Possible Impacts

❖ **Effects on Individuals**

- Burns
- Injuries demanding surgical treatment
- Loss of Life

Specific demands raised or required

- Serious burn cases may need immediate transport for admission to burn wards in the hospital
- In many cases, panic behaviour may lead to injuries requiring treatment for orthopedic surgery and fractures.

- Expertise of fire brigade may be essential in the rescue operations and control of fire particularl when population density is very high.

- In case of separation of family members information counters would play an important role. (Thi is normally observed in case of fires in large slums)

- In case of family disruption resulting from death of major eamer, economic rehabilitation of th family may have to be planned as a long-term strategy.

- Loss of life, property and livestock may require damage assessment procedures to avoid litigation and delays in gratuitous relief and compensation.

❖ **Damage caused**

- House
- Personal Belongings

Specific demands raised or required

- Partially damaged houses needs technical inspection to decide the habitation worthiness an the extent of repairs required

- Certain partially damaged houses may require demolition

- Transit arrangements may have to be identified when the structure needs reconstruction

- Salvaging personal belongings from the debris needs clearance from technical personnel t ensure safety of persons engaged

- As far as possible, family members only should be permitted to salvage their individual famil belongings.

❖ **Damage to infrastructure and disruption of services**

- Buildings
- Overhead lines
- Communication Lines

Specific demands raised or required

- Care needs to be taken to ensure that all electrical supplies to damaged area are disconnecte promptly by CEB officials in the area

- Underground cables need thorough inspection before power is restored

- Extensive damage to residential buildings resulting in disruption of telecommunication facilities requires provision of public telephones (PCO) to facilitate communication
- Damage to hospital, school buildings and other public facilities may disrupt the services. In such a case restoration of services through temporary arrangements is the first priority
- PWD (may have to take repairs or reconstruction of such public facilities on a priority basis
- Some fires may demand traffic control measures including identification of alternate routes and diversion of traffic
- In congested areas controlling curious onlookers may block movement of rescue and
- Fire workers. The police will need to cordon off the area for smooth operations.

❖ **Economic consequences**

- Loss of livelihood
- Disruption of market
- Loss in production

Specific demands raised or required

In addition to immediate relief requirements for effective and early recovery process,

- Restoration of markets, production units, employment avenues
- Provision of damage assessment

ATTACHMENT A

REGULATION AND DIRECTIVE ORDERING CURFEW AND OTHER SPECIFIED RESTRICTIONS DURING EXISTENCE OF A LOCAL EMERGENCY

Whereas, a Local emergency now exists within the city of Ratnapura and existence of the same has bee duly declared and published.

Now therefore, by virtue of the authority vested in me as Mayor of the city of Ratnapura pursuant to th provisions of the Local Government. Administrative code ..... to promulgate, issue and enforce rules regulations and directives, I hereby declare the following orders to be necessary for the protection of life an property in the city.

1. No person shall be upon any public street avenue, boulevard, alley, park or other public plac or unimproved private property anywhere with the city boundaries between sunset and sunris of the following day

2. The community development department of the city of Ratnapura shall immediately activate its cold/wet weather sheltering program to provide shelter for citizens who have no other place to go between sunset and sunrise of the following day

3. No person shall sell or dispense any gasoline or other flammable liquids except for normal filling of motor vehicle fuel tanks within the city boundaries and

4. No person shall sell or transfer possession of any ammunition of any type within the city boundaries

These restrictions shall not apply to peace officers, fire, fighters, Emergency Operations Organisation (EOO) personnel and military or police personnel.

Any violation of these regulations shall be punished as provided by the Ratnapura MC Administrative Code, Chapter 8 section

Mayor
Ratnapura M.C., Sabaragamuwa P.C.

Dated at Ratnapra

Time .....
Copy filed with the Municipal Commissioner .....
By .....

SAMPLE

ATTACHMENT B

DECLARATION OF LOCAL EMERGENCY

By virtue of the authority vested in me as Deputy Inspector General of Police (Sabaragamuwa) pursuant to the provisions of Local Govt. Authority Administration code section ..... hereby find that:

The city of Ratnapura is experiencing the results of repeated storms/winds/heavy rains, and flooding which have saturated the ground during the past few weeks:

Some damage has been reported;

On ..... 1999 with the National Meteorological Dept. predicting an additional two to six inches of rain in the next 24 hours for our region;

The magnitude of these conditions is such that the emergency is likely to become beyond the control of the normal services, personnel, equipment and facilities of the regularly constituted branches and departments of the city government; and

Said results of the storm, wind heavy rain, flooding, and mudslides may cause extraordinary loss of life and property.

Now therefore, I hereby declare the existence of a local emergency and direct the Emergency Operations Organisation (EOO) to be immediately activated to take such steps that are necessary for the protection of life and property in the affected area.

I further request that the Sabaragamuwa PC declares a State of Emergency for the city of Ratnapura.

I therefore direct that the Declaration of Local Emergency shall take effect immediately and that widespread publicity and notice shall be given to the said declaration through the most feasible and adequate means of disseminating such notice throughout the city.

Deputy Inspector General of Police
(Sabaragamuwa) Province

Dated at Ratnapura

Time: .....
Copy filed with the Municipal Commissioner
Date: .....
Time: .....
By: .....

SAMPLE

Part II

Multi-Disaster Response and Mitigation Strategy

PART II

MULTI-DISASTER RESPONSE AND MITIGATION STRATEGY

TABLE OF CONTENTS

How to use the document		iii
Definitions used in the document		v
Acronyms		viii
1. INTRODUCTION		1
1.1	Disaster Preparedness	2
1.2	Disaster Mitigation	3
2. MITIGATION STRATEGY: PARTNERSHIPS FOR BUILDING SAFER COMMUNITIES		4
2.1	Planning Assumptions	4
2.2	Goals of Mitigation Strategy	5
2.3	Cost-Benefit Analysis	5
3. ELEMENTS OF MITIGATION STRATEGY		6
3.1	Risk Assessment and Vulnerability Analysis	6
3.2	Applied Research and Technology Transfer	7
3.3	Public Awareness and Training	8
3.3.1	Training Needs Assessment	9
3.3.2	Training	9
3.3.3	Community Efforts at Mitigation	10
3.3.4	Community Level Training and Public Awareness Activities.	11
3.4	Institutional Mechanisms	13
3.4.1	Disaster Mitigation: Strengthening Institutional Frameworks	13
3.4.2	Disaster Management Legislation, Relief and Rehabilitation Policy	14
3.5	Incentives and Resources	14
3.5.1	Insurance	15
3.6	Land-use Planning and Regulations for Sustainable Development	16
3.6.1	Siting and Safety	17
3.6.2	Safe siting for a new settlement	17

4. EVALUATION 18

5. THE ROLE OF THE MEDIA IN HAZARD MITIGATION AND DISASTER MANAGEMENT 19

5.1 Sharing of Media Facilities 20

5.2 Integration of the Media into Disaster Mitigation Activities and activities during disasters 20

6. MITIGATION MEASURES 22

6.1 Structural Alterations for Buildings 22

6.2 Structural Alterations for Other Installations 24

6.3 Specific Disaster Mitigation Measures 24

6.3.1 Flood Mitigation 24

6.3.2 Landslides 28

6.3.3 Cyclones 30

6.3.4 Epidemics 33

6.3.5 Road Accidents 35

6.3.6 Fires 37

6.3.7 Industrial and Chemical Accidents 38

HOW TO USE THE DOCUMENT

This document is a part of the activities undertaken by Sri Lanka Urban Multi-Hazard Disaster Mitigation Project to establish public and private sector mechanisms for disaster mitigation in Ratnapura Demonstration Project area. This is prepared with a view to provide uniform directives from the central government to the district administration and establish a uniform response to any disaster situation by the municipal authorities. The document attempts to evolve a multi-disaster response structure which can adapt itself to any specific disaster situation by any other local government institution in Sri Lanka.

Certain parts of the document therefore are disaster specific whereas the others deal with uniform response procedures. The complex dimensions of a response situation have been dealt with at the central government. district authority and local government level. A comprehensive understanding of the multi-hazard response structure with accompanying directives can therefore be best appreciated only when seen in their totality. However, the separation of the parts of the Emergency Management and Response Plan (EMRP) is done with a view to allow functioning of the plan smoothly. Therefore, some of the parts would need continuous updating whereas, others would need to be reviewed after several years. The following description of the different parts of the EMRP publication would assist the reader in terms of selection of the part required for immediate reference.

Part I of the EMRP is the **Emergency Management and Response Mechanism-Organisation Structure.** It outlines the institutional arrangements, inter-department linkages, role of NGOs, voluntary agencies and local communities. The procedure and mechanisms for plan dissemination and plan update are also reflected. The inventory of resources forms an integral part of this document, but has to be included after carrying out an assessment on requirements and availability. That is yet to be carried out.

Part II of the EMRP is the **Multi-Disaster Response and Mitigation Strategy** at Central government, provincial, district and local government levels.

Part III of the EMRP is the **Operating Procedure Guidelines and Standards.** This document presents the guidelines for various departments during different stages of the disaster cycle. The standards of services for food, water, shelter and health services have been elaborated extensively in this document. Information Reporting and Monitoring Tools suggested in this document gives the reporting institutions, necessary, formats for preparedness, immediate response and damage assessment.

Previously published **Ratnapura Disaster Management Action Plan** discusses various technology options and dimensions of training research and community participation. Therefore generic mitigation measures for specific disasters have also been discussed in this report.

This EMRP has been prepared with the consultation of the Ratnapura Disaster Management Committee and the cooperation and guidance of all who contributed in preparation of this document are acknowledged with gratitude.

I wish to acknowledge with gratitude the assistance provided by ADPC management, specially the contributions made by Mrs. Shirely Mattingly - ADPC Consultant, in bringing this document to this standard

Mrs. G Karunaratne
Project Director
Sri Lanka Urban Multi-Hazard Disaster Mitigation Project

April 1999

DEFINITIONS USED IN THE DOCUMENT

Hazard means an event with a potential for human injury, damage to property, damage to the environment, or some combination thereof. A threatening event or the probability of occurrence of a potentially damaging phenomenon within a given time period and area.

Hazard is an event or occurrence that has the potential for causing injury to life or damage to property or the environment. The magnitude of the phenomenon, the probability of its occurrence and the extent and severity of the impact can vary. In many cases, these effects can be anticipated and estimated." (Terry Jeggle and Rob Stephenson, Concepts of Hazard and Vulnerability Analysis)

Hazard Assessment

In order to focus limited resources on to those areas of the state at risk, it is necessary to understand the pattern of hazard activity precisely and put a quantitative probability to the likelihood of occurrence of hazards. Information is available through newspaper clippings and records maintained with the various government departments of the hazard prone areas in the State with respect to various hazards.

Risk and Vulnerability

Assessment of the potential severity of these hazards within a particular situation involves an assessment of vulnerability and risk.

Risk has been defined by the United Nations as a measure of the expected losses due to a hazard event of a particular magnitude occurring in a given area over a specific time period. The level of risk depends upon:

- the nature of the hazard
- the vulnerability of the elements which it affects
- and the economic value of those elements

As communities grow larger, more established and more complex, experience has shown that the level of risk which they face increases.

Risk Assessment means the quantitative evaluation of the likelihood of undesired events and the likelihood of harm or damage being caused by them, together with the value judgments made concerning the significance of the results. Risk Frequency means the number of occurrences per unit of time.

Risk Analysis means the identification of undesired events that lead to the materialization of a hazard, the analysis of the mechanisms by which these undesired events could occur and usually. the estimation of the extent, magnitude, and likelihood of any harmful effects.

Risk Management means the program that embraces all administrative and operational programs that are designed to reduce the risk of emergencies involving acutely hazardous materials. Such programs include, but are not limited to, ensuring the design safety of new and existing equipment, standard operating procedure, preventive maintenance, operator training, accident investigation procedures, risk assessment for unit operations, emergency planning, and internal and external procedures to ensure that these programs are being executed as planned.

The vulnerability of a particular element of society is defined as the degree of loss which is would suffer as a result of a specific hazard event. The nature of vulnerability and its assessment vary according to whether the element involved represents people and social structures, physical structures, or economics assets and activities.

The vulnerability of an area is determined by the capacity of its social, physical and economic structures to withstand and respond to hazard events. Certain groups of people, types of physical assets and economic activities can be particularly vulnerable or susceptible to damage.

The concept of vulnerability implies a measure of risk combined with the level of social and economic ability to cope with the resting event in order to resist major disruption or loss.

Vulnerability is thus the liability of a community to suffer stress, or the consequence of the failure of any protective devices and may be defined as the degree to which a system or part of a system, may react adversely to the occurrence of a hazardous event.

Accident means an unexpected event that results in loss or injury to a person and/or damage to property or the environment.

Hazardous Materials includes explosives, compressed and liquefied gases, flammable and combustible materials, oxidizing materials and organic peroxides, poisonous and infectious substances, radioactive materials, corrosives, and miscellaneous dangerous goods.

An emergency by definition is "A situation or occurrence of a serious and often dangerous nature, developing suddenly and unexpectedly, and demanding immediate action." An emergency may be the result of man-caused or natural occurrences such as but not limited to, process upsets, uncontrolled reactions, fires, explosions, structural failures, cyclones, earthquakes, floods, and storms.

Emergency Response Plan/Action Plan means a detailed program of action to control and/or minimize the effects of an emergency requiring prompt human life, minimize injury, optimize loss control and reduce the exposure of physical assets and the environment, or in other words is the process by which the response to an extraordinary event is categorized into functional components and responsibility for each component is assigned to the appropriate individual or agency.

Concept of Operations. A general notion of how disasters progress and how agencies may plan their response. In this plan, it is supposed that disasters progress through identifiable phases and that certain responses are appropriate during each of these phases.

Emergency Operations Centre at the State level and District Control Room at the District Level.
A centralised facility form which emergency operations can be directed and coordinated.

Mutual Aid and Response Groups. A localised system designed to ensure that adequate resources, facilities, and other support are provided within an identified jurisdiction whenever individual unit's resources prove to be inadequate to cope with a given industrial complex.

Preparedness. Those activities which governments, organisations, communities and individuals develop to minimise loss of life and damaged and to organise and facilitate timely and effective rescue, relief and rehabilitation in case of disaster.

Preparedness is the "insurance policy" against disasters, it is undertaken because mitigation activities cannot fully eliminate the occurrence of those events. Preparedness is supported by the necessary legislation and means a readiness to cope with disasters or similar emergencies education and training of the population, organization for and management of disasters, including preparation of operational plans, training of relief groups, the stockpiling of supplies and the earmarking of the necessary finds.

Preventive Action Disaster preventive action may be described as measures designed to prevent natural phenomena from causing or resulting in disaster or other related emergency situations.

Preventive Actions concerns the formulation and implementation of long-range policies and programmes to prevent or eliminate the occurrence of disasters. On the basis of vulnerability analyses of all risks, preventive action includes legislation and regulatory measures, principally in the fields of physical and urban planning, public works and building.

Mitigation

The concept of mitigation spans the broad spectrum of disaster prevention and preparedness. Mitigation means reducing the actual or probable effects of extreme disaster on man and his environment. Thus an emergency plan if properly executed can have a mitigating effect on a disaster just as the proper observance of building and land-use regulations designed to avert disaster, Mitigation is, in effect, prevention to a degree.

Evacuation Moving people to a safer area.

Response is the first phase which occurs after the onset of an emergency and is intended to provide emergency assistance for disaster effects and casualties. This includes search, rescue, shelter, medical care, and other efforts to reduce the probability or extent of secondary damage. An example of a response activity may include sand bagging against impending flood waters in an attempt to save lives and minimize damages.

Recovery activities continue beyond the emergency period immediately following disaster. Their purpose is to return all systems, both formal and informal, to normal. They can be broken down into two sub-phases: short-term and long-term recovery activities.

Short-term activities attempt to return vital human systems to minimum operating standards, and normally encompass approximately a 2 weeks period.

Long-term activities stabilize all systems to normal. This includes functions such as redevelopment loans, legal assistance, and community planning. Long-term recovery activities can vary in length and potentially take years.

ACRONYMS

CBO	-	Community Based Organisations
CEB	-	Ceylon Electricity Board
CERT	-	Community Emergency Response Team
CHPB	-	Centre for Housing Planning and Building
CNA	-	Community Needs Assessment
DCR	-	District Control Room
DDMAP	-	District Disaster Management Action Plan
DHS	-	Dept. Health Services
DMC	-	Disaster Management Committee
DMO	-	District Medical Officer
EOC	-	Emergency Operations Centre
G&JA	-	Gem and Jewelry Authority
MARG	-	Mutual Aid and Response Group
MPCS	-	Multipurpose Cooperative Society
NBRO	-	National Building Research Organisation
NDMC	-	National Disaster Management Centre
NGO's	-	Non Governmental Organisations
PC	-	Provincial Council
PHD	-	Public Health Department
RDA	-	Road Development Authority
SHS	-	Senior Superintendent of Health Services
SLCTB	-	Sri Lanka Central Transport Board
SLIDA	-	Sri Lanka Institute of Development Administration
SLUMDMP	-	Sri Lanka Urban Multi Hazard Disaster Mitigation Project
SP	-	Superintendent of Police
SS	-	Social Service
TNA	-	Training Needs Assessment
UC	-	Urban Council

SECTION I

INTRODUCTION

1. INTRODUCTION

A hazard becomes a disaster only when it affects human settlements and causes loss of life and damage to property. In order to reduce the impact of such events through mitigation efforts, it is necessary to understand how such hazards become disasters. The extent of vulnerability of area, people and property to a hazard or the probability of its occurrence defines the extent of risk. Vulnerability analysis and risk assessment therefore are essential forerunners for evolving appropriate preventive measures and mitigation strategies. The document on "Risk Based Mitigation Planing Approach" published by the Sri Lanka Urban Multi-Hazard Disaster Mitigation Project and the Environmental Map Workbook assume significance in this context.

The analysis shows that various locations in the Ratnapura Demonstration Project area are vulnerable to different disasters in varied degrees. Preparedness and mitigation plans, therefore, will have to be evolved locally to reduce the impact of the disasters. While evolving such area specific preparedness and mitigation plans, types of vulnerabilities will essentially define the levels of preparedness and mitigation strategies. These strategies will have to be concentrated more towards the social and economically backward communities, as against the vulnerability of the overall system.

The social and economic backwardness is a direct result of marginalisation, non-access to goods and services, illiteracy and population growth. In some cases, particularly in urban areas, with a high population concentration of the poor, preventive service measures cannot reach everybody, resulting in large sections of people being left to face the impact of the hazards with their own means. Preparedness and mitigation strategies will have to be oriented, in such a situation, to higher degrees of community involvement and participation.

In rural areas, characterised by inadequate infrastructure and poverty groups, all mitigation efforts will have to be backed up by a strong and committed programme of social development for the communities. There is ample evidence and extensive literature describing the relationship between disasters and development. Constant re-examination, therefore, of development policies and programmes, leading to equity and social justice, will be a pre requisite to ensure the success of mitigation efforts that are being proposed.

The United Nations has declared the 1990s to be the International Decade for Natural Disaster Reduction (IDNDR). Specially, it focuses primary attention on planning and preparedness for hazards rather than waiting passively for them to strike. The belief is that post-disaster relief, while humanitarian in its motivation and certainly necessary, is relatively ineffective as compared with various actions that could be taken before disaster strikes. In any case, preparedness is the key to effective action after the event. The roles of training, education, and information dissemination has therefore been given a high priority in the Sri Lanka Urban Multi-Hazard Disaster Mitigation Project activities.

In essence, the decade's activities seek to shift the emphasis from post-disaster relief to pre disaster risk refection. The key tasks in risk reduction are:

- avoiding habitation in hazardous areas;
- developing structures resistant to the onslaughts of hazards

- developing the ability to rapidly evacuate hazardous areas or to shift residents to hazard resistant structures
- reducing or eliminating natural hazards through Engineered Construction and introduction of best practices
- establishing, through preparedness, the means to quickly recover from disasters-with minimal additional suffering and loss of life.

While devising the mitigation strategy it is necessary to differentiate between disaster preparedness and disaster mitigation.

1.1 Disaster Preparedness

Preparedness focuses on plans to respond to a disaster threat or occurrence. It takes into account an estimation of emergency needs and identifies the resources to meet these needs. It also involves preparation of well-designed plans to structure the entire post-disaster response, and familiarizing the stakeholders particularly the communities through training and simulation exercises. Preparedness has to be supported by the necessary legislation means, a readiness to cope with disasters or similar emergencies which cannot be avoided.

The first objective of preparedness is to reduce the disaster impact through appropriate actions and improve the capacity of those who are likely to be affected most (that is, the marginalised and the poor), to get the maximum benefit out of relief. The second is to ensure that ongoing development continues to improve the capacities and the capabilities of the system to strengthen preparedness efforts at community level. Finally, it guides reconstruction so as to ensure reduction in vulnerability.

The best examples of preparedness activities are the development of local warning and community evacuation plans through community education, evolving local response structures such as Community Emergency Response Teams (CERT) and administrative preparedness by way of stockpiling of supplies, developing emergency plans for rescue and relief.

Since disasters are economics and social processes, preparedness and mitigation must emphasise the socioeconomic rather than just physical aspects. If disasters demonstrate the vulnerability of the social system, then any policy for disaster management must include the potential reduction of such vulnerability.

1.2 Disaster Mitigation

Pre-disaster planning consists of activities such as disaster mitigation and disaster preparedness. Disaster mitigation focuses on the hazard that causes the disaster and tries to eliminate or drastically reduce its direct effects. The best example of mitigation is the construction of dams or levies to prevent floods or coordination of release of water from various irrigation dams to avoid flooding in the downstream areas. Other examples include strengthening buildings to make them cyclone or landslide resistant, planting of crops that are less affected by disasters, changing crop cycles, controlling land-use patterns to restrict development in high-risk areas diversification of economic activities to act as insurance to offset losses in different sectors.

Structural measures such as the construction of protective works or alterations designed to diminish the vulnerability of the elements at risk, and non-structural measures, such as regulating land use and building codes, incorporating preventive aspects into development planning, and equipping line departments for damage reduction, can all reduce the impact of a disaster on a region or a population. Everything that is done to reduce or prevent the damages that a disaster may cause is called "mitigation of risk."

Such mitigation measures can be integrated with normal development activities and inter-department coordination. Mitigation is not, in fact a cost. In the long run it pays for itself. And it does so in lives saved and in real money.

SECTION II

MITIGATION STRATEGY: PARTNERSHIPS FOR BUILDING SAFER COMMUNITIES

2. MITIGATION STRATEGY: PARTNERSHIPS FOR BUILDING SAFER COMMUNITIES

Mitigation are actions that have a long-term impact and are different from those that are more closely associated with preparedness for, immediate response to, and short-term recovery from a specific disaster, recognizing that the boundaries are not absolute. Mitigation efforts must not only be a priority for the repair, reconstruction, and rehabilitation of developed areas, but must become a prerequisite for growth in areas that have not been developed.

A complicating factor is that there will always be residual losses from extreme events above and beyond those for which mitigation is cost-effective. It may not be economical to protect buildings and infrastructure other than critical facilities from these more extreme events since the increased cost of construction can far exceed the damage prevented.

2.1 Planning Assumptions

- Risk reduction measures ensure long-term economic success for the community as a whole rather than short-term benefits for special interests.
- Mitigation supports the building (or rebuilding) of communities as model sustainable development, so that they are likely to recover more quickly from the economic impacts of disasters and so that the people are disaster survivors, not disaster victims.
- Risk reduction measures must be evaluated to achieve the best mix for a given location
- All mitigation is local.
- Disaster costs and the impacts of hazards can be reduced by emphasising pro-active mitigation before emergency response, that is both pre-disaster and post-disaster mitigation.
- Hazard identification and risk assessment are the cornerstones of mitigation.
- Building new Centre -Province- Local partnerships and public-private partnerships are the most effective means of implementing measures to reduce the impacts of hazards.
- Those who knowingly choose to assume greater risk must accept responsibility for that choice.
- Risk reduction measures for hazards must be compatible with protection of natural and cultural resources.

This is an appropriate time to launch a state level effort because

- The economic and social costs of recent large- scale disasters like Lathur earthquake are still fresh in our minds.

- Significant technical know-how is finding its way into practical application.
- Mitigation is being recognized as an integral component of sustainable development.
- There is growing acceptance of the need to develop a Multi-disaster approach to mitigation.
- There is an ongoing UNDP sponsored programme to define the roles of Central government and Provincial governments for reducing the impacts of disasters and to strengthen the national Disaster Management Centre in Sri Lanka.

2.2 Goals of Mitigation Strategy

- To substantially increase public awareness of disaster risk so that the public demands safer communities in which to live and work; and
- To significantly reduce the risks of loss of life, injuries, economic costs, and destruction of natural and cultural resources that result from disasters.

2.3 Cost- Benefit Analysis

The underlying assumption of mitigation is that in the long-term analysis, the expenditure on mitigation measures will prove to be cost-effective in terms of the savings generated via reduced losses and reduced deaths. The hazard assessment and the vulnerability analysis can, to an extent, project the probable future losses. While the specific time and location of future losses cannot be specified, general trends, and areas of elevated risk can be identified. Specific mitigative actions can be taken to prevent losses in these areas. However, such actions do have a cost built into them, in terms of relocation or structural enhancements or protection. This cost, however, will be offset by the expected reduction in loss during a disaster. The difference between the cost of mitigation and the cost of expected loss, is a tangible financial benefit.

While it is difficult to quantify many intangible assets like loss of life or disruption in social structure, studies done in many countries have clearly demonstrated the benefits of mitigation as compared to the expenditure incurred on mitigation. These then, are the various non-financial benefits of mitigation. A cost benefit analysis of any proposed mitigation measure is therefore, essential to analyse the extent of loss-reduction. The effectiveness and efficiency of mitigation investments is directly influenced by scientific development in hazard identification and loss reduction measures. For this reason, scientific and engineering research provide the foundation for improved mitigation investment returns.

SECTION III

ELEMENTS OF MITIGATION STRATEGY

3. ELEMENTS OF MITIGATION STRATEGY

Historical data on disasters clearly underscores the fact, that disasters have, by and large, a definite frequency to their occurrence. While in Ratnapura divesting landslides may occur once in fifteen years, floods, on the other hand, may occur once every three-four years. With the advancement in science and increased understanding of the natural phenomena, it is possible to apply this knowledge in combination with the traditional or local modes of mitigation, to develop a comprehensive mitigation strategy.

A mitigation strategy however, cannot be successful unless it has the backing and support of all concerned the administrative machinery, the research institutions, the non-officials and the community. So, it also becomes imperative to have built-in institutional arrangements and/or legislative backing to oversee the mitigation over a period of time.

The main elements of mitigation strategy therefore, are:

- Risk Assessment and Vulnerability Analysis
- Applied Research and Technology Transfer
- Public Awareness and Training
- Institutional Mechanisms
- Incentives and Resources for Mitigation
- Land Use Planning and Regulations

3.1 Risk Assessment and Vulnerability Analysis

Before embarking on any specific mitigation measure, it is essential to have a proper understanding of the risks and vulnerability of the community. This basically means carrying out a risk assessment and vulnerability analysis. Such an activity will have to carried out in electoral wards, resulting in identification of hot-spot areas or areas of prime concern. While such assessments would be administrative exercises, it is essential that the local community is also involved in such exercises as this gives them a better understanding of risks and vulnerabilities in the given area.

A comprehensive vulnerability analysis should be undertaken in all hazard prone areas, taking into account past disaster events, the socio-economic conditions of the population living in the area, the infrastructure and other structural facilities for cyclones, floods, storm surges, geological hazards etc. Risk assessment should be undertaken for all hazards, and should include the following:

(a) areas of influence
(b) frequency
(c) intensity
(d) impact, and
(e) time to return to normalcy

Hazard mapping can then be undertaken to delineate causative source areas and areas exposed to hazards, as well as the potential risk levels for different hazards. There is also a great need for the production of geologic "thematic maps". Hazard maps can therefore be deterministic or probabilistic.

Geographical Information System (GIS) can also play a crucial role in the gathering and analysis of information needed for disaster management. The GIS can give higher quality results than can be obtained manually, regardless of the costs involved. It can facilitate decision making and improve

coordination among agencies when efficiency is at a premium. In general, there are three categories of information to be assembled:

- Natural Hazards information
- Information of natural ecosystems
- Information on population and infrastructure

Valuable information on individual hazards in a study area may appear on maps with varying scales, coverage, and detail, but these disparate maps are difficult to use in risk analyses or in deciding on suitable mitigation strategies. Information from several of them can be combined in a single map to give a composite picture of the magnitude, frequency and area of effect of all the hazards.

The GIS can be used for hazards management at different levels of development planning. At the level of Central Govt. and provincial levels it can be used in hazard assessments for resource analysis and project identification. At the district and local authority level, it can be used to formulate investment projects and specific mitigation strategies.

The assessments of risks and vulnerabilities will have to be constantly revised and therefore a regular mechanism should be established for this. The use of GIS in this regard would be highly beneficial, as the primary data can be easily updated and corresponding assessments can be made.

A special effort will have to be undertaken to provide for hazard assessment in highly urbanised locations and look at the existing infrastructure and system in terms of their capacity to sustain the increasing demands and their vulnerability to various disasters.

3.2 Applied Research and Technology Transfer

Emphasis should be placed on expanding observation and monitoring systems, especially in areas of the region where the data is scarce and risk is high. Reliable feedback information on warning systems, public reception and response and susceptibility of the warning system, to damage should also be collected.

There is a great need to

- establish or upgrade observation equipment and networks
- monitor the hazard properly
- improve quality of forecast and warning
- disseminate warnings quickly through the warning systems
- undertake disaster simulation exercises

Space technologies such as remote sensing, satellite communication and Global Positioning Systems (GPS) are widely used in monitoring the occurrence of different types of disasters and in evaluating the losses and the impact in development working.

Remote sensing is useful to hazard management for focusing on priority areas, verifying small-scale data interpretations and providing information about features. It is possible through remote sensing to identify areas of potential exposure to hazards, so that measures to reduce the social and economic impact of potential disasters can be introduced in the planning process. Remote sensing can be used for mapping of areas susceptible to disasters.

Apart form monitoring and observations through use of GPS and remote sensing (basically activities carried out by or central government institutions like National Building Research Organisation (NBRO), Meteorological Department, Irrigation Dept. etc., applied research on formulating various mitigation strategies specific to a district or a local govt. area can be carried out through educational institutions or universities located in the region.

Universities or technical educational institutions should be encouraged to include disaster mitigation as a part of graduate training programmes. The contents of such a course can be location-specific to the institution. For example, institutions located at areas of micro seismic activity (like the Kandy area) can have micro seismic monitoring as a specialization, whereas more flood-prone areas (like Ratnapura region) can have flood mitigation topics. Existing engineering and architectural institutions and technical colleges can incorporate these components in their syllabuses.

Research and studies should be undertaken on various aspects of disasters and their reduction, with national and international assistance if required, on such topics as: the assessment and mapping of hazards, early warning systems, the effects of deforestation, effects of changing land-use patterns and urbanisation and specific vulnerabilities of various systems such as power, sewer, transport, etc., note the incidence and damage caused by disasters and the countermeasures required and, the application of remote sensing and GIS technologies in hazard forecasting, warning, assessment and management. Non-structural approaches, social and developmental policies, institutional arrangements, community preparedness and response capacity are some of the other areas in which research can be undertaken.

Such steps would lead to the formulation of specific mitigation measures, more appropriate to the area. Community based mitigation measures combined with scientific knowledge would expand the existing knowledge of the local community, as well as the students due to the increased interaction. A comprehensive database on mitigation measures can also be generated in this manner.

At the same time, it is essential that this database on the mitigative measures are communicated to, and understood by the local govt. institutions and local govt. administrators, who might be involved in giving clearances and permissions for various projects.

3.3 Public Awareness and Training

The Disaster Management Action Plan for Ratnapura Demonstration Project area intends to influence the present institutional arrangements to the capacity of each of the components, within the institutional arrangements, is improved. This is proposed to be done through capacity building of the linked departments on the one hand, and providing an organisational structure such as EOC at the local govt. level and DCRs at the district level. The efficiency of such an exercise will largely depend on the type of preparedness measures, coupled with necessary training inputs undertaken.

3.3.1 Training Needs Assessment

One of the most critical components of the Mitigation Strategy is the training to be imparted to the officials and staff of the various departments involved at the state and the district level. Through the training inputs it is visualised that both information and methodology will be shared with the concerned actors. The training activity will be undertaken both at central govt. through CHPB and SLIDA and, at the district and local govt. level through NGOs, government schools and institutions affiliated to universities and research centres.

The need for action and intervention in a disaster situation is at multiple levels and cuts across various sectors. The quality of intervention depends a lot on the inter-sectoral and interdepartmental coordination and efficient teamwork. Thus, it is pertinent to assess the specific training requirements of the key personnel to be involved in the intervention.

Training Needs Assessment (TNA) exercises for different categories and levels of functionaries, will enable identification of the gaps that need to be attended to through training activities. These will be done by assessment of the level of knowledge, attitudes and skills, with respect to the task to be undertaken and the expected levels of knowledge attitudes and skills. Preparation of training modules and materials based on such TNA exercises will be undertaken by the training institutions.

3.3.2 Training

3.3.2.1 Centre for Housing Planning and Building (CHPB) and Sri Lanka Institute of Development Administration (SLIDA)

The Disaster Management training is to be conducted at National level by CHPB (under the Ministry of Urban Development, Housing and Construction) and SLIDA (under the Ministry of Public Administration, Home Affairs and Plantation Industry)

The efforts at the National level training institutions would include;

1. Upgrading training technology
2. Refining the methodologies for Training Needs Assessment and Community Needs Assessment
3. Updating Risk Analysis and Vulnerability Assessment
4. Developing training materials and preparing training modules
5. Refining the methodologies for training and simulation both at the Centre as well as at the community level
6. Undertaking training programmes and simulation exercises. Simulation exercise can be carried out once every year under both real time and compressed time conditions.

The implementation strategy envisages that the NGOs, private sector organisations and other government training institutions will, in turn, organise training and simulation exercises at the district and community level, in order to ensure preparedness from the grass-roots.

3.3.2.2 NGOs and other Private Sector and Government Training Institutions

The non-governmental organisations play an important role in disaster management and provide valuable resources and expert manpower. Their strength lies in the choice of their manpower, the informality in operations and flexibility in procedures. Their capacity to reach out to community groups and their sensitivity to traditions of the local agencies, both from within and outside the state have evolved technical expertise and capabilities which can be brought into managing typical issues. These organisations enjoy a fair degree of autonomy and flexibility and hence, can respond to changing needs immediately.

NGOs generally work on well-defined problems and issues and hence, the resources are generally ear-marked for specific activities and programmes. Particularly, in the mitigation efforts, it may therefore, be necessary that special efforts are made towards capacity building of NGOs to enable them to carry out disaster management activities. These could include their contribution for community preparedness, and actors in the Management of disaster situations. Apart from orienting these NGOs towards Disaster Management Action Plans, the mitigation strategy will consider capacity building of these NGOs as resource groups for community preparedness by providing necessary inputs for improving their infrastructure and communication capabilities, particularly in vulnerable areas, thereby integrating them with the communication net work of the district.

Private sector, including the Gem Mining community with their strong resource base, and infrastructure facilities, will be very consciously brought into the mitigation strategy. Institutional arrangements such as Gem and Jewelry Authority (G&JA) may have a significant role to play within a well-defined geographical area, an added advantage of their contacts with the villages around. Currently, most of the Gem Mining Cooperatives and G&JA are engaged in providing various services such as education, health, recreation, credit facility to the communities and therefore have built a good rapport. However, possibilities of involving private sector or involvement beyond the local geographical area cannot be overlooked. Efforts will, therefore, be made to look at some of these actors in the mitigation strategy.

While at one level, training will be concentrated on providing information regarding disaster management, efforts will also be made to involve private sector contribution towards the mitigation strategy.

3.3.3 Community Efforts at Mitigation

Mitigation through development policy and planning and appropriate steps through line departments in mitigation efforts, will have to be backed up through community efforts to ensure its effectiveness. Particularly in marginalised communities, with high concentration of poor, the capacity of the administration to intervene with mitigation efforts will be undermined if the community does not appreciate the linkage of these interventions with vulnerability reduction. Administrative intervention alone, therefore, will not be adequate.

At the community level, apart from households the stakeholders include, community based organisations (CBOs), NGOs and private sector initiatives providing services. It is these stakeholders who will have to define their role with respect to mitigation, that is, reduction of risk and vulnerability.

There is evidence to show that the local communities, in spite of their limitations and inadequacy of resources have sufficient motivation, backed up by traditional knowledge to minimise and counter the impact of disasters through individual as well as collective actions.

Local governments, NGOs, private sector organisations, businesses, and individuals each have important roles to play in mitigating the impacts of hazards. A conscious effort therefore, on the part of community level actors, NGOs and private sector, to adopt community based mitigation strategies, will strengthen and stabilise the efforts of development administration to evolve a comprehensive mitigation strategy. They must lead by providing example, adopting and practicing the best mitigation techniques for all actions affecting its facilities and employees, thereby providing leadership and coordination.

Since most mitigation occurs at the local level, partnerships must be formed among all levels of government and the private sector to develop consensus on mitigation issues.

The district administration should encourage and support initiatives from CBOs, NGOs and private sector for promoting community based mitigation strategies through Community Needs Assessment (CNA) exercises. The review and updating of District Disaster Management Action Plan (DDMAP) should include continuous review and planning of all such community mitigation efforts.

One of the pre-requisites before development of such strategies, would involve the training and orientation of these community level actors to appreciate and understand the importance of grass-root initiatives. Methods and techniques of mobilising such initiatives. Their appreciation of the capacity of the poor will further enhance their capabilities to reach out to those who are the most vulnerable and at risk within the system.

3.3.4 Community Level Training and Public Awareness Activities

Before organisations communities and individuals can reduce their risk from hazards, and they need to know the nature of the threat and its potential impact on them and the community. Achieving widespread public awareness of hazards, the options for reducing risk or impact and how to carry out specific mitigation measures, will facilitate informed decisions on where to live, purchase property or locate a business. Local decision makers will know where to locate and appropriately construct critical facilities, to reduce potential damage from hazards.

Communities must be fully aware of their vulnerability to natural hazards as well as means to reduce their impacts, before it can insist upon support actions to mitigate the impacts and take the individual steps necessary to protect lives and property. Generating this level of awareness is perhaps the most challenging task. The public must view hazard mitigation as a basic component of civic responsibility. Much is already known about the potential for and impacts of natural hazards and the preventive actions that can be taken to mitigate those impacts.

The community awareness and training activities will basically be carried out in the form of training programmes through NGOs, Private Sector and Government Training Institutions. Apart from spreading awareness of disasters, the focus will essentially be on community capacity building, including formation of Mutual Aid and Response Group (MARG) and Community Emergency Response Team (CERT). These organisations will also organise simulation exercises on a regular basis in identified disaster prone areas, as a part of mitigation strategy.

Techniques for articulating this knowledge in a way that impels action by individuals, private sector organisations, NGOs and local governments must be developed, refined, and put into practice. This would entail developing a strategic all-hazards awareness, training, education plan and an evaluation of the most effective methods and messages, involving hazard-resistant planning, designing safety programs and community risk-reduction activities. Additionally, this would include communicating the achievements, progress and success of the mitigation strategy and evaluating and updating tools (documents, plans, training courses, and other mitigation guidance materials) to reflect state-of the-art technology and engineering practices.

- A programme targeted at state and local elected officials, to encourage the development of legislation and administrative policies that support hazard mitigation.
- A programme to encourage public-private partnerships to educate employees and customers about mitigation
- Providing a training programme for teachers to ensure that they understand disasters, likely effects and the precautions that should be taken.
- Include in the academic curriculum information about disasters and the precautionary measures to be taken
- Organise disaster simulations within schools to review, with staff and students emergency procedures to be followed in the event of a disaster
- Promote publicity and educational sessions through use of mass media including television

3.3.4.1 Mobilising Community Efforts for Mitigation Measures through CBOs, NGOs and Private Sector

The community should be helped to determine ways to avoid or reduce the impact of the next disaster. The following activities are a suggestive list of mitigation efforts which need to be promoted, by encouraging local communities to undertake either at individual, household or community level to avoid loss of life, damage to property and crop.

1. Assist in disposal of properties located in disaster-prone areas e.g. flooding areas landslides prone areas etc., and purchase of safe sites in return.
2. Technical guidance to rebuild or retrofit houses that can sustain the shaking due to an earthquake or high winds and ensuring availability of appropriate materials through local government, hardware dealer or private building contractors.

3. Encourage households to undertake not only corrective repairs, but also preventive repairs.

4. Explain options for flood resistant housing

5. Encourage compliance in construction with local building codes that pertain to flood, fire, wind hazards and slope instability. Encourage compliance by the contractors and inspection by local authorities. Organise community level training with respect to these.

6. Determine ways to prevent hazards such as securing light fixtures, moving heavy or breakable objects to low shelves etc.

7. Provide information specific to the community and encourage community exercises for community needs assessments (CNA) and analysis of vulnerability and risk. Make source documents such as local disaster management plan, zoning and building norms, DDMAP etc. available to local communities.

8. Promote appropriate climate for disaster insurance for life, property and crop.

Demonstration Houses: At vantage points in villages or blocks, demonstration housing units indicating the various technology features and options should be built by the Government/NGOs/Community. Put them into use in all the community buildings of public importance. This can be done in buildings like village offices, primary health centres, community centre, Samurdhi Banks, Govisevana etc. That way these buildings of high visibility and frequent local use would themselves be the medium for demonstrating the right level of strengthening features needed. At the same time, it would also emphasise the importance of having essential installations, such as schools where children are most vulnerable, protected.

3.4 Institutional Mechanisms

3.4.1 Disaster mitigation: strengthening institutional frameworks

Perhaps the most important need at the National level is to strengthen or develop capacity to undertake disaster mitigation strategies. After assessing and mapping natural hazards experienced in the past, and analysing possible future risks and their potential social and economic effects, the adequacy of the existing disaster reduction measure scan be evaluated.

Disaster vulnerability assessment should be incorporated in the development process at all levels, so that projects and future investments reduce, rather than increase vulnerability. Areas frequently exposed to severe hazards should seriously consider investing an appropriate portion of the state revenue in disaster reduction activities for sustainable development. In order to overcome resource constraints and to be effective, the action plan for disaster reduction programmes can be monitored to ensure that hazard reduction components are applied, such as building up the infrastructure and increasing the resilience to disaster in the long term.

No matter what loss-reduction strategy is use, major reductions in losses of life and property come only when the emphasis shifts from reaction to anticipation. That is, the emphasis must be on proactive pre-disaster measures rather than post-disaster response.

Therefore, it becomes essential for a permanent administrative structure which will monitor the developmental activities across departments, providing suggestions for incorporating necessary mitigation measures. Such a task can be performed by the National Disaster Management Centre (NDMC). This office should also ensure proper enforcement of existing regulations and acts. The Director-NDMC will also be the authority in-charge of the Vulnerability Reduction Fund. This fund can be used by the Director-NDMC to provide incentives to developmental projects where mitigation measures have been adopted.

At the same time, professionals like architects, structural engineers etc., and risk managers in business organisations dealing with hazardous chemicals, can be asked to form consortiums which will look into, and incorporate mitigation aspects for all projects in their field. Existing bodies like the Chamber of Commerce, Institution of Engineers, Institution of Planners, Institution of Architects, Contractor's Association and Samurdhi Movement can also be asked to promote mitigation amongst their members.

3.4.2 Disaster Management Legislation, Relief and Rehabilitation Policy

Over the years, the government efforts to regulate relief and rehabilitation (R&R) with respect to various disasters have resulted in a number of policy guidelines and regulations. It is therefore necessary to take stock of these existing instruments and bring them under the purview of Disaster Management Legislation and R&R policy. The existing ad-hoc measures will have to be replaced to the extent possible with more definite arrangements. This would help in communicating the expectations of the administration.

Apart from the intent and overall objectives, the policy statement should specifically emphasise the need for reaching out to the poor and the marginalised. The R&R policy can incorporate various packages for R&R specific to disasters and extent of impact on the community, and the family implying entitlement of communities. The policy should also include resettlement and development of safe sites. Both directly and indirectly impacted families should be brought within the purview of R&R.

Disaster Management Legislation (National Disaster Counter Measures Bill) should be primarily aimed at operationalising Disaster Management Action Plan documents at the provincial and the district levels. The scope for community participation should be clearly emphasised and given a legal mandate.

Strengthening of line departments, developing training capabilities, partnership with NGOs and private sector, disaster funding, insurance, mitigation requirements etc. are some of the critical areas which must find appropriate expression in the legislation. The legislation should affirm the value of mitigation.

3.5 Incentives and Resources

The continued development and application of hazard mitigation measures will depend largely on the existence of stable funding sources and effective incentives that encourage mitigation in both the public and private sectors. Mitigation must become a primary consideration in all actions taken by Central government and Provincial Government and linked with grants and loan programmes. More emphasis is needed on pre-event planning, action and on the development of state funding mechanisms.

Incentives and funding should include;

- Developing mechanisms to provide stable sources of funding for preparedness and mitigation activities at all levels of government. This may include setting up of Vulnerability Reduction Fund at the provincial level.
- A review of the current incentives and disincentives for undertaking both pre and post-disaster mitigation actions will determine what additional incentives and disincentives are required to ensure cost-effectiveness. This should include the review of certain policies which are actually subsidising risk.
- Incentives for relocation of commercial and residential activities outside the hazardous and disaster prone areas.
- Incentives for retrofitting of commercial and residential structures located in disaster prone areas.
- Providing resources for Central Govt., Provincial Councils and local authorities to ensure adequate levels of coordination and effective implementation of mitigation activities.
- introducing disaster insurance, based on community rating systems that recognise adoption and enforcement by communities of building codes, that contain all-hazards building standards.
- Establishing Disaster Relief Fund at the Provincial Council level for meeting the requirements of immediate relief
- Encouraging the formation of partnerships among private industry, academia, and the state and local authorities to maximize resources for mitigation activities.
- Contracting major business organizations like the Chamber of Commerce and Contractors Association for introducing mitigation measures in all their projects.
- Providing funds for state sponsored mitigation activities.
- Credit finance and housing finance companies should make it mandatory for their clients to follow special building and structural codes or zoning regulations as part of loan requirements.

3.5.1 Insurance

Insurance is a mechanism for spreading the cost of losses both over time and over a relatively large number of similarly exposed risks. The introduction of disaster linked insurance should be actively pursued and insurance cover should be made available not just for life but also for household goods, cattle, structures and crops.

Since insurance premiums are based on the location of a structure within the disaster-prone areas, and are determined primarily by the extent of risk, higher rates may be applied to structures subject to high risk.

Strategies for introducing disaster insurance for structures will include

- More stringent enforcement by lenders of the mandatory purchase requirements
- Increasing public awareness of the hazard
- Imposing risk disclosure requirements on real-estate agents
- Offering special insurance coverage and policy riders
- Maintaining premiums at affordable levels

One of the difficulties in promoting disaster insurance is that those who are at highest risk have the least capacity to pay the premiums. Possibilities of group/community insurance should also be available, particularly for the marginalised communities.

The insurance agency may promote a Community Rating System to encourage communities to go beyond the required standards of minimum safety. The incentive can be a reduction in insurance premiums for policyholders within communities that take approved actions to reduce disaster losses.

3.6 Landuse planning and regulations for sustainable development

The physical impacts of hazards can be reduced by preventing or modifying the occurrence of the hazard, such as in the case of floods. This can be done very effectively at relatively small catchment by landuse planning and management, particularly in areas where structural measures would be too difficult or, too expensive to implement.

Rapid urbanization has led to higher concentrations of people living in hazardous areas and consequently to higher losses when disasters occur. As urbanization also alters the response of a watershed to rainfall, many large cities of the region are becoming increasingly vulnerable to flooding.

Long-term disaster reduction efforts should, therefore, aim at promoting appropriate land use in the disaster-prone areas, by harmonizing land suitability with agricultural development strategies. High investment industries and installations, as well as important infrastructure elements, should not be located in areas that are susceptible to disaster impact.

Fire and industrial accidents can be reduced if the landuse planning ensures separation of industrial units form residential areas, and or fire prone industries from other industries. Licensing authorities of industries should examine these location aspects.

The measures to promote proper land use should include both legislative and economic inducements and creation of public awareness of proper land practices. Formulation of landuse polices for long-term sustainable development is therefore imperative.

Proper long-term land use planning by incorporating all geology-related data available, would identify and allocate hazard-free areas for industrial and urban development and thus be by far the most effective way of dealing with disasters.

Large concentrations of people living in hazardous zones, not capable or willing to be moved to safer areas. deserve to have at least a fighting chance of survival in the event of a disaster. Authorities in charge of disaster management should therefore have at their disposal reliable estimates of the type, severity and location of the damage likely to occur. Damage to property can be limited, if for example, building codes are enforced.

Introduction of the legal enforcement of property insurance against damage inflicted by disaster events may be considered as one of the most efficient ways to ensure that building codes are followed.

Regulations have a potentially greater impact on loss reduction than any other single management tool and have been widely used. Development that conforms to regulations is less prone to damage than pre-existing development. Regulation is largely a local government responsibility. Effective enforcement often requires more training, personnel and financial resources than many communities can provide. Regulations cannot provide full protection for they have a limited impact on existing buildings and infrastructure prone to hazards.

The minimum regulations vary depending upon the risk studies and mapping that have been done in the community.

3.6.1 Siting and Safety

Building safely begins by choosing a safe site. A lot of protection can be gained by careful location. For some hazards, like floods or land instability, siting is the most important protection measure. For other hazards, like earthquakes or cyclones, where a building is sited is less critical than how well it is built, but location can still be important in determining how strongly the hazard is experienced and the potential for follow-on hazards causing damage.

The degree of choice that people have in siting their structures is highly variable: some may have little or no choice, others may have a large area within which to choose a site. The hazard considerations of a site are outlined so that those with some freedom of choice can exercise it to protect themselves, and for existing sites, to reduce their hazard potential.

Siting can be considered on a number of scales - at a community scale, where perhaps there is a building improvement programme to locate or to relocate a community within a geographical area, and at individual scale, when choosing a site for a building within a locality.

3.6.2 Safe siting for a new settlement

In locating a new town, village or housing estate, the hazard proneness content is only one of the many factors that should be taken into account to make a successful settlement. It should therefore be considered at an early stage of site selection. The penalties of siting on ground with possible hazard problems should be balanced against the advantages of locating for other reasons. When a large site is needed, it is possible that some areas within the land chosen will be safer than others. Therefore, sensitivity to use of land within the settlement will be important.

SECTION IV

EVALUATION

4. EVALUATION

Evaluation would help in reassessing and examining the available options. The objectives of mitigation strategy will keep evolving from one level of safety to another. The proposed initiation strategy is not static and is subject to alteration and redefinition over time, based on systematic assessments of its utility and the contribution to achieving the mitigation goals.

Such assessments will assist policy makers and the public to learn whether mitigation activities or policies are reducing future damages, and hardship in a reasonable time, and whether such benefits match or exceed the costs.

Evaluation mechanisms will include:

- Periodic surveys of the end-beneficiaries of mitigation programmes, through structured instruments and through review sessions (workshops, seminars, conferences etc.)
- Periodic structured reporting of progress in implementing the mitigation strategy
- Convening an Annual Disaster Mitigation Conference at Central Govt. level to focus public attention on the mitigation activities and to evolve consensus for the action agenda.

SECTION V

THE ROLE OF THE MEDIA IN HAZARD MITIGATION AND DISASTER MANAGEMENT

5. THE ROLE OF THE MEDIA IN HAZARD MITIGATION AND DISASTER MANAGEMENT

Reducing the losses in life and property caused by disasters, is a compelling objective now receiving worldwide attention. Scientists and engineers now believe that, the knowledge and technology base potentially applicable to the mitigation of hazards, has grown so dramatically in recent years that, it would be possible, through a concerted co-operative international effort, to save many lives and reduce human suffering, dislocation and economic losses. Communications are central to this effort for public education, early warning, evacuation, and post-disaster relief.

The media acts as the link between the common man and technical information about the risk and the hazards. They absorb and transform technical information provided by either experts or mediators and relay the information to the public in a simple manner.

The strengths of the mass media lie partly in their independence form governments or other agencies, and partly in their ability to attract large audiences who regard them as reasonably credible information sources.

The capabilities of communication, data-gathering and data-management technology have leaped forward with our increasing knowledge about the origins and behavior of disasters and mitigation of their effects. Indeed, advances in telecommunication and computer science are among the major contributors to the recognition that technology can do much to blunt the effects of hazards.

Mass communication is inextricably entwined with disasters and hazard mitigation. The electronic and print media, reflecting great public interest and concern, provide extensive coverage of disasters, particularly those with strong visual impact. And increasingly as forecasters have gained the ability to predict, the media have covered the near-term prediction and relief planning phases of the event. The media have significantly improved the level and sophistication of their pre and post-disaster coverage in recent years by using new technology and consulting technology and technical experts better able to describe the causes and mitigation of disaster.

The print media, too, have benefited from advanced technology. Facsimile transmission and closer linkages between reporters and specialists in government and academia have deepened understanding of the causes and impacts of these disastrous events, and no doubt, have had some effect in reducing long-term exposure and risk.

Clearly, mass communications technology already has had a significant impact on how the public learns of and perceives the impact of disasters. And as the costs are further reduced and the capabilities of these technologies improve, the level and sophistication of information presented to the public will also be enhanced.

In addition to the vastly improved opportunities that telecommunication technologies have provided to report on prospective, ongoing and recent disasters and relief efforts, their capabilities have slowly shifted our thoughts form post-disaster relief to more effective means of coping with sudden disasters.

Better linkage between the public media and the community of disaster mitigation researchers and practitioners, whether scientific, technological or service-oriented can make disaster management efforts more effective and more important, can accelerate the shift in both the public's and the administration's thoughts towards effective pre-disaster initiatives. To this end, the electronic and print media could embark on a two-step process to enhance the quality of its hazard-related services.

5.1 Sharing of Media Facilities

The first step is to foster still closer linkages with the research community, and their vast information gathering and transmission resources, when appropriate and available, with disaster mitigation organizations.

In the post-disaster phase, for example, the facilities established by the media to report on an event are often far more robust and more promptly operational than those of relief organisations, whether governmental or voluntary. These channels should be available as means for better assessing the nature and extent of damage, local relief requirements, the need for specialized recovery equipment, and unique problems or opportunities.

5.2 Integration of the Media into Disaster Mitigation Activities and Activities During Disasters

The second step in building links with the news organisations is to more effectively link the media into and intensified effort in disaster mitigation, including such activities as;

- Risk assessment
- Avoidance measures
- Early warning and evacuation
- Public awareness and education
- Organisation for self-help and effective response to risk.

The media are seen as medium of release of official information and measures, which the citizens are expected to undertake immediately and at the same time are conduits for relaying information through inter-governmental structures and channels, to bring the citizens' concerns to official attention.

In the event of a disaster, media has a responsibility of reporting the same on a day-to-day basis. Such reporting can contribute to;

- Bringing true stories of disaster to public
- Stimulating public response to needs and sufferings caused by disaster
- Creating tremendous pressure on agencies and government to get involved
- Injecting efficiency by reducing response time
- Motivating public and generating disaster assistance and resources

However, care should be taken to safeguard the authenticity of the information and the credibility of the media. This can be done by;

- Avoiding reinforcing stereotypes that the people carry about disaster "victims"
- Promoting sensitivity as against sensationalism
- Highlighting both the positive and the negative aspects of disasters management
- Cross-checking information from the disaster site as well as the official sources

During disasters, it is important to organise regular press meetings and issue press releases. The importance of the efforts of various non-governmental agencies engaged in relief operations and their specific problems should be through such briefings. This will ensure highlighted transparency in all operations, concerns, and commitments to those affected.

A rational approach to media involvement in disaster management would depend that the media is familiarised as a part of preparedness with the disaster management action plans, roles and responsibilities, strengths and limitations with respect to administrative capabilities. This will prepare the ground for utilising the technological and human resources available with mass media. Tapping the media's capabilities can, and will improve the preparedness and response to disasters. Conversely, the study and application of disaster mitigation techniques can enhance the quality of and interest in the services the media can provide. The media have the definitive opportunity to play a leadership role in the transition in thinking and action away from post-disaster relief, towards preparedness and disaster mitigation.

SECTION VI

MITIGATION MEASURES

6. MITIGATION MEASURES

The level of disaster preparedness is a major factor in mitigation of natural disasters. With the available technology, some disasters, particularly landslides, cyclones and floods, can be forecast. However, not all the people can be warned in time, and in many places there are not enough disaster preparedness measures, such as adequate number of easily accessible cyclone shelters and evacuation equipment. There is a need for dissemination of the measures to be taken before, during and after a disaster event. Particularly preparedness measures need to be practiced periodically.

Environmental planning would also be necessary to avoid or mitigate losses form disasters, by using such instruments as land-use planning and disaster management. Mitigation of the effects of disasters and protection against hazards require both structural and non-structural measures. The traditional approach to reducing losses relied upon the implementation of structural mitigation measures such as construction of retaining structures, drainage, dams, levies and channels.

In recent years, the inadequacy of programmes based solely on structural measures have been recognized. It has been suggested that numerous attempts have been suggested to employ non-structural loss prevention measures, as well to assist in minimising losses through exercising control over development in disaster prone areas. Non-structural mitigation measures typically concentrate on identifying hazard prone areas and limiting their use. Examples include land-use zoning, selection of building sites, tax incentives, insurance programmes, relocation of residents and establishment of a warning system.

Disaster proof structures such as shelters, raised platforms, emergency food, grain silos, drinking water storage tanks and health facilities can be built in high-risk areas, but easy access to such structures must be ensured. Design codes for buildings and other structures need to be constantly reviewed in the light of previous experience. From time to time it could be necessary to revise disaster management regulations and disaster-resistant designs.

6.1 Structural Alterations for Buildings

Many of the public buiidings are probably vulnerable to damage form earthquakes, cyclones, winds or other hazards. Buildings Department and State Engineering Corporation (SEC) are the main engineering departments responsible for construction and maintenance of public buildings and installations. As a part of mitigation strategy, the Buildings Department will have to consider both the structural and material standards so as to ensure that these structures and installations, are sufficiently protected from the disaster impact. Apart form adopting the building codes, the conceptual design should take into account the following:

- Location of the building
- Zoning and building codes requirements
- Functional relations between various sections
- Geometry, shape or composition of the building
- Structural system

- Building materials
- Vulnerability to specific disasters
- Possible impact of disasters on occupants
- Type of beneficiaries or users
- Special needs of beneficiaries or users
- Nature of occupancy by beneficiaries and users - residential, non-residential etc.

Design decisions should be taken in consultation with the user-departments/institutions and all those professionals who for some reason are involved with its conception and execution in the early stages of the execution of the project.

It is suggested that the building performance should be guided by the following objectives:

- The damage caused by the disaster should be reparable and should not be a threat to life
- Users, beneficiaries and visitors should be protected during the disaster
- The emergency services of the organisation should remain operational after the disaster
- The occupants, rescue and emergency personnel must be able to move about safely inside the installations.

These objectives attempt to guarantee that the organisation continues to fulfill its role by putting into effect its own emergency plan following a disaster. At the same time, it is possible to reduce the vulnerability of existing buildings through minor adaptation or alteration, thereby enhancing the safety of these facilities and installations. The usual methods for retrofitting existing structures generally include the insertion of the following elements:

- Walls on the outside of the building
- Buttresses
- Walls in the interior of the building
- Portico fill-in walls
- Specially anchored frames
- Covering of columns and beams
- Construction of a new frame system

6.2 Structural Alterations for Other Installations

- Use disaster resistant high tension towers and poles in the construction of new lines and in any replacement of existing towers and poles
- Set poles to an adequate enough depth, to prevent overturning or leaning from wind pressure, when the ground is waterlogged
- Upgrade design specifications and quality of construction for concrete poles, to ensure that they are cyclone resistant
- Upgrade the specifications for wooden poles, to ensure that mature timber is used, that poles are cured adequately, and that the wood has been treated by a proper impregnation method against moisture and insect damage
- Replace pole-mounted transformers with plinth-mounted transformers
- Place underground the low tension main supply cables between transformer stations in urban areas, where economically feasible
- Upgrade outside telecommunication equipment to withstand wind speeds of at least 120 mph (192 kmph)
- House electrical and switching equipment in storm-proof buildings above flood level
- Replace overhead cables with underground armored cables in areas of high vulnerability and where economically feasible
- Pumping stations must be upgraded to be damage-proof
- Water tower and storage tanks should be designed to withstand cyclone winds, earthquake and floods.

6.3 Specific Disaster Mitigation Measures

6.3.1 Flood Mitigation

Modifying susceptibility to flood damage and disruption is the floodplain management strategy of avoiding dangerous, uneconomic, undesirable or unwise use of the floodplain. The tools used to implement this strategy are regulations, development and redevelopment policies, flood-proofing and elevation.

6.3.1.1 Regulations

This would include

- Not permitting unrestricted new development in the hazard prone areas
- Anchoring and flood-proofing structures to be built in known flood-prone areas

- Built-in safeguards for new water and sewage systems and utility lines from flooding
- Enforcing risk zone, base flood elevation, and floodway requirements
- Prohibition on development in wetlands
- Prescribing standards for different flood zones on flood maps

To meet these requirements, local governments will have to adopt specific floodplain management or storm-water management regulations into zoning and subdivision regulations, housing and building codes, and resource protection regulations.

6.3.1.2 Safe siting in flood hazard areas

In low-lying areas, close to the coast, and on flat land in river valleys, there may be a potential for coastal or river flooding. In geologically younger river valleys, in mountains, and foothills there may be a potential for flash-flooding.

It is important to check the history of flooding in the area. Wherever possible

- Map the extent of land covered by past floodwaters
- Get an indication of the depth of past floodwaters
- Find out about the severity of past floods; how much damage they have caused, how fast they have flowed and how much debris they have left behind, and
- Find out how often flooding has happened, over at least the past 20 years

Land morphology is the main factor in determining how safe a site is against floodwaters.

6.3.1.3 Development and Redevelopment Policies

In some cases, the only way to preclude future uses incompatible with the flood risk is to permanently evacuate a portion of a floodplain and to obtain full title on its development rights. Although this process (called "acquisition") is expensive, the long-term benefits in reduced floodplain losses, protection of natural resources, and public use of the land, may make it worthwhile.

Most redevelopment relating to flood loss reduction occurs after one or more major floods. Usually, a temporary moratorium is imposed to allow evaluation and planning. Unfortunately, legislative and regulatory requirements often encourage a quick return to the pre-flood status quo, wasting opportunities to mitigate and revitalize the area.

6.3.1.4 Flood-proofing and Elevation

Flood-proofing is the use of permanent, contingent, or emergency techniques to either prevent flood waters form entering buildings or to minimize the damages from water that does get in. Some of the techniques involve using water-tight seals, closures or barriers, using water resistant materials, and temporarily relocating the contents of a building. Elevating a structure means raising it on fill, piers or pilings so that it is above expected flood levels.

Most new floodplain structures should be designed to incorporate flood-proofing and/or elevation. Flood-proofing could be applied retroactively ("retrofitted") to existing structures.

6.3.1.5 Modifying Flooding

Modifying flooding is a floodplain management strategy of using structural means to divert the flood water. Structural measures such as dams, reservoirs, dikes, levies, floodwalls, channel alterations, high flow diversions, spiliways, land treatment measures, shoreline protection works and stormwater management facilities permit deliberate changes in the volume of run-off, peak stage of the flood, time of rise and duration of flood waters. The effectiveness of these measures for protecting property and saving lives has been well demonstrated. Flood control projects can save people from anxiety, injury and death, and prevent economic losses.

One of the issues, that needs consideration, is how to feel with the ageing inventory of existing flood control structures. Many dams and reservoirs may be nearing or even past their design lives, and the flood control capacity of many reservoirs has been reduced by sedimentation. The financial resources are not available to undertake all required remedial actions.

Dams and Reservoirs

Storing flood water in reservoirs can modify floods by reducing the speed at which the water flows, limiting the area flooded, and reducing and altering the timing of peak flow. However, misconceptions about or lack of understanding of dams can create an exaggerated sense of security. Reservoir sedimentation can significantly reduce flood reduction capacity. In addition, most dams are designed for purposes other than flood control, although they do have temporary effect of flood reduction through storage.

The availability of water or power associated with dams, therefore, often attracts new developments, regardless of the flood risk or the ability of the dam to provide flood protection. Over time, without adequate land use regulations, encroachment onto the floodplain downstream of dams, can increase exposure to flooding. Once signs of darn failure become visible, breaching often occurs within minutes or a few hours, leaving little or no time for evacuation. The massive volume of water and its high velocity will cause severe damage.

Dikes, Levees, and Flood walls

Dikes, including levees and flood walls, can be thought of as dams built roughly parallel to a stream rather than across its channel, or parallel to the shorelines of lakes and other water bodies. Levees

are generally constructed of earth and flood walls of masonry or steel. Although they can be effective in reducing flood losses, they are poorly designed and maintained.

Areas behind levees and flood walls may be at risk of greater than normal flood damage for several reasons. Many floodplain residents in those areas believe that precautionary measures are not needed for such areas. Development within the downstream area may also continue to accelerate the level of risk. A levee breach or flood wall failure, like a dam break, can release a large wave of flood waters with high velocity. After a breach, the downstream portion of the levee system may also act like a dam, catching and prolonging flooding of the once-protected area.

Channel Alterations

Channel alterations increase the flow-carrying capacity of a stream's channel and thereby reduce the height of a flood. The various types of alterations include straightening, deepening, or widening the channel, removing debris, paving the channel, raising or enlarging bridges and culverts, and removing other obstructions.

Alternative designs now developed include less straightening of channels, employ more gradual slopes, and use natural vegetation or riprap rather than concrete-lined channels. This minimise destruction of fish and wildlife habitat, helps maintain water quality and avoids undesirable downstream impacts.

High Flow Diversions

Diversions intercept flood waters upstream of a damage-prone or constricted area and convey them around it through an artificial channel or a designated flow-way. Diversions may either completely reroute a stream or collect and transport only excessive or potentially damaging flows. A negative aspect of such diversions is the false sense of security that may prevail in the protected areas along with a lack of awareness that the floodway actually exists.

Stormwater Management

Stormwater management is the removal of water that falls directly onto properties, as opposed to flood water, that flows onto property from upstream sources or an ocean surge. Stormwater networks have historically been constructed in urban and agricultural areas to remove these waters. A significant problem occurs when an agricultural zone with an adequate Stormwater system is urbanised. Large areas are paved with roofs, roads, and parking, contributing to additional run-off. Often, shopping centres and other developments are placed on natural drainage ways. The pre-existing stormwater network becomes inadequate for its new urban use. Localised flooding then occurs. In an alternative approach often used in new developments today, run-off may be retained on the site, within a regional system, and total run-off within a watershed may be managed, so that discharges from different units reach the main channel, at different times to reduce peak flows downstream. Natural drainage systems may be used, instead of concrete-lined channels or enclosed pipes.

Coastline Protection

Quasi-natural methods such as beach nourishment or artificial sand dune building are often used to attempt to restore an eroding beach, as well as protect development. However, these methods provide only temporary solutions, to chronic long-term erosion caused by the diminishing supply of sediment in the littoral system. They also require periodic renourishing during their 15 to 50 year life span.

Structures like seawalls, bulkheads and revetments protect development, but are not intended to renourish or widen the beach. Erosion can occur in front of them because the natural movement of the shoreline gets affected. Such structures as breakwaters and jetties, which are designed to protect harbours and navigation channels from wave action or to stabilise inlets, can also cause erosion on the down drift side, if they do not include a sand bypassing system.

Watershed Management

Watershed Management measures reduce overland run-off from agricultural lands to streams or other waters by improving infiltration of rainfall into the soil, slowing and minimising run-off and reducing the sedimentation that can clog stream channels or storage reservoirs. These techniques are most commonly, used in agricultural areas. They include maintaining trees, shrubbery and vegetative cover, terracing, slope stabilisation, using grass waterways, contour plowing, conservation tillage and strip farming. Some measures involve little additional costs. Technical and financial assistance is provided through government and international development organisations. Although the impact of an individual measure is limited, extensive watershed management programs can effectively reduce flooding in small headwater areas.

6.3.2 Landslides

6.3.2.1 Zoning and Building Codes

After excavation of landslide events in 1986 and 1989, the Government of Sri Lanka with the technical and financial assistance of UNDP and UNCHS undertook a project of Landslide Hazard Zonation. The mitigation strategy must review the existing landslide hazards zoning to facilitate adoption of building codes, amendments to building regulations, land-use and for new constructions in various areas. Further, ways and means will have to be evolved to enforce compliance to recommended building codes in all new constructions through local planning bodies and municipal authorities. Additionally, compliance to building codes can be ensured by linking property insurance to such compliance.

6.3.2.2 Safe siting in landslide prone areas

- Build structures on rock or stiff soil; never build on colluvium or debris accumulation
- The most important element of safe siting in landslide prone areas is to avoid being affected by land instabilities.

- Depending on the formations, instability of slopes may be encountered to different degrees. E.g.; Softer soils and those with high water content generally are subjected to distabilisation faster than rocky sites. Wherever possible site structures have to be located on firm ground. This will reduce the severity of the damage experienced in a slope failure.

- Excessive rainfall sometimes cause liquefaction of soils. Loose soils on flat land usually with a high water content can suddenly lose their strength with vibration due to various reasons including minor trimmers. Soil temporarily turns to liquid causing structures that are built on them to sink, subside or overturn.

- Capital intensive infrastructure, hazardous facilities and materials, and other important buildings should not be located in the vicinity of a known fault.

- When sloping ground is used for house construction, as much as possible avoid cutting and filling. Split foundation designs or constructions on pillars/columns with limited excavation is suitable. Provide proper drainage.

- In retaining wall construction use proper designs. Quality of construction also is important. Select materials and skill workers so that performance can be guaranteed.

- Building storage facilities for chemical, hazardous materials and poisonous materials (pesticides, weedicides, etc.) should be avoided in landslide prone areas or within the impact zone.

6.3.2.3. Retrofitting

It is essential to undertake studies of designs and materials used in existing conventional housing and structures in each of the landslide prone areas and examine the same in the context of recommended building codes. This would enable identification of the need for retrofitting of the existing structures and dwellings. The NBRO has prepared a manual for restructuring of non-engineered structures, which would be useful for the rural areas. This report indicates the potential of similar exercises in other parts of the country. The system retrofitting should also be explored as a part of mitigation strategy, including linking with property insurance as in the case of new construction.

6.3.2.4 Instrumentation

Since early warning is possible in case of landslides (but difficult), the best choice is to ensure that porewater pressure development on vulnerable slope is monitored. Ratnapura situation indicates that even high risk zones of the MC have not been adequately provided with the instrumentation. It is necessary that mitigation strategy considers instrumentation of all areas susceptible to slope instability in order to have a total assessment of the failure mechanisms. This should enable reconfirmation and upgradation of land-use zonation plans. The government may consider setting up of a technical team comprising scientists to look into the aspects of instrumentation and prepare instrumentation plan for the RMC. The specific instruments required for these purposes include:

(a) Microgravimeter: The delineation of minor faults, regionally and locally, needs sophisticated instruments which can detect the minor mass displacements. The microgravimeter can monitor minute mass changes due to minor faults on a continuous basis.

(b) Telemetered pressure meters: The pore pressure development in certain areas will constantly be monitored and telemetered to a central laboratory at National Building Research Organisation (NBRO).

(c) Electromagnetic Tomography System: The system deals with continuous monitoring of naturally occurring electric and magnetic signals at various places near the active fault zones.

(d) Piezometer: This is the cheapest instrument to use for obtaining the information in porewater pressure development. It can be installed in a drill hole.

(e) Surface markers: These surface markers can be used for monitoring the degree of movement on a slope.

(d) Inclinometers and Tiltmeters: The slope inclination changes and tilt of buildings can be monitored using the above equipment.

6.3.2.5 Watershed Management

Watershed management measures reduce overland run-off from agricultural lands to streams or other waters by improving infiltration of rainfall into the soil, slowing and minimising run-off and reducing the sedimentation that can clog stream channels or storage reservoirs. These techniques are most commonly used in agricultural areas. They include maintaining trees, shrubbery and vegetative cover, terracing, slope stabilisation, using grass waterways, contour plowing, conservation tillage and strip farming. Some measures involves little additional costs.

Technical and financial assistance is provided through government and international development organisations. Although the impact of an individual measure is limited, extensive watershed management programs can effectively reduce flooding in small headwater areas.

6.3.3 Cyclones

6.3.3.1 Safe siting in cyclones prone areas

- Certain factors can make some sites more exposed than others.
- Estuaries and river deltas will flood during heavy rainfall associated with the cyclone.
- Exposed sites on the tops of hills or cliff tops. Winds can be up to 15% stronger on elevated sites.
- Valley necks or open-ended valleys, through which winds may be channeled.
- Select a sheltered site. Use any topographical effects or natural defends that may protect the building or settlement from the prevailing wind.

- Consider the orientation of the site. Shelter behind hills from prevailing wind directions.
- Create wind breaks by planting trees or making strong bush fences. Settlements with many trees experience lower wind speeds.
- The layout of the building on the site can also influence the way winds affect them. Generally, settlements that are built in close clusters are known to suffer more damage than those that have reasonable spacing between buildings. Large buildings can be used to shelter smaller buildings.
- A guide to safer setout would include:
  - Site buildings some distance from adjacent structures (at least three times the plan dimension of the buildings)
  - Site buildings in staggered formations rather than straight lines
  - Keep buildings away from tall trees that might fall down
  - Maximise street widths. Where possible they should be wider than 6 m
  - In cyclone prone areas it is also important to site to minimise damage from floods, and landslides

6.3.3.2 Shelter Plantation

This covers the sea coast protection along the coast to avoid sea erosion. Construction of earth bunds along the coast and development of shelter plantation all along the coast line will provide a buffer or cushion against the onslaught of high speed cyclonic storms of 150 to 250 km/hr. The shelter protection plantation belt of Casuarina trees, which are fast growing recyclables, have substantially helped to protect the human settlements due to the resistance of the trees to withstand the force.

6.3.3.3 Drainage

It is important to provide adequate storm water drainage to the sites and maintain the system through periodic inspections, so that the system does not obstruct flow in natural courses and cause inundation in periods of cyclones. For settlements in low-lying areas this assumes great importance. Roads are required to be provided with camber and, side drains and culverts to carry away water into the next level of drains of the drainage system.

Another important aspect is to ensure that settlements are not provided in natural hydraulic flood paths. Cleaning and widening/deepening of natural drainage paths, which get affected due to silting and other causes, should be taken up, on a regular basis, as part of periodic maintenance work.

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6.3.3.4 Shelter options for Cyclone Resistance

House design

In addition to the various measures that can be covered under pre-disaster activity, another major initiative that can be taken is to ensure that least amount of damages is caused at the time of occurrence of a cyclone. This can be done by providing appropriate strengthening and construction resistant features in housing and building programmes to be taken up in different vulnerable areas.

The country is divided into various wind pressure zones, and the coastal areas with the frequent visitation of high velocity cyclones are specially identified. There are specific design codes to provide the needed wind protection and cyclonic effects. The ABC of cyclone protection housing are:

A - Anchorage
B - Bracing
C - Connection

The methodology to ensure all the three facets of cyclone resistant construction have been identified for various elements, and if these are provided for, the houses/buildings built with these measures, are able to substantially mitigate the damage during the occurrence of natural disaster. The large amount of coastal housing constructed over the last decade with various cyclone resistant features, have been able to give the necessary protection.

There are several considerations to be made while designing a house in its three dimensional form, which are related to shape, orientation, height and positioning of openings in a building, for ensuring the least extent of damage during cyclone storms. (Such details can be obtained from NBRO, Buildings Department and other research organisation in India such as SERC-Madras, HUDCO etc.)

The cyclone resistant shelters can be built at individual level or at community level.

At individual level there are three kinds of shelter options:

- The first option is when building a new house, build it to be totally cyclone resistant, with specific design standards and construction methods.
- The second option is where only the frame and roof are designed to be cyclone resistant and permanent (partial). The occupants can then progressively upgrade the house as and when feasible.
- The third option is, to make a part of the house cyclone resistant either by making a new addition, or reinforcing an existing room (retrofitting). It is called an 'in-house' shelter. During a cyclonic storm, the occupants seek shelter in this part. This option reduces the cost of cyclone-resistant construction and extensive modification of traditional designs is not necessary.

The key principle underlying cyclone resistant building construction is the secure tying up of all elements in the buildings from foundation to roof.

6.3.3.5 Cyclone shelter

At the community level, the local administration has to provide temporary cyclone shelter at the time of cyclone in the nearby villages. These shelters, with built-in safety against high wind velocity and heavy rainfall, should be at specially selected sites and within easy reach of the people most affected. It should have an all weather access. Educational buildings or places of worship may also be designed as cyclone shelters, for evacuation and temporary occupation.

As a means to evacuate and shelter the people likely to be affected, the most important among the various action programmes is, designing and constructing special multi-purpose anti-cyclone community relief shelters, for providing safe and secure accommodation to vulnerable population. The cyclone relief shelters can take care of populations ranging from 50 to 300 people (men, women and children). These are provided as multi purpose community facility spaces to be used as adult education, primary health centres, primary schools, vocational training centres. These will be at elevated areas to be protected from floods and also with proviso for community kitchens, ensuring water supply, sanitation, battery operated electric supply and in some cases helicopter landing facility on roof for relief supply etc.

Initiative can also be taken to develop a low cost, anti-cyclone core unit, designed to provide safe secure deposit of personal belongings during cyclones to each family in the existing villages. This would help to resume economic activity soon on return.

6.3.4 Epidemics

The Public Health Department (PHD) is the nodal agency responsible for monitoring and control of epidemics. Local governments and municipal authorities also have a responsibility for taking appropriate steps in this context. Therefore, success of mitigation strategy for control of epidemics will depend on the type of coordination that exists between the PHD and local authorities.

Mitigation efforts for control of epidemics would include

1. Surveillance and warning
2. Preventive and Promotive measures
3. Strengthening institutional infrastructure

6.3.4.1 Surveillance and Warning

Situation analysis indicates the need for strengthening surveillance programmes and warning system. Inadequacy of testing laboratories and access to existing laboratories make the surveillance of epidemics a difficult task. As a part of mitigation, this would require:

- Identification of areas endemic to certain epidemics which must be routinely updated to access field requirements
- Identification of appropriate locations for testing laboratories

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- Ensuring continuous flow of field data from both government establishments and private medical personnel

- Collating and analysing the data at regular intervals to assess epidemiological monitoring requirements.

In addition to the surveillance it is necessary to keep the general population informed about the health situation in the district, which would encourage communities to take necessary promotive and preventive steps in controlling the epidemics. As a part of mitigation strategy, therefore, the Public Health Department should develop a system of issuing health bulletins through mass media, particularly television, on the lines of weather bulletin.

6.3.4.2 Preventive and Promotive Measures

In order to mitigate the possibilities of the outbreak of epidemics, the public health department should encourage the local authorities and the communities to undertake certain preventive and promotive measures. The mitigation strategy would include

- Piped drinking water supply and water quality monitoring

- Vector control programmes as a part of overall community sanitation activities

- Promotion of personal and community latrines

- Introduction of sewage and drainage systems

- Enforcement of FDA norms on edibles and production and sale of these

- Solid waste management systems

- Surveillance of water bodies and canal distribution network for control of malaria

6.3.4.3 Strengthening Institutional Infrastructure

- Promoting and strengthening community hospitals with adequate network of paraprofessionals will improve the capacity of the Public Health Department (PHD) for surveillance and control of epidemics.

- Establishing testing laboratories at appropriate locations in different divisions within the state will reduce the time taken for diagnosis and subsequent warnings

- Establishing procedures and methods of coordination between PHD and local authorities.

6.3.5 Road Accidents

Unlike in the case of railways. road accidents are not investigated into. Findings of accident investigations will provide useful guidelines for evolving mitigation measures and developing safety standards appropriate to the ever-changing road traffic scenario..

Mitigation Measures: If the current provision of Motor Vehicle Act and other related legislations and regulations, including regulations on transport of hazardous and toxic materials, are strictly enforced, the incidence of road accidents will reduce drastically. The mitigation strategy therefore assumes that enforcement of such regulations will precede the measures suggested.

6.3.5.1 Strengthening Institutional Capability

- Strengthening the enforcement wing in Transport Ministry
- Creation of adequate highway/traffic aid posts. At every major intersection on the highway, traffic aid posts should be setup
- Trauma care centres should be established at every 100 kilometers on the national and state highways
- Every traffic aid post should have a hot line telephone connection with the nearest trauma care centres
- Modern technology including speed monitoring equipments and computerisation of movement of vehicles with adequate checkpoints on the national highways should be introduced
- Equipments for removal of accident vehicles form the highways should be easily accessible to the police
- Considerable confusion exists because of multiple authorities and agencies involved in the regulation and monitoring of movement of vehicles on all roads. It is necessary to coordinate the roles of all such agencies through a single agency
- Identify and designate routes for transportation of hazardous chemicals. Such routes should not pass through highly populated areas.

6.3.5.2 Strengthening Road Infrastructure

- Parking of vehicles on national highways and even on MC roads, should be strictly prohibited on peak hours and restricted on other times.
- Excavation on roads must be protected well, particularly in the night, with barricades, fluorescent signs and red lights.

- Special bays for parking of vehicles on trunk routes should be provided at strategic points with provision for food and other facilities
- Public works department and RDA should concentrate on removal of bottlenecks on national and provincial highways in particular. Bridges should be widened before roads are widened
- Efforts should be made to provide road dividers on all national and provincial highways on a priority basis
- Efforts should be made to light up all national highways carrying excessive vehicle load
- All unmanned railway crossings should be manned with signal facilities
- All provincial roads should have adequate embankments on the valley side
- The speed breakers must have standard designs
- Provision of laybyes for all bus stops must be made mandatory with authority given to SLCTB to clear them of all encroachments
- Information sign-boards should be provided giving the location of the nearest village, police station, hospital, traffic police post, fuel station etc. at every traffic aid post.

6.3.5.3. Improving Regulations

- Insurance claims should be linked with compliance of all regulations related to vehicles and transport restrictions.
- All two wheeler drivers, including pillion riders must wear the right kind of protective head-gear.
- As transport of goods has been increasing over the years, there should be a uniform regulation on permissible loads.
- Vehicles carrying school children must be registered and provided with flashlight signs and designated halts. Regulations for overtaking such vehicles when they are stationary should be introduced.
- Vehicles with break -downs on the highway must display a plate on a stand with a danger sign painted thereon in the front and rear. Every goods vehicle must have such plates with the stands and should be inspected at the check points.
- Simulation aided training should be made mandatory for drivers carrying hazardous and toxic materials.

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- Every vehicle must be provided with hazard lights(blinking lights) which would warn drivers of other vehicles of the stationary vehicle.

- Reflectors and tail lamps should be made compulsory for handcarts, cattle driven carts, tractors, tractor and jeep trolleys, cycles, and other non-motorised vehicles not falling under appropriate Motor Vehicles Act.

- Simplify the procedure under the Motor Vehicles Act, for compensation to accident victims.

6.3.6. Fires

Fire brigades are essentially under the control of municipal authorities and hence are discouraged from crossing the municipal limits. Industrial safety departments also have fire fighting equipments for on-site emergencies. It is therefore, seen that often local authority areas by and large, are totally deprived of any fire fighting assistance.

As a part of mitigation strategy, efforts should be made to

- Make fire fighting services available to other local authority areas outside the local municipal limits.

- Assisting municipal authorities not having fire brigade to establish such a service.

- Encourage agriculture marketing committees and cooperatives in rural areas to establish their fire services.

- Evolving methods of coordination between municipal fire services and industrial safety departments.

- Undertake community education and preparedness for fire fighting in areas where fire services are not easily available.

- In industrial towns, fire services should be equipped with protective clothing and fire fighting devices including masks, gloves etc. for dealing with chemicals and toxic materials.

- Special burns wards should be established in every civil hospital and in the hospitals near the industrial estates.

- Equipping fire services with communication facilities like wireless etc. and where such facilities exist, these should be upgraded.

- Computerized data management system should be introduced to keep the record of all fires including frequency, extent, fatality, economic losses etc.

- The roles and responsibilities of district administration, police, fire, services and medical services should be clearly laid down.

6.3.7. Industrial and Chemical Accidents

- All industrial concentrations should be encouraged to establish Mutual Aid Response Gro (MARG) for management of industrial accidents.

- Industries involved in the production or transportation of inflammable, hazardous and to: materials should have a mandatory responsibility for preparing an off-site plan a communicating the same to district collector. Simulation exercise should be undertaken the adjoining communities.

- Poison centres should be established in every civil hospital and in the hospitals near t industrial estates with facilities for detoxication.

- All transport of hazardous and toxic materials should be communicated to the Provinc Transport Ministry.

- All pipelines carrying hazardous and toxic material should be equipped with devices to che any leakage or metal fatigue.

- Small scale industries releasing toxic waste in water should be encouraged to set up comm effluent treatment facility.

- A common format for chemical data sheets should be devised which should be used police to collect information from all industries in the state and the same should be availat with both fire brigade and police.

Part III

Operating Procedure Guidelines and Standards

Part III
Operating Procedure Guidelines and Standards

TABLE OF CONTENTS

How to use the document iv

Acronyms vi

1 OPERATING PROCEDURE GUIDELINES AND STANDARDS 1
2 OPERATING PROCEDURE GUIDELINES FOR WARNING 2
2.1 Agencies authorised to issue warning 2
2.2 Important elements of warning 3

3 OPERATING PROCEDURES FOR EVACUATION 4
3.1 Factors to be considered for evacuation 4
3.1.1 Planning assumptions 4
3.1.2 Factors 4
3.2 Emergency Evacuations 5
3.3 Evacuation of Marooned Persons 6

4 OPERATING PROCEDURE GUIDELINES AND STANDARDS FOR DEPARTMENTS 8
4.1 Planning Assumptions 8

5 OPERATING PROCEDURE GUIDELINES FOR POLICE 9
5.1 Planning assumptions 9
5.2 Normal time activity 9
5.3 Activities on receipt of warning or activation of district EMRP 9
5.3.1 Evacuation 10
5.3.2 Relief and Rehabilitation 10
5.3.3 Preparedness checklist for police 12
5.3.4 Checklist for police 13

6 OPERATING PROCEDURE GUIDELINES FOR PUBLIC HEALTH DEPARTMENT 14
6.1 Planning assumptions 14
6.2 Normal Time Activity 14
6.3 Activities on receipt of warning or activation of district EMRP 15
6.3.1 Evacuation 17
6.3.2 Relief and Rehabilitation 18
6.4 Standards of Service 19
6.4.1 Tagging 19
6.4.2 Vector Control Standards 22
6.4.3 Materials and Equipment 23
6.4.4 Preparedness Checklist for Public Health Department 25
6.4.5 Checklist for Public Health Department 26

7 OPERATING PROCEDURE GUIDELINES FOR CEYLON ELECTRICITY BOARD (CEB) 31
7.1 Planing assumptions 31
7.2 Normal Time Activity 31
7.3 Activities on receipt of warning or activation of district EMRP 31
7.3.1 Relief and Rehabilitation 33
7.3.2 Preparedness checklist CEB 34
7.3.3 Checklist for CEB . 35

8 OPERATING PROCEDURE GUIDELINES FOR IRRIGATION DEPARTMENT 36
8.1 Planning assumptions 36
8.2 Normal Time Activity 36
8.3 Activities on receipt of warning or activation of district EMRP 37
8.3.1 Relief and Rehabilitation 38
8.3.2 Preparedness checklist for Irrigation Department 40
8.3.3 Checklist for Irrigation Department 41

9 OPERATING PROCEDURE GUIDELINES FOR AGRICULTURE DEPARTMENT 42
9.1 Planning assumptions 42
9.2 Activities on receipt of warning or activation of district EMRP 42
9.2.1 Relief and Rehabilitation 43
9.2.2 Preparedness checklist for Agriculture Department 45
9.2.3 Checklist for Agriculture Department 46

10 OPERATING PROCEDURE GUIDELINES FOR DEPARTMENT OF ANIMAL HUSBANDRY 47
10.1 Planning assumptions 47
10.2 Activities on receipt of warning or activation of district EMRP 48
10.2.1 Relief and Rehabilitation 49
10.3 Standards for Cattle Camps 50
10.3.1 Preparedness checklist for Animal Husbandry Department 51
10.3.2 Checklist for field activities of Animal Husbandry Department 52

11 OPERATING PROCEDURE GUIDELINES FOR NATIONAL WATER SUPPLY & DRAINAGE BOARD (NWS&DB) 53
11.1 Planning assumptions 53
11.2 Activities on receipt of warning or activation of district EMRP 53
11.2.1 Relief and Rehabilitation 55
11.3 Standards of Service 55
11.3.1 Water Supply 55
11.3.2 Stockpile of equipment and supplies 61
11.3.3 The Sanitarian's equipment 63
11.3.4 Preparedness checklist for NWS&DB 64
11.3.5 Checklist for NWS&DB 65

12 OPERATING PROCEDURE GUIDELINES FOR PROVINCIAL PUBLIC WORKS DEPARTMENT (PWD) 66
12.1 Planning assumptions 66
12.2 Activities on receipt of warning or activation of district EMRP 66
12.2.1 Relief and Rehabilitation 68
12.3 Standards for Relief Camps 69
12.3.1 Tent camps 69
12.3.2 Buildings 70
12.3.3 Preparedness checklist for Provincial PWD 71
12.3.4 Checklist for Provincial PWD 72

13 OPERATING PROCEDURE GUIDELINES FOR TELE COMMUNICATIONS 75
13.1 Planning assumptions 75
13.2 Activities on receipt of warning or activation of district EMRP 75
13.2.1 Relief and Rehabilitation 76
13.2.2 Preparedness checklist for Telecommunications 78

14 OPERATING PROCEDURE GUIDELINES FOR ROAD DEVELOPMENT AUTHORITY (RDA) AND TRANSPORT AUTHORITIES 79
14.1 Planning assumptions 79
14.2 Activities on receipt of warning or activation of district EMRP 79
14.2.1 Relief and Rehabilitation 81

15 STANDARDS FOR RELIEF WORK, TRANSIT AND RELIEF CAMPS AND FEEDING CENTRES 82
15.1.1 StandardsforFood 82
15.1.2 Storage 83
15.1.3 Cooking 83
15.1.4 Standard for assessment 83
15.2 Standards for Potable water 84
15.2.1 Requirements 84
15.2.2 Storage 84
15.2.3 Distribution 85
15.3 Standards for feeding centres 85
15.4 Standards for Environmental Health Measures 87
15.4.1 During search, rescue and evacuation 87
15.4.2 Solid waste disposal in the camps or in affected villages 88
15.4.3 Miscellaneous installations 89
15.5 Facilities for relief workers 91
15.5.1 Sleeping and cooking equipments for a team of 5 relief workers 105
15.6 Checklist for transit camps, relief camps and feeding centres 92
15.6.1 Checklist for each transit camp 106
15.6.2 Checklist for feeding centre 93
15.6.3 Checklist for transit camps, relief camps for more than three days 94

HOW TO USE THE DOCUMENT

This document is a part of the activities undertaken by Sri Lanka Urban Multi-Hazard Disaster Mitigation Project to establish public and private sector mechanisms for disaster mitigation in Ratnapura Demonstration Project area. This is prepared with a view to provide uniform directives from the central government to the district administration and establish a uniform response to any disaster situation by the municipal authorities. The document attempts to evolve a multi-disaster response structure which can adapt itself to any specific disaster situation by any other local government institution in Sri Lanka.

Certain parts of the document therefore are disaster specific whereas the others deal with uniform response procedures. The complex dimensions of a response situation have been dealt with at the central government, district authority and local government level. A comprehensive understanding of the multi-hazard response structure with accompanying directives can therefore be best appreciated only when seen in their totality. However, the separation of the parts of the Emergency Management and Response Plan (EMRP) is done with a view to allow functioning of the plan smoothly. Therefore, some of the parts would need continuous updating whereas, others would need to be reviewed after several years. The following description of the different parts of the EMRP publication would assist the reader in terms of selection of the part required for immediate reference.

Part I of the EMRP is the **Emergency Management and Response Mechanism-Organisation Structure.** It outlines the institutional arrangements, inter-department linkages, role of NGOs, voluntary agencies and local communities. The procedure and mechanisms for plan dissemination and plan update are also reflected. The inventory of resources forms an integral part of this document, but has to be included after carrying out an assessment on requirements and availability. That is yet to be carried out.

Part II of the EMRP is the **Multi-Disaster Response and Mitigation Strategy** at Central government, provincial, district and local government levels.

Part III of the EMRP is the **Operating Procedure Guidelines and Standards.** This document presents the guidelines for various departments during different stages of the disaster cycle. The standards of services for food, water, shelter and health services have been elaborated extensively in this document. Information Reporting and Monitoring Tools suggested in this document gives the reporting institutions, necessary, formats for preparedness, immediate response and damage assessment.

Previously published **Ratnapura Disaster Management Action Plan** discusses various technology options and dimensions of training research and community participation. Therefore generic mitigation measures for specific disasters have also been discussed in this report.

This EMRP has been prepared with the consultation of the Ratnapura Disaster Management Committee and the cooperation and guidance of all who contributed in preparation of this document are acknowledged with gratitude.

I wish to acknowledge with gratitude the assistance provided by ADPC management, specially the contributions made by Mrs. Shirely Mattingly - ADPC Consultant, in bringing this document to this standard

Mrs. G Karunaratne
Project Director
Sri Lanka Urban Multi-Hazard Disaster Mitigation Project

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ACRONYMS

ADPC	-	Asian Disaster Preparedness Centre
CAO	-	Office of the Municipal Commissioner
CERTs	-	Centres Identified for Evacuation of Victims
CERTs	-	Community Emergency Management Teams
CWO	-	Co-operative Wholesale Establishment
DAC	-	Disaster Application Centre
DCR	-	District Control Room
DDM	-	District Disaster Management
DIDM	-	Divisional Disaster Management
DIV. Sec	-	Divisional Secretary
DMO	-	District Medical Officer
DMSC	-	Disaster Management Steering Committee
DOCS	-	Departmental Operating Centres
EMRP	-	Emergency Management and Response Plan
EOB	-	Emergency Operation Board
EOC	-	Emergency Operation Centre
EOCIMS	-	EOC Information Management System
EOD	-	Emergency Operation Director
EOO	-	Emergency Operation Centre
FOP	-	Emergency Operational Priorities
EPD	-	Emergency Preparedness Division
ICS	-	Incident Command System
LAN	-	Local Area Newwork
MC	-	Municipal Council
MM	-	Municipal Member
MP	-	Member of Parliament
NDMC	-	National Disaster Management Centre
NGO	-	Non-Governmental Organisation
NWS & DB	-	National Water and Supply Drainage Board
PC	-	Provincial Council
PDM	-	Provincial Disaster Management Steering Committee
RMC	-	Ratnapura Municipal Council
SAR	-	Search and Rescue
SEMS	-	Standard Emergency Management System
SLCTB	-	Sri Lanka Central Transport Board
SOC	-	Site Operation Centre
SOP	-	Standard Operating Procedure
USAR	-	Urban Search and Rescue

SECTION I

OPERATING PROCEDURE GUIDELINES AND STANDARDS

1. OPERATING PROCEDURE GUIDELINES AND STANDARDS

This part on "Operating Procedure Guidelines and Standards for Monitoring" includes

- Procedures for warning
- Operating Procedures for evacuation
- Comprehensive Operating Procedure Guidelines for the Departments
    - relief and recovery
    - the standards of services
    - Check lists for monitoring
- Monitoring relief and rehabilitation
    - standard arrangements for transit camps
    - relief camps
    - cattlecamps
    - feeding centres
    - standards of service.

SECTION II

OPERATING PROCEDURE GUIDELINES FOR WARNING

2. OPERATING PROCEDURE GUIDELINES FOR WARNING

Definition: Onset of disaster, is indicated through frecasting, and the information should be communicated to the community likely to be attected through a warning system. This system may range from alarms (eg. for fires), and sirens (eg. for industrial accidents) to public announcements through radio, television etc. (eg., for cyclones, floods and landslides) and other traditional modes of communication (eg. beating of drums, ringing of bells, hoisting of flags).

[In most disaster situations experience has shown that loss of life and property could be significantly reduced due to preparedness measures and appropriate warning systems. The importance of warning systems therefore hardly needs army emphasis. However, not in all cases the opportunity for warning exists. Indiscriminate warnings may result in non responsiveness of the people. It is therefore necessary that with respect to every disaster, a responsible officer is designated to issue the warnings].

2.1 Agencies authorised to issue warning

The district administration is the prime agency responsible for issuing the disaster warning. Additionally the technical agencies authorised to issue warning are mentioned below.

Disaster	Agencies
Earthquakes	Geological Survey and Mines Bureau (GSMB)
Floods	Irrigation Department
Adverse climate conditions and Cyclones	Met. Dept
Epidemics	Public Health dept.
Road Accidents	Police
Industrial and Chemical Accidents	Industry, Police; Central Environmental Authority
Fires	Fire Brigade, Police
Landslides	National Building Research Organisation (NBRO)

2.2 Important Elements of Warning

The following aspects may be considered for dissemination of warning:

- All warning systems and technologies are maintained in working condition and checked regularly
- Communities in disaster prone areas are made aware of the warning systems
- Alternate warning systems must be kept in readiness in case of technical failure (eg., power failure)
- Only the designated agencies/officers will issue the warning

- All available warning systems should be used (each warning system has a limited reach and multiple warning systems will help in reinforcement).
- The warning should to the extent possible, be clear about the severity, the time frame area that may be affected
- Warning statements should be conveyed in a simple, direct and non-technical language and incorporate day-to-day usage patterns.
- The do's and don'ts should be clearly communicated to the community to ensure appropriate responses
- Warning statements should not evoke curiosity or panic behavior. This should be in a professional language devoid of emotions.
- Rumor control mechanisms should be activated
- All relevant agencies and organisations should be alerted
- Wherever possible, assistance of community leaders and organised groups should be sought in explaining the threat.
- Once a warning is issued it should be followed-up by subsequent warnings in order to keep the people informed of the latest situations.
- In the event of the disaster threat fading away, an all clear signal must be given.

SECTION III

OPERATING PROCEDURES FOR EVACUATION

3. OPERATING PROCEDURES FOR EVACUATION

- It is important to understand the nature of threat and the procedures to be adopted
- All agencies involved in evacuation must have a common understanding of their roles and responsibilities in order to avoid confusion and panic behavior.
- Different situations demand different priorities and hence the responsibility for ordering evacuation is assigned to different agencies.
- All evacuations will be ordered only by the Divisional Secretariat, Police, Fire Brigade or by the Industries Security Officer.
- For appropriate security and, law and order evacuation should be undertaken with assistance from community leaders.
- All evacuations should be reported to Divisional Secretary or Senior Superintendent of Police immediately.

3.1 Factors to be considered for Evacuation

3.1.1 Planning Assumptions

- Amount of time needed for evacuation will depend on the disaster.
- If the event can be monitored, like a cyclone, the authorities would have a day or two to get ready.
- In other disasters, it is mostly emergency evacuation of people.

3.1.2 Factors

- Shelter sites should be within one hours walk and three miles (5 km) of dwellings.
- The evacuation routes should be away from the coast or flood-prone areas.
- Evacuation routes should not include roads likely to be submerged in flood, but may include pathways.
- Ensure proper evacuation by seeking community participation along the following lines:

- Evacuation should be undertaken with assistance from community leaders NGO's and community based organisations (CBOs) for appropriate security and law and order

- Care should be taken to see that evacuation routes are not blocked.

- It is always preferable to encourage an entire family to evacuate together as a unit.

- In case of inadequate transport or limited time, encourage community emergency evacuation in the following order:

  - seriously injured and sick
  - children, women and handicapped
  - old
  - able-bodied.

[An evacuation plan on a priority basis helps to avoid stampede and confusion.]

3.2 Emergency Evacuations

- Families should be encouraged to take along with them adequate supplies of water, food, clothing and emergency supplies.

- The families should be encouraged to assemble the following disaster supplies kit.

  - Adequate supply of water in closed unbreakable containers

  - Adequate supply of non-perishable packaged food and dry rations

  - A change of clothing and rain gear

  - Blankets and bedsheets, towels

  - Buckets, plates, glasses, mugs made of plastic

  - Soap, toothbrushes, toothpaste

  - A battery-powered radio, torch, lantern, matches

  - Cash and jewelry

  - Personal medicines
  - A list of important family documents including samurdi card, passport, national identity card, bank passbook, address/telephone book (of relatives), certificates, driving license, property documents, insurance documents etc.

- Special items including foods for infants, elderly or disabled family members.
- Encourage people to keep fuel in their cars as petrol pumps may be closed during emergencies.
- Ask people to shut off electricity, gas and water at main switches and valves before leaving.
- Ask people to listen to a battery-powered radio and follow local instructions.
- If the danger is a chemical release, then people should be instructed to evacuate immediately.
- In other cases, advise people to follow these steps:
- Wear protective clothing
- Secure their homes. Close and lock doors and windows.
- Turn off the main water valve and electricity
- Leave early enough to avoid being trapped.
- Follow recommended evacuation routes. Shortcuts may be blocked.
- Not to move or drive into flooded areas.
- Stay away from downed power lines.
- Animals may not be allowed in public shelters.
- Community should set the livestock free
- If possible, the community may be advised to carry the livestock along [if the evacuation does not involve transportation by vehicles].

3.3 Evacuation of Marooned Persons

In the case of marooned persons, if necessary

- evacuation must be carried out within the shortest possible time
- the marooned persons must be transferred to transit camps.
- Within the shortest possible time (3 hours of the disaster), marooned people must be provided with

- water
- medicines
- first-aid
- cooked food.

[This can continue for 48 hours after the disaster].

- Emergency transport for the seriously injured by

  - speed boats

- A senior medical officer should accompany the rescue team along with required medical kit and ensure priority for shifting of those seriously injured or requiring immediate medical attention.

- Water supplied must be in accordance with acceptable standards of potable water. It is the responsibility of medical officer to check the water quality.

- The procedures for tagging as given in the standards should be followed.
  [Tagging is a process of prioritising transfer of injured based on first hand assessment of chance of survival by the medical officer on the disaster site. The identification of patients is done by attaching a tag to each patient, usually color coded to indicate a given degree of injury and the priority for evacuation].

- For food supplies, the standards as given in the "Standards for Food" should be followed.

SECTION IV

OPERATING PROCEDURE GUIDELINES ANDSTANDARDS FOR DEPARTMENTS

4. OPERATING PROCEDURE GUIDELINES AND STANDARDS FOR DEPARTMENTS

4.1 Planning Assumptions

The standards of services have been adopted from internationally accepted norms and have been at times modified to suit local conditions. Although it is difficult to maintain efficient service standards in a disaster, which presents a fluid and confused situation, all efforts should be made to reach as close to these norms as possible. Some of the standards make a lasting impact on the communities whereas others have an immediate impact in the field situation, e.g. lack of adequate space per person in relief camps can lead to mental health issues and the absence of adequate sanitation facilities can lead to epidemics.

The operating procedures developed for each department refer to standards of services to be delivered and the appropriate checklists for field monitoring. Hence, the standards and checklists go hand in hand with the operating procedures for every department.

These departments include police, public health, CEB irrigation, agriculture, animal husbandry, NWS&DB, CEB, Provincial Works Dept., RDA, Telecom and Transport authorities.

SECTION V

OPERATING PROCEDURES GUIDELINES FOR POLICE

5. OPERATING PROCEDURE GUIDELINES FOR POLICE

5.1 Planning Assumptions

- For effective preparedness, the police department must have a clearly defined disaster response plan or clearly defined, in order to avoid confusion and, improve efficiency in cost and time.

- Operating procedures for mobilising community participation during various stages of disaster management have been given in section on "Areas of Community Participation". Refer Section 15.5 of EMRP Part I. The department is required to study these and adopt appropriate measures to ensure that community participates substantially.

- Orientation and training for disaster response plan and procedures accompanied by simulated exercises will keep the department prepared for such eventualities. Special skills required during emergency operations need to be imparted to the officials and the staff. Select personnel can be deputed for training as "NODAL OFFICER - Police" and "Officer-in-charge - Police" at the provincial and district level respectively.

- To the extent possible preventive measures as recommended in the preparedness and mitigation document of EMRP. Measures should be undertaken to improve departmental capacity to respond to a disaster.

5.2 Normal Time Activity

- Assess preparedness level and report the same as per the formats in Sections 5.3.3 and 5.3.4 to District Control Room every six months

- Maintain a list of disaster prone areas in the district

- Organise training on hazardous chemicals for police officers to facilitate handling of road accidents involving hazardous materials

- Designate an area, within police station to be used as public information centre

Action Plan Objective in a Disaster Situation

Maintain Law and Order

5.3 Activities On Receipt of Warning or Activation of District EMRP

- Within the affected district/electoral ward all available personnel will be [illegible] available to the District Disaster Manager. If more personnel are required, then out of station [illegible] on leave may be recalled.

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- All personnel required for disaster management should work under the overall supervision and guidance of District Disaster Manager/District Magistrate.

- Establish radio communications (and assist in precautionary evacuation activities) with

  - Emergency operations centre
  - Divisional commissioner
  - district control room and
  - departmental offices within the division.

- All district level officials of the department would be asked to report to the Collector.

- Appoint one officer as "NODAL OFFICER - Police" at the provincial level

- Appoint one officer as "Officer-in-Charge - Police" at the district level

- Review and update precautionary measures and procedures and, review with staff the precautions that have been taken to protect equipment and the post-disaster procedures to be followed.

- Fill department vehicles with fuel and park them in a protected area.

- Provide guards as needed for supply depots such as cooperative food stores and distribution centres.

- Provide convoys for relief materials.

- Identify anti-social elements and take necessary precautionary measures for confidence building.

5.3.1 Evacuation

- All evacuations will be ordered only by the Div. Secretary, police, Fire Brigade or by the Industries Security Officer.

- For appropriate security and law and order evacuation should be undertaken with assistance from community leaders.

- All evacuations should be reported to Div. Secretary or Senior Superintendent of Police immediately.

- For evacuation follow the evacuation procedures as outlines in operating procedures for evacuation.

5.3.2 Relief and Rehabilitation

- Immediately after the disaster, dispatch officers to systematically identify and assist people and communities in life-threatening situations.

- Help identify the seriously injured people, and assist the community in organising emergency transport of seriously injured to medical treatment centres.

- Ensure that the police stations are functioning immediately after the disaster at all required locations, as may be requested by the district control room, and that staff are available for the variety of needs that will be presented.

- Assist and encourage the community in road-cleaning operations.

- Identify roads to be made one-way, to be blocked, alternate routes and other access roads to Disaster site.

- Provide security in transit and relief camps, affected villages, hospitals end medical centres and identify areas to be cordoned off.

- Transport carrying transit passengers (that is, passengers traveling through trains or buses and passing through the district), should be diverted away from the disaster area.

- Provide security arrangements for visiting VVIPs and VIPs.

- Assist district authorities to take necessary action against black marketers and those found manipulating relief material

- In conjunction with other government offices, activate a public information centre to:

  - respond to personal inquiries about the safety of relatives in the affected areas.
  - statistics about affected communities, deaths, complaints and needs
  - respond to the many specific needs that will be presented
  - serve as a rumor control centre
  - reassure the public.

- Make officers available to inquire into and record deaths, as there is not likely to be time nor personnel available, to carry out standard postmortem procedures.

- Monitor the needs and welfare of people sheltered in relief camps.

- Coordinate with military service personnel in the area

5.3.3 Preparedness Checklist for Police

(to be filled in by the Department Head and submitted to the District Secretary before May and November every year.)

Preparedness measures taken	Details/Remarks
The department is familiar with disaster response plan and disaster response procedures are clearly defined.	
Orientation and training for disaster response plan and procedures undertaken.	
Special skills required during emergency operations imparted to the officials and the staff	
Reviewed and updated • Precautionary measures and procedures • the precautions to be taken to protect equipment • the post-disaster procedures to be followed.	
Adequate warning mechanisms established for evacuation.	
An officer has been designated as Nodal Officer for disaster management.	
Sources of materials required for response operations have been identified.	

Reported By:

Designation:

Signature :

Date :

5.3.4 Checklist for Police

(to be filled in by "Officer-in-Charge" and submitted to district control room and the department head.)

Action Taken	Y/N	Details /Remarks
Radio communications established with • Emergency operations centre • Divisional Secretary • District control room • Other police headquarters within the division		
Community assisted in organising emergency transport of seriously injured to medical treatment centres. Community assisted in road-clearing operations. Overall traffic management and patrolling on all highways and other access roads to disaster site being carried out. The following roads have been identified • To be made one-way • To be blocked • Alternative routes		
Transport carrying transit passengers (that is, passengers travelling through trains or buses and passing through the district), are diverted away from the disaster area.		
Security is being provided in • Transit camps • Feeding centres • Relief camps • Cattle camps • Affected areas • Hospital and medical centres		
Areas to be cordoned off identified		
Guards provided for supply depots such as cooperative food stores and distribution centres		
Security arrangements provided for visiting VVIPs and VIPs,		
District authorities assisted for taking necessary action against, black marketers and those found manipulating relief material.		
A public information centre activated		
Officers made available to inquire into and record of deaths,		
Coordination with military service personnel in the area being carried out		

Inspected By :

Designation: Signature : Date :

SECTION VI

OPERATING PROCEDURE GUIDELINES FOR PROVINCIAL PUBLIC HEALTH DEPARTMENT

6. OPERATING PROCEDURE FOR PROVINCIAL PUBLIC HEALTH DEPARTMENT

6.1 Planning Assumptions

- There is no substitute for maintaining standards of services and regular maintenance during normal times. This affects the response of the department to any disaster situation.

- Operating procedures for mobilising community participation during various stages of disaster management have been given in section on "Areas of Community Participation". Refer Section 15.5 of EMRP - PART I. The department is required to study these and adopt appropriate measures to ensure that community participates substantially.

- For effective preparedness, the department must have a disaster response plan or disaster response procedures clearly defined in order to avoid confusion and improve efficiency in cost and time.

- Ensure that every hospital follows "The Guide to Health Management in Disasters". The plan should be specifically developed for the facilities, equipment and staff of that particular hospital.

- Orientation and training for disaster response plan and procedures, accompanied by simulated exercises, will keep the department prepared for such eventualities. Special skills required during disaster situations need to be imparted to the officials and the staff Coordinate training for treatment of people affected due to hazardous spills. Select personnel can be deputed for training as "NODAL OFFICER - Health Services" and "Officer-in-charge
  - Health Services" at the provincial and district level respectively.

- To the extent possible, preventive measures as recommended in the preparedness and mitigation document of EMRP, should be undertaken to improve departmental capacity to respond to a disaster.

- Ensure that standby generator is available at every hospital.

- Ensure that at least one kerosene-powered refrigeration unit exists for vaccines.

Action Plan Objective in a Disaster Situation

- Providing efficient and quick treatment

- Preventing outbreak of epidemics.

6.2 Normal Time Activity

- Assess preparedness level and report the same as per the format in Sections 6.4.4 and 6.4.5 to district control room every six months.

- Ensure that hospital staff are aware of the hospital rooms and buildings which are damage proof.
- In the case of hospitals located in proximity to industrial areas obtain chemical Data sheet from the different industries.

6.3 Activities on Receipt of Warning or Activation of District EMRP

- Within the affected district/local govt. all available personnel will be made available to the District Disaster Manager. If more personnel are required, then out of station officers or those on leave may be recalled.
- All personnel required for disaster management should work under the overall supervision and guidance of District Disaster Manager.
- Establish radio communications with emergency operation centre, district and divisional secretary, district control room and hospitals (including private) within the division.
- Ensure that personnel working within the district come under the direction and control of (the collector/ civil Surgeon.
- Appoint one person as "NODAL-OFFICER Health Services" at the provincial level.
- The civil surgeon will act as "Officer-in-Charge Health Services" at the district level.
- All district level officials of the department would be asked to report to the District Secretary
- Review and update precautionary measures and procedures, and review with staff, the precautions that have been taken to protect equipment and the post-disaster procedures to be followed.
- Fill department vehicles with fuel and park them in a protected area.
- Stock emergency medical equipment which may be required after a disaster.
- Determine type of injuries illnesses expected and drugs and other medical items required, and accordingly ensure that extra supplies of medical items can be obtained quickly.
- Provide information to all hospital staff about the disasters, likely damages and effects, and information about ways to protest equipment and property.
- Discharge all ambulatory patients whose release does not pose a health risk to them. If possible, they should be transported to their home areas.
- Non-ambulatory patients should be relocated to the safest areas within the hospital. The safest rooms are likely to be:

- On ground floor
- Rooms in the centre of the building away from windows
- Rooms with concrete ceilings.

- Equipment supplies such as candles, matches, lanterns and extra clothing should be provided for the comfort of the patients.

- Surgical packs should be assembled and sterilised.

- A large enough number should be sterihised to last four to five days.

- The sterilised surgical packs must be stored in protective cabinets to ensure that they do not get wet. Covering the stock with pohythene is recommended as an added safety measure.

- All valuable instruments, such as surgical tools, opthalmoscopes, portable sterihisers, CGS, dental equipments, etc., should be packed in protective coverings and stored in rooms considered to be the most damage-proof.

- Protect all immovable equipment, such as x-ray machines, by covering them with tarpaulins or polythene.

- All electrical equipments should be unplugged when disaster warning is received

- Check the emergency electrical generator to ensure that it is operational and that a buffer stock of fuel exists. If an emergency generator is not available at the hospital, arrange for one on loan.

- All fracture equipment should be readied.

- If surgery is to be performed following the disaster, arrange for emergency supplies of anesthetic gases (usually supplied on a daily basis)

- Check stocks of equipments and drugs which are likely to be most needed after the disaster. These can be categorised generally as:

  - Drugs used in treatment of cuts and fractures, such as tetanus toxoid, analgesics and antibiotics

  - Drugs used for the treatment of diarrhoea, water-borne diseases and flu (including oral rehydrating supplies).

  - Drugs required to treat burns and fight infections.

  - Drugs needed for detoxication including breathing equipments.

- Assess the level of medical supplies in stock, including:

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- Fissure materials
- Surgical dressings
- Splints
- Plaster rolls
- Disposable needles and syringes
- Local antiseptics.

- Request central warehouse for immediate despatch of supplies likely to be needed to hospitals on an emergency priority basis.

- Fill hospital water storage tanks and encourage water savings. If no storage tanks exist, water for drinking should be drawn in clean containers and protected.

- Prepare an area of the hospital for receiving large number of casualties

- Develop emergency admission procedures (with adequate record keeping)

- Orient field staff with EMRP standards of services and procedures including tagging.

- Hospital administrators should

  - Establish work schedules to ensure that adequate staff are available for in-patients

  - Organise in-house emergency medical teams to ensure that adequate staff are available at all times to handle emergency casualties.

  - Set up teams of doctors, nurses and dressers for visiting disaster sites.

6.3.1.1 Evacuation

- All evacuations will be ordered only by the Divisional and District Secretary, Police, Fire Brigade, Health Department or by the Industries Security Officer.

- For appropriate security and law and order evacuation should be undertaken with assistance from community leaders

- All evacuations should be reported to Divisional and District Secretary, or senior Superintendent of Police immediately.

- For evacuation follow the evacuation procedures as outlined in "Operating Procedures for Evacuation" and "Areas for Community Participation - Evacuation"

- For Marooned Persons

A senior medical officer will ensure that water supply is in accordance with acceptable standards of potable

water and is packed under appropriate conditions and containers. A senior medical officer should accompany the rescue team along with required medical kit and ensure priority for shifting of those seriously injured or requiring immediate medical attention (the procedure for tagging as given in the Annexure should be followed).

6.3.1 Relief and Rehabilitation

Field Office Priorities

- Transport should be arranged for the transfer of seriously injured patients from peripheral villages hospitals to hospital. If roads are blocked, a method should be established to request helicopter transport.
- Establish health facility and treatment centres at disaster sites.
- The provision of medical services should be coordinated by the District Medical Officer (DMO) with district control room and SOCs
- Procedures should be clarified between
  - Peripheral hospitals
  - Private hospitals
  - Blood banks
  - General hospitals and
  - Health services established at transit camps, relief camps and affected villages.
- Maintain checkposts and surveillance at each railway junction, bus depots and all entry and exit points from the affected area, especially during the threat or existence of an epidemic.
- An injury and disease monitoring system should be developed to ensure that a full picture of health risks is maintained. Monitoring should be carried out for epidemics. Water and food quality and disposal of waste in transit and relief camps, feeding centres and affected villages.
- Plan for emergency accommodations for auxiliary staff from outside the area.
- Information formats and monitoring checklists should be used for programme monitoring and development, and for reporting to Emergency Operations Centre. This is in addition to existing reporting system in the department.
- Seek security arrangements from district police authorities to keep curious persons from entering hospital area and to protect staff from hostile actions.

- Establishment of a public information center with a means of communication to assist in providing an organized source of information. The hospital is responsible for keeping the scommunity informed of its potential and limitations in disaster situations.

- The local police, rescue groups. and ambulance teams should be aware of the resources or each hospital.

Head Office Priorities

On the recommendations of the EOC ("NODAL OFFICER-Health Services") collector, district control room, the Public Health Department will

- Send required medicines, vaccines, drugs, plasters, syringes, etc.
- Arrange for additional blood supply.
- Provide for sending additional medical personnel equipped with food, bedding, tents.
- Send vehicles and any additional medical equipments.

6.4 Standards of Service

6.4.1 Tagging

Tagging is a process of prioritising transfer of injured, based on first hand assessment of the medical officer on the disaster site. It is based on the medical criterion of chance of survival decision made regarding cases which can wait for treatment, those which should be taken to more appropriate medical units, and those which have no chances of surviving. The grouping is based on the benefit that the casualties can expect to derive from medical care, not on the seriousness of the injuries.

Whenever possible, the identification of patients should be accomplished concurrently with triage. This is done by attaching a tag to each patient, usually color-coded to indicate a given degree of injury and the priority for evacuation.

- Red Tag

This tag signifies that the patient has a first priority for evacuation. Red-tagged patients need immediate care and fall into one of the following categories:

(1) Breathing problems that cannot be treated at the site.
(2) Cardiac arrest (witnessed).
(3) Appreciable loss of blood (more than a liter).
(4) Loss of consciousness.
(5) Thoracic perforations or deep abdominal injuries.
(6) Certain serious fractures:

- Pelvis
- Thorax
- Fractures of cervical vertebrae
- Fractures or dislocations in which no pulse can be detected below the site of the fracture or dislocation
- Severe concussion
- Burns (complicated by injury to the air passages).

- **Green Tag**

Identifies those patients who should receive second priority for evacuation. Such patients need care, but the injuries are not life-threatening. They fall into the following categories:

(1) Second-degree burns covering more than 30 per cent of the body.
(2) Third-degree burns covering 10 per cent of the body.
(3) Burns complicated by major lesions to soft tissue or minor fractures.
(4) Third-degree burns involving such critical areas as hands, feet, or face but with no breathing problems present.
(5) Moderate loss of blood (500-1000 cc)
(6) Dorsal lesions, with or without injury to the spinal column.
(7) Conscious patients with significant craniocerebral damage (serious enough to cause a subdural hematoma or mental confusion). Such patients will show one of the following signs :

signs:

- Secretion of spinal fluid through ear or nose
- Rapid increase in systolic pressure
- Projectile vomiting
- Changes in respiratory frequency
- Pulse below 60 ppm
- Swelling or bruising beneath the eyes
- Anisocoric pupils
- Collapse
- Weak or no motor response
- Weak reaction to sensory stimulation (profound stupor)

- Yellow Tag

Used on patients who are given third priority for evacuation and who fall into the following categories:

Minor Lesions

(1) Minor fractures (fingers, teeth, etc.).
(2) Other minor lesions, abrasions, contusions.
(3) Minor burns:
  (a) Second-degree burns covering less than 15 per cent of the body
  (b) Third-degree burns covering less than 2 per cent of the body surface
  (c) First-degree burns covering less than 20 per cent of the body, excluding hands, feet, and face.

Fatal Injuries

1. Second and third-degree with burns over more than 40 per cent of the body, with death seeming reasonably certain.
2. Second and third degree burns over more than 40 per cent of the body, with other major lesions, as well as major fractures, major craniocerebral lesions, thoracic lesions, etc.
3. Cranial lesions with brain tissue exposed and the patient unconscious.
4. Craniocerebral lesions where the patient is unconscious and has major fractures.
5. Lesions of the spinal column with absence of sensitivity and movement.
6. Patient over 60 years old with major lesions.

[It should be noted that the line separating these patients from red-tag casualties is very tenuous. If there are any red-tag patients, this system will have to be followed. If there are none, the yellow-tag patients with apparently fatal injuries become red-tag candidates. The reason is simple: if there are many red-tag patients with a chance to survive and there are yellow-tag patients, who apparently cannot be saved because of their injuries, the time spent on the dying wounded could be better spent on the patients with a chance to survive].

- Black Tag

Black tags are placed on the dead, i.e., casualties without a pulse or respiration who have remained in that condition for over 20 minutes, or whose injuries render resuscitation procedures impossible.

Evacuation Procedures under the Following Conditions

(I) Casualties not trapped or buried. Evacuate in the following order:
  (a) Red-tag casualties
  (b) Green-tag casualties
  (c) Yellow-tag casualties

(2) Casualties trapped or buried. Evacuate in the following order:
  (a) Red-tag casualties
  (b) Green-tag casualties
  (c) Yellow-tag casualties
  (d) Black-tag casualties not trapped or buried
  (e) Trapped black-tag casualties

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6.4.2 Vector Control Standards

Vector control programmes should be planned so as to cope with two distinct situations:

- The initial phase immediately following the disaster, when control work should concentrate on the destruction, by a physical or chemical process of vermin on persons, their clothing. bedding, and other belongings, and on domestic animals. An emergency sanitation team should be available from the beginning for carrying out this disinfestation.

- When the period after the disaster subsides, control work should be directed towards proper food, sanitation, safe disposal of wastes, including drainage, and general and personal cleanliness.

Suggested Vector Surveillance Equipment and Supplies

- Collecting bag
- Collecting forms
- Mouth or battery powered aspirators
- Tea strainer
- Flashlight and spare batteries
- Grease pencil
- Memo pad
- Sweep net
- Pencil
- Tweezers
- White enameled dipper
- Keys and other references
- Labels
- CDC light traps (optional)
- Collecting vials
- Aedes aegypti ovitraps (optional)
- Bulb syringe or medicine dropper
- Fly grill
- Mirror
- Teaching aids
- Transfer bags
- Plastic bags
- Vials
- Plastic cups
- Alcohol
- Rubber bands
- Forceps
- Scissors
- Insecticide dusting pan
- Snap Traps
- Formaldehyde
- Live traps

- Acute rodenticides
- Gloves
- Anticoagulant rodenticides
- Flashlights and batteries

6.4.3 Materials and Equipment

In the absence of clear indication from the field, a minimum kit comprising the following materials and equipment should be carried by the advance party to the disaster Site. (This is only a sample list and should be updated to suit the specific conditions prevailing in the area after careful assessment).

(1)	Equipment for pediatric intravenous use	36	
(2)	Tensiomerers for children and adults	12	
(3)	Assorted ferrules	2	boxes
(4)	Tracheal cannulac	36	
(5)	Set of laryngoscopes for infants, children, and adults	1	each
(6)	Endotracheal tubes, No. 7 Murphy	36	
(7)	Endotracheal tubes. No. 8	36	
(8)	Nasogastric probes	36	
(9)	Oxygen masks, for adults and children	2	boxes
(10)	Large scissors for cutting bandages	3	
(11)	Plastic linings	60	
(12)	Phonendoscopes	15	

Sterilization Unit Supplies

(1)	Tracheotomy set	6
(2)	Thorachotomy set	6
(3)	Venous dissection set	6
(4)	Set for small sutures	12
(5)	Bottles for drainage of thorax	10
(6)	Hand scissors, No. 4	6
(7)	Syringes (disposable) x 2 cc	60
(8)	Syringes (disposable) x 10 cc	90
(9)	Syringes (disposable) x 50 cc	60

Ambulance Fleet

The ambulances will carry the following equipment:

(l) Oxygen, oxygen mask, and manometer.
(2) Stretchers and blankets.
(3) Emergency first aid kit.
(4) Suction equipment.

(5) Supplies for immobilizing fractures.
(6) Venoclysis equipment.
(7) Drugs for emergency use.
(8) Minimal equipment for resuscitation maneuvers.

Each ambulance should be staffed by at least a physician, a nurse, a stretcher-bearer, and a driver. The medical and paramedical personnel should be experienced in procedures for the management of patients in intensive care units.

Equipment and Supplies required for Vermin control for a population of 10000

Power sprayers	2
Hand-pressured sprayers. capacity' 20-30 litres	50
Dusters (hand-operated. plunger type)	60
Dusters, power-operated	2
Space sprayer	1
Adequate supply of accessories and spare parts for the above equipment	
Insecticides:	
DDT. powder	0.5 tons
DDT, 75 % water wettable	1 -2 tons
DDT, 10 % powder	1 ton
Dieldrin 0.625-1 .25 % emulsifiable concentrate or wettable powder	100 kg
Lindane, 0.5 % emulsifiable concentrate or wettable powder	100 kg
Chlordane, 2 % emulsifiable concentrate or wettable powder	100 kg
Malathion. 1 % emulsifiable concentrate or wettable powder	100 kg
Dichlorvos emulsion	100 lit
Rodenticides, anticoagulant type (warfarin, etc.)	1 -2 kg
Rodent traps Screen, for fly control	100
Screen, for fly control	100
Garbage cans, capacity 50-100 litres	300-500

The Quantity depends on availability and on the number of distribution points.

6.4.4 Preparedness Checklist for Public Health Department

(to be filled in by the Civil Surgeon and District Health Officer and submitted to the District Secretary before May and November every year)

Preparedness Measures taken	Details / Remarks
The department is familar with disaster response plan and disaster response procedures are cleary defined.	
A hospital plan for the facilities, equipment and staff of that particular hospital based on "The Guide to Health Management in Disaster" has been developed	
Orientation and training for disaster response plan and procedures undertaken	
Special skills required during disaster situations are imparted to the officials and the staff	
Hospital staff are aware of damage - proof hospital rooms/buildings	
Reviewed and updated • Precautionary measures and procedures • Precautions that have to be taken to protect equipment • the post-disaster procedures to be followed	
All hospital staff have been informed about the possible disasters in the district, likely damages and effects, and information about ways to protect life, equipment and property	
An area of the hospital has been identified for receiving large number of casualties	
Emergency admission procedures with adequate record keeping developed	
Field staff oriented about • EMRP • Standards of services • Procedures for tagging	
An officer has been designated as Nodal Officer for Disaster Management	
Sources of materials required for response operations have been identified	

Reported By :

Designation: Signature: Date:

6.4.5 Checklist for Public Health Department

I. Checklist for Hospitals

(to be filled in by the OFFICER-IN-CHARGE and submitted to district control room and the department head)

Action Taken	Y/N	Details /Remarks
Radio communications established with • Emergency operations centre • Divisional commissioner, • District control room • Hospitals • Private hospitals		
The Civil surgeon designated as "OFFICER-IN-CHARGE - Heath Services"		
The following emergency medical equipment are stocked • Drugs used in treatment of cuts and fractures, such as tetanus toxoid, analgesics and antibiotics • Drugs used for the treatment of diarrhoea, water-borne diseases and flu (including oral rehydrating supplies) • Drugs required to treat burns and fight infections • Drugs needed for detoxication including breathing equipments		
Discharge of all ambulatory patients whose release does not pose a health risk to them.		
Non-ambulatory patients relocated within the hospital to safest areas		
Equipment supplies such as candles, matches, lantems and extra clothing provided for the comfort of the patients		
Adequate supplies of anesthetic gases for surgery cases available		
The hospital water storage tanks were filled		
An area of the hospital designated for receiving large number of casualties.		
• Emergency admissions • Procedures developed • Records maintained • Work schedules to ensure availability of adequate staff		
In-house emergency medical teams to ensure that adequate staff available at all times to handle emergency casualities		
Emergency accommodation provided for medical personnel from outside the area		
Public information center established at the hospital		
The local police, rescue groups, and ambulance teams were made aware of the resources of each hospital		

Inspected By :

Designation: Signature : Date :

II. Checklist for Field Centres

(to be filled in by the OFFICER-IN-CHARGE and submitted to district control room and the deparment head)

Action Taken	Y/N	Details /Remarks
Surgical packs assembled and sterilised		
Field staff aware of tagging procedures		
Emergency admissions • Procedures developed • Records maintained • Work schedules to ensure that adequate staff is available		
Teams of doctors, nurses and dressers for visiting disaster sites set-up		
Transport for the transfer of seriously injured patients from villages and peripheral hospitals to general hospitals available.		
Health facility and treatment centres established at disaster sites.		
Water quality monitoring done at • Transit camps • Relief camps • Feeding centres • Sources of water • Affected areas Epidemic surveillance is bein[illegible] • Transit camps • Relief camps • Affected are[illegible]		

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III. Casualty Treatment Post at camp sites and affected Villages

(to be filled in by OFFICER-IN-CHARGE, Health Services and submitted to district control room and the department head)

Action Taken	Y/N	Details /Remarks
Liaise with SOC for suitable location		
Finalise suitable location Near water supply • Clear access / egress routes • Communication link with SOC • Close to disaster site • Stuitably protected against weather conditions • Sufficient privacy • Separate area for relatives and visitors • Adequate sanitation facilities for patients • Adequate sanitation faciliteis for staff • Adequate sanitation facilities for relatives and visitors.		
Coordinating hospital notified		
First Aid facilities available		
Inform Police of location		
Whether Police personnel posted at treatment post		
Request for additional medical assistance sent • Base hospital • District control room		
Stocks of triage tags are available on hand		
Records kept on • Names and addresses of casualties (As far as possible) • Type of injuries (As far as possible) • Whether transferred for further treatment		
Records communicated to • Police • SOC		
Information about intentions to close Casualty Treatment Post communicated to • SOC • Police		

Inspected By:

Designation :

Signature :

Date :

IV. Report and Checklist on Epidemics for each camp site and affected village

(to be filled in by "OFFICER-IN-CHARGE-Health Services and submitted to district control room and the department head)

Time :

Name of the village :

Name of the camp :

An epidemic exists at the location :

An active threat of epidemics does not exist at the location :

Brief description of assessment of risk of epidemics in affected area / location :

Brief description of assessment of risk of epidemics in affected area / location and reasons thereof:

Services / desciplines mobilised:

Discipline / Organisation	Notified (Y/N)	Time	Whether mobilised (Y/N)	Stand by (Y/N)	Alert (Y/N)	contact person with address & Tel.

Compiled By:

Designation :

Signature :

Date :

V. Checklist for epidemic situations

(to be filled in by "OFFICER-IN-CHARGE-Health Services and submitted to district control room and the department head)

Action Taken	Y/N	Details /Remarks
Warning and Instructions to public issued		
Cordoning off of affected areas recommended		
Logistical support required		
Cordoning off to roads required		
Alternate routes to and from affected areas required		
Alternative communication		
Waste disposal system adequate		
Sterilisation system adequate		
Life saving drugs adequate		
Facilities for inoculation and vaccination exist		
Supply of inoculation and vaccination exists		
Accommodation for required number exists		
Facilities for special diet exist		
Risk of spread exists		
Isolation of affected persons done Facilities for testing water/wastewater for contamination exist		
Facilities for treatment of contaminated water/ wastewater exist		
Suitable protection of workers ensured		

Inspected By:

Designation :

Signature :

Date :

SECTION VII

OPERATING PROCEDURE GUIDELINES FOR CEYLONELECTRICITY BOARD (CEB)

7. OPERATING PROCEDURE GUIDELINES FOR CEB

7.1 Planning Assumption

- There is no substitute for maintaining standards of services and regular maintenance during normal times. This determines the response of the department to any disaster situation.

- Operating procedures for mobilising community participation during various stages of disaster management have been given in section on "Areas of Community Participation". Refer Section 15.5 of EMRP Part I. The department is required to study these and adopt appropriate measures to ensure that community participates substantially.

- For effective preparedness, the department must have a disaster response plan or disaster response procedures clearly defined, in order to avoid confusion and improve efficiency in cost and time.

- Orientation and training for disaster response plan and procedures accompanied by simulated exercises, will keep the department prepared for such eventualities. Special skills required during emergency operations need to be imparted to the officials and the staff. Select personnel can be deputed for training as "NODAL OFFICER - Power supply" and "Officer-in-charge - Power Supply" at the provincial and district level respectively.

- To the extent possible, preventive measures as recommended in the preparedness and mitigation document of EMRP, should be undertaken to improve the departmental capacity to resspond to a disaster.

7.2 Normal Time Activity

- Assess preparedness level and report the same as per the format in Section 7.3.2 and 7.3.3 to District Control Room every six months.

- Establish at each sub-station a disaster management tool kit comprising cable cutters, pulley blocks, jungle knives, axes, crowbars, ropes, hacksaws and spanners. Tents for crews should also be in storage.

Plan Objective in a Disaster Situation

- Restore the power supply and ensure uninterrupted power to all vital installations and facilities.

7.3 Activities On Receipt of Warning or Activation of District EMRP

- Within the affected district/electoral ward, all available personnel will be made available to the District Disaster Manager. If more personnel are required, then out-of-station officers or those on leave may be recalled.

- All personnel required for Disaster Management should work under the overall supervision and guidance of District Disaster Manager.

- Establish radio communications with Emergency Operations Centre, divisional secretary/district secretary, district control room and your departmental offices within the division.

- All district level officials of the department would be asked to report to the work station.

- Appoint one officer as "NODAL OFFICER - Power Supply" at the national level.

- Appoint one officer as "Officer-in-Charge - Power Supply" at the district level.

- Review and update precautionary measures and procedures and review with staff, the precautions that have been taken to protect equipment and the post-disaster procedures to be followed.

- Assist the authorities to make arrangements for stand by generators in the following public service offices from the time of receipt of alert warning:

  * Hospitals
  * Water Supply and Drainage Board
  * District Secretariat (Kachcheri)
  * Police stations
  * Telecommunications buildings
  * Meteorological stations.

- Fill department vehicles with fuel and park them in a protected area.

- Check emergency tool kits, assembling any additional equipment needed.

Immediately undertake inspection from the time of receipt of alert warning of

- High tension lines Towers
- Substations
- Transformers
- Insulators
- Poles and
- Other equipment.

- Review the total extent of the damage to power supply installations by a reconnaissance flight, if possible.

On the recommendations of the collector/district control room!" Officer-in-Charge - Power Supply" of the department in the district,

- Instruct district staff to disconnect the main electricity supply for the affected area.
- Dispatch emergency repair gangs equipped with food, bedding, tents and tools.

7.3.1 Relief and Rehabilitation

Field office priorities

- Hire casual labourers on an emergency basis for clearing of damaged poles and salvage of conductors and insulators.
- Begin repair/reconstruction.
- Assist hospitals in establishing an emergency supply by assembling generators and other emergency equipments, if necessary.
- Establish temporary electricity supplies for other key public facilities, public water systems, etc.
- Establish temporary electricity supplies for transit camps, feeding centres, relief camps and SOC, district control room and on access roads to the same.
- Establish temporary electricity supplies for relief material warehouses.
- Compile an itemised assessment of damage, from reports made by various electrical receiving centres and sub-centres.
- Report all activities to the head office.
- Plan for emergency accommodations for staff from outside the area.

Head office priorities

On the recommendations of the EOC (Nodal Officer-Power Supply)/District Secretary /district control room at the district level, CEB will

- Send cables, poles, transformers and other needed equipment
- Send vehicles and any additional tools needed.
- Provide additional support as required.

7.3.2 Preparedness Checklist for District Office - CEB

(to be filled in by the department head and submitted to the district secretary before May and November every year)

Preparedness measures taken	Details/Remarks
The department is familiar with disaster response plan and disaster response procedures are clearly defined.	
Orientation and training for disaster response plan and procedures undertaken.	
Special skills required during emergency operations imparted to the officials and the staff.	
Reviewed and updated: * Precautionary measures and procedures. * The precautions to be taken to protect equipments. * The post-disaster procedures to be followed.	
An officer has been designated as Nodal Officer for Disaster Management.	
Sources of materials required for response operations have been identified.	

Reported By:

Designation:

Signature :

Date :

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7.3.3 Checklist for District Office - CEB

(to be filled in by the "Officer-in-Charge" and submitted to district control room and the department head)

Actions taken	Y/N	Details/Remarks
Radio communications established with • Emergency Operations Centre • Divisional Secretary • District control room and • Departmental offices within the division		
An officer appointed as ~Officer.-in-Charge- Power Supply"		
Standby arrangements for temporary electric supply or generators made for • Hospitals • Water department • Kacheheri - DS office • Police stations • Telecommunications buildings • Meteorological stations • Transit camps • SOC • Feeding centres • Relief camps • Cattle camps • Warehouses for storing relief materials • Access roads.		
Each depot provided with disaster management tool kit.		
Inspection, and repairs if needed, carried out for • High tension lines • Towers • Substations • Transformers • Insulators • Poles.		
Clearing of damaged poles carried out.		
Salvage of conductors and insulators done.		
Emergency accommodations undertaken for staff from outside the area		
An itemised damage assessment carried out		

Inspected By:

Designation :

Signature : Date :

SECTION VIII

OPERATING PROCEDURE GUIDELINES FOR IRRIGATION DEPARTMENT

8. OPERATING PROCEDURE GUIDELINES FOR IRRIGATION DEPARTMENT

8.1 Planning Assumptions

- There is no substitute for maintaining standards of services and regular maintenance during normal times. This affects the response of the department to any disaster situation.

- Operating procedures for mobilising community participation during various stages of disaster management have, been given in section on "Areas of Community Participation". Refer Section 15.5 of EMRP Part I. The department is required to study these and adopt appropriate measures to ensure that community participates substantially.

- For effective preparedness, the department must have a disaster response plan or disaster response procedures clearly defined in order to avoid confusion, improve efficiency in cost and-time.

- Orientation and training for disaster response plan and procedures accompanied by simulated exercises will keep the department prepared for such eventualities. Special skills required during emergency operations need to be imparted to the officials and the staff. Select personnel can be deputed for training as "NODAL OFFICER - Irrigation" and "Officer-incharge - Irrigation" at the provincial and district level respectively.

- To the extent possible, preventive measures as recommended in the preparedness and mitigation document of EMRP should be undertaken to improve departmental capacity to respond to a disaster.

8.2 Normal Time Activity

- Assess preparedness level and report the same as per the formats in Section 8.3.2 to District Control Room every six months.

- Identify flood prone rivers and areas, and activate flood monitoring mechanisms in all flood prone areas from 1st of June every year.

- Water level gauges should be marked on rivers, dams and minor tank structures not having level gauges.

Action Plan Objective in a Disaster Situation

- Monitor flood situation
- Monitor and protect irrigation infrastructure
- Restore damaged infrastructure

8.3 Activities on Receipt of Warning or Activation of District EMRP

- Within the affected district/electoral ward, all available personnel will be made available to the District Disaster Manager. If more personnel are required, then out-of-station officers or those on leave may be recalled.

- All personnel required for Disaster Management should work under the overall supervision and guidance of District Disaster Manager.

- Establish radio communications with Emergency Operations Centre, Divisional Secretary, district control room and your departmental offices within the division

- All personnel working within the district come under the direction and control of the collector.

- All district level officials of the department would be asked to report to the collector.

- Appoint one officer as "NODAL OFFICER - Irrigation" at the state level.

- Appoint one officer as "Officer-in-Charge - Irrigation" attached to district control room.

- Review and update precautionary measures and procedures and review with staff, the precautions that have been taken to protect equipment and the post-disaster procedures to be followed.

- Fill department vehicles with fuel and park them in a protected area.

- Organise round the clock inspection and repair of

  - Bunds of dams
  - Irrigation channels
  - Bridges
  - Culverts
  - Control gates and
  - Overflow channels

- Organise round the clock inspection and repair of pumps

  - Generators
  - Motor equipments and
  - Station buildings.

- The officer responsible for the tanks of an area should also be designated as emergency officer, knowledgeable about disasters, their effects, and understand well the appropriate emergency procedures.

- Officers should ensure that all staff are well aware of precautions to be taken to protect their own lives and personal property.

- Each technical assistant should have instructions and operating procedures for disaster conditions.

- Irrigation engineers should review with technical assistants emergency actions that are required.

- Emergency tool kits should be prepared for all technical assistants in disaster prone areas.

  These tool kits should include:

  - Ropes
  - Pulley blocks
  - Jungle knives
  - Shovels
  - Cement in bags
  - Concrete pans
  - Gunny bags
  - Cane baskets.

- The emergency tool kits with each technical assistant should be checked.

- The officers on site should ensure that, the level of impounding in the tanks is reduced to create increased capacity, and coordinate the same with officers on other dam sites and the district control room, if heavy rains are expected. The amount of lowering will depend on the rainfall forecast. In case of possibilities of flooding in the downstream, the restractive settlements should be forewarned, and necessary warnings for evacuation should be given, to the adjoining districts and to those districts beyond the state borders.

- The inlet and outlet to tanks should, be inspected to ensure that waterways are unobstructed by trees or vegetation.

- Any repairs/under construction activity should be well secured with sandbags, rockfalls, etc.

- Materials likely to be damaged by rains, such as concrete in bags, electric motors, office records, etc., should be covered with plastic and well secured, even though stored inside.

8.3.1 Relief and Rehabilitation

Field Office Priorities

- Continue round the clock inspection and repair of bunds of dams, irrigation channels, bridges, culverts, control gates and overflow channels as may be necessary

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- Continue round the clock inspection and repair of pumps, generators, motor equipment and station buildings.

- The officers on site should continue to ensure that, the level of impounding in the tanks is reduced to create increased capacity, and coordinate the same with officers on other dam sites and the district control room, if heavy rains are expected. The amount of lowering will depend on the rainfall forecast. In case of possibilities of flooding in the downstream, the settlements should be forewarned, and necessary warnings for evacuation should be given to the adjoining districts.

- Clearing the inlet and outlet to tanks to ensure that waterways are unobstructed by trees or vegetation on an on-going basis.

- Information formats and monitoring checklists should be used for programme monitoring and development and for reporting to Emergency Operations Centre. This is in addition to existing reporting system in the department.

Head Office Priorities

On the recommendations of the EOD ("NODAL OFFICER-Irrigation") District/Divisional Secretary, district control room, the Irrigation department will:

- Provide for sending additional support along with food, bedding, tents.

- Send vehicles and any additional tools and equipments needed.

- Coordinate with other distincts about release of water and dissemination of warning.

8.3.2 Preparedness Checklist for Irrigation Department

(to be filled in by the department head and submitted to the district secretary before May and November every year)

Preparedness measures taken	Details/Remarks
The department is familiar with disaster response plan and disaster response procedures are clearly defined.	
Orientation and training for disaster response plan and procedures undertaken. Special skills required during emergency operations imparted to the officials and the staff.	
Reviewed and updated : • Precautionary measures and procedures • Precautions to be taken to protect equipment • Post-disaster procedures to be followed.	
Flood monitoring mechanisms can be activated in all flood prone areas from 1st of June.	
All staff are well aware of precautions to be taken to protect their own lives and personal property.	
Each technical assistant has instructions and knows operating procedures for disaster conditions.	
Methods of monitoring and impounding the levels in the tanks evolved. Methods of alerting officers on other dam sites and the district control room, established. Mechanisms evolved for • Forewarning settlements in the downstream. • Evacuation. • Coordination with other dam authorities.	
An officer has been designated as Nodal Officer for Disaster Management.	
Sources of materials required for response operations have been identified.	

Reported By:

Designation :

Signature :

Date :

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8.3.3 Checklist for Irrigation Department

(to be filled in by the OFFICER-IN-CHARGE and submitted to district control room and the department head)

Action Taken	Y/N	Details/Remarks
Radio communications established with • Emergency operations centre • Divisional commissioner • District Control room and • Departmental offices within the division		
An officer appointed as "OFFICER-IN-CHARGE-Irrigation"		
Emergency tool kits for all technical assistants prepared.		
Water level gauges on minor tank structures not having level gauges marked.		
Repairs/under construction activity are well secured.		
Round the clock inspection and repair being carried out of • Bunds of dams • Irrigation channels • Bridges • Culverts • Control gates, and • Overflow channels as may be necessary		
Round the clock inspection and repair being carried out of • Pumps • Generators • Motor equipment and • Station buildings		
Level of impounding in the tanks reduced. Coordination of this action with other districts is done.		
Inlet and outlet to tanks are cleared.		

Reported By:

Designation :

Signature :

Date :

SECTION IX

OPERATING PROCEDURE GUIDELINES FOR AGRICULTURE DEPARTMENT

9. OPERATING PROCEDURE GUIDELINES FOR AGRICULTURE DEPARTMENT

9.1 Planning Assumptions

- There is no substitute for maintaining standards of services and regular maintenance
- Operating Procedures for mobilising community participation during various stages of disaster management have been given in section on "Areas of Community Participation". Refer Section 15.5 of EMRP Part I. The department is required to study these and adopt appropriate measures to ensure that community participates substantially.
- For effective preparedness, the department must have a disaster response plan or disaster response procedures clearly defined in order to avoid confusion, improve efficiency in cost and time.
- To the extent possible, preventive measures as recommended in the preparedness and mitigation document should be undertaken to improve departmental capacity to respond to a disaster.
- Orientation and training for disaster response plan and procedures will keep the department prepared for such eventualities. Special skills required during disaster situations need to be imparted to the officials and the staff. Select personnel can be deputed for training as "NODAL OFFICER - Agriculture" and "Officer-in-charge -Agriculture" at the provincial and district level respectively.
- To the extent possible, preventive measures as recommended in the preparedness and mitigation document of EMRP should be communicated to the community to prevent extensive loss of crops and plantations.

Action Plan Objective in a Disaster Situation

- Restore the Agricultural operations (including soil conditions)
- Crop Protection
- Restore agriculture produce market.

9.2 Activities on Receipt of Warning or Activation of District EMRP (EMRP)

- Within the affected district/electoral ward, all available personnel will be made available to the District Disaster Manager. If more personnel are required, then out-of-station officers or those on leave may be recalled.
- All personnel required for Disaster Management should work under the overall supervision and guidance of District Disaster Manager.

- Establish communications with divisional commissioner, district control room and agricultural colleges, seed banks, nurseries (private and-public) within the division
- Appoint one officer as "NODAL OFFICER - Agriculture" at the state level
- The District Agriculture Officer will act as "Officer-in-Charge Agriculture"
- Review and update precautionary measures and procedures and review with staff, the precautions that have been taken to protect equipment and the post-disaster procedures to be followed.
- Fill department vehicles with fuel and park them in a protected area.
- Check available stocks of equipments and materials which are likely to be most needed after the disaster.
- Stock agricultural equipments which may be required after a disaster
- Determine what damage, pests or diseases may be expected, and what drugs and other insecticide items will be required, in addition to requirements of setting up extension teams for crop protection, and accordingly ensure that extra supplies and materials, be obtained quickly.
- Provide information to all concerned, about disasters, likely damages to crops and plantations, and information about ways to protect the same.
- All valuable equipments and instruments should be packed in protective coverings and stored in the most damage-proof room.
- All electrical equipments should be unplugged when disaster warning is received.
- Extension Officers should be assisted to
  - Establish work schedules to ensure that adequate staff are available
  - Set up teams of extension personnel and assistants for visiting disaster sites.

9.2.1 Relief and Rehabilitation

- Assess the extent of damage to soil, crop, plantation, micro-irrigation systems and storage facilities and the requirements to salvage or replantation
- Establish contact with soil and water testing laboratories
- Provision of agricultural services should be coordinated with irrigation department, Provincial RDA district control room, SOCs

- Estimate the requirement of
  - Seeds
  - Fertilsers
  - Pesticides, and
  - Labour.

- Organise transport, storage and distribution of the above with adequate record keeping procedures.

- Ensure that adequate conditions through cleaning operations are maintained to avoid water logging and salinity.

- A pests and disease moniroring system should be developed to ensure that a full picture of risks is maintained.

- Plan for emergency accommodations for agriculture staff from outside the area.

- Establishment of a public information center with a means of communication, to assist in providing an organized source of information. The department is responsible for keeping the community informed of its potential and limitations in disaster situations.

- The NGOs and other relief organisations should be aware of the resources of the department.

- Assist farmers to re-establish their contacts with agriculture produce market and ensure that appropriate prices be offered to them.

9.2.2 Preparedness Checklist for Agriculture Department (to be filled in by the department head and submitted to the district secretary before May and November every year)

Preparedness Measures taken	Y/N	Details/Remarks
The department is familiar with disaster response plan and disaster response procedures are clearly defined.		
Orientation and training for disaster response plan and procedures undertaken.		
Special skills required during emergency operations imparted to the officials and the staff.		
Reviewed and updated • Precautionary measures and procedures • Precautions to be taken to protect equipment • Post-disaster procedures to be followed.		
Information provided to all concerned about the disasters, likely damages to crops and plantations, and information about way into protect the same.		
The NGOs and other relief organisations are informed about the resources of the department.		
An officer has been designated as Nodal Officer for Disaster Management		
Sources of materials required for response operations have been identified.		

Reported By:

Designation:

Signature :

Date :

9.2.3 Checklist for Agriculture

(to be filled in by the OFFICER-IN-CHARGE and submitted to district control room and the department head)

Action Taken	Y/N	Details/Remarks
Communication link within the division established with • Divisional Secretary • District control room • Agricultural colleges • Seed banks • Nurseries (private and public).		
The district agriculture officer designated as "OFFICER-IN CHARGE - Agriculture".		
Agricultural equipments which may be required stocked		
Contact established with soil and water testing laboratories.		
Extent of damage assessed for • Soil • Crop • Plantation • Micro-irrigation systems and • Storage facilities Requirements for salvage or replantation assessed.		
Information provided to all concerned about the disasters, likely damages to crops and plantations, and information about ways to protect the same.		
Actions coordinated with • Irrigation Department • RDA.		
Organised transport, storage and distribution of • Seeds • Fertilisers • Pesticides and • Labour.		
Cleaning operations carried out to avoid water-logging and salinity.		
Surveillance for pests and diseases being carried out.		
Public information center established.		
NGOs and other relief organisations informed of the resources of the department.		
Farmers assisted to reestablish their contacts with agriculture produce market.		
Adequate facilities provided to field teams.		

Inspected By:
Designation :
Signature :
Date :

SECTION X

OPERATING PROCEDURE GUIDELINES FOR DEPARTMENT OF ANIMAL HUSBANDRY

10. OPERATING PROCEDURE GUIDELINES FOR ANIMAL HUSBANDRY DEPARTMENT

10.1 Planning Assumptions

There is no substitute for maintaining standards of services and regular maintenance during normal times. This affects the response of the department to any disaster situation.

Operating Procedures for mobilising community participation during various stages of disaster management have been given in section on "Areas of Community Participation". Refer Section 15.5 of EMRP Part I. The department is required to study these and adopt appropriate measures to ensure that community participates substantially.

For effective preparedness, the department must have a disaster response plan or disaster response procedures clearly defined in order to avoid confusion and improve efficiency in cost and time.

Orientation and training for disaster response plan and procedures accompanied by simulated exercises will keep the department prepared for such eventualities. Special skills required during disaster situations need to be imparted to the officials and the staff. Select personnel can be deputed for training as "NODAL OFFICER - Veterinary Services" and "Officer-in-charge -Veterinary Services" at the state and district level respectively.

To the extent possible, preventive measures as recommended in the preparedness and mitigation document of EMRP, should be undertaken to improve departmental capacity to respond to a disaster.

Hospital staff are aware of damage - proof hospital rooms/buildings.

A standby generator is made available for every hospital.

At least one kerosene-powered refrigeration unit is made available for storage of drugs.

Orientation and training for disaster response plan and procedures, accompanied by simulated exercises, will keep the department prepared for such eventualities. Special skills required during disaster situations need to be imparted, to the officials and the staff.

To the extent possible, preventive measures as recommended in the preparedness and mitigation document of EMRP, should be communicated to the community to prevent extensive loss of livestock.

Action Plan Objective in a Disaster Situation

Treatment of injured cattle

Protection and care of abandoned/lost cattle.

10.2 Activities on Receipt of Warning or Activation of District EMRP

- Within the affected district/electoral ward, all available personnel will be made available to the District Disaster Manager. If more personnel are required, then out-of-station officers or those on leave may be recalled.

- All personnel required for Disaster Management should work under the overall supervision and guidance of District Disaster Manager.

- Establish radio communications with

  - Emergency Operations Centre
  - Divisional Commissioner
  - District control room and
  - Veterinary aid centres and hospitals (including private practitioners) within the division.

- Appoint one officer as "Nodal Officer - Veterinary Services" at the provincial level.

- The District Animal Husbandry Officer will act as "Officer-in-Charge - Veterinary Services".

- Review and update precautionary measures and procedures and review with staff the precautions that have been taken to protect equipments and the post-disaster procedures to be followed.

- Fill department vehicles with fuel and park them in a protected area.

- Stock emergency medical equipments which may be required after a disaster.

- Determine what injuries illnesses may be expected, and what drugs and other medical items will be required, in addition to requirements of setting up cattle camps, and accordingly ensure that extra supplies of medical items and materials can be obtained quickly.

- Provide information to all staff of veterinary hospitals and centres about the disasters, likely damages and effects, and information about ways to protect life, equipment and property.

- Surgical packs should be assembled and sterilised.

- Enough stock of surgical packs should be sterilised to last for four to five days.

- The sterilised surgical packs must be stored in protective cabinets to ensure that they do not get wet. Covering the stock with polythene is recommended as an added safety measure.

- All valuable equipments and instruments should be packed in protective coverings and stored in the most damage-proof room.

- All electrical equipments should be unplugged when disaster warning is received
- Check the emergency electrical generator, to ensure that it is operational, and that a buffer stock of fuel exists. If an emergency generator is not available at the hospital, arrange for one on loan.
- Arrange for emergency supplies of anesthetic drugs.
- Check stocks of equipments and drugs which are likely to be most needed after the disaster.
- Request from central warehouses, on an emergency priority basis, those supplies likely to be needed to be dispatched to the hospital immediately.
- Fill hospital water storage tanks and encourage water savings. If no storage tanks exist, water for drinking should be drawn in clean containers and protected.
- Prepare an area of the hospital for receiving large number of livestock.
- Develop emergency admission procedures (with adequate record keeping).
- Cattle camps and hospital administrators should
  - Establish work schedules to ensure that adequate staff are available
  - Set up teams of veterinary doctors, and assistants for visiting disaster sites.

10.2.1 Relief and Rehabilitation

- Organise transfer of seriously injured livestock from villages to veterinary aid centres where ever possible.
- The provision of medical services should be coordinated by the District Animal Husbandry Officer with district control room, SOCs and cattle camps.
- Establish cattle camps and additional veterinary aid centres at disaster sites and designate an Officer In-charge for the camp.
- Estimate the requirement of water, fodder and animal feed, for cattle camps and organise the same.
- Ensure that adequate sanitary conditions operations are maintained through cleaning in order to avoid outbreak of any epidemic.
- An injury and disease monitoring system should be developed, to ensure that a full picture of risks is maintained.
- Plan for emergency accommodations for veterinary staff from outside the area.

- Information formats and monitoring checklists as given in Annexure should be used for programme monitoring and development and for reporting to Emergency Operations Centre. This is in addition to existing reporting system in the department.

- Establishment of a public information center with a means of communication, to assist in providing an organized source of information. The hospital is responsible for keeping the community informed of its potential and limitations, in disaster situations.

- The local police. and rescue groups should be aware of the resources of each veterinary aid centres and hospital.

10.3 Standards for Cattle Camps

1. The minimum number of cattle in the cattle camp should be about 100 and the maximum 500.

2 The cattle camps should be located at suitable sites, bearing in mind, that adequate supply of water and shade are most essential for the well being of the cattle.

3. Cattle sheds constructed should not exceed 20 sq.feet per animal. Suitable arrangements for water trough and manger(s) should be made.

4. The feeding centres for cattle should be located in such a manner that

   - There is adequate supply of drinking water
   - There is sufficient shade for cattle to rest during the afternoon
   - They are located as near the rail head as possible
   - They are conveniently located, not beyond a radius of 8 Km from the affected villages.

The cattle will require 6 Kg per cattle head per day of fodder, and I to 1 1/2 Kg per cattle head per day, of concentrate like Bago molasses.
Each cattle camp will have a minimum of one camp manager, two labourers and two sweepers.

10.3.1 Preparedness Checklist for Animal Husbandry Department

(to be filled in by the department head and submitted to the district Secretary before May and November every year)

Preparedness measures taken	Details/Remarks
The department is familiar with disaster response plan and disaster response procedures are clearly defined.	
Orientation and training for disaster response plan and procedures undertaken.	
Special skills required during emergency operations imparted to the officials and the staff.	
Reviewed and updated • Precautionary measures and procedures • The precautions to be taken to protect equipment • The post-disaster - procedures to be followed.	
Hospital staff are aware of which hospital rooms buildings are damage-proof.	
All veterinary hospitals and centres staff have been informed about the possible disasters, likely damages and effects, and information about ways to protect life, equi ment and property.	
An area of the hospital identified for receiving large number of livestock.	
Emergency admission procedures with adequate record keeping developed.	
An officer has been designated as Nodal Officer for Disaster Management.	
Sources of materials required for response operations have been identified.	

Reported By:

Designation:

Signature :

Date :

10.3.2 Checklist for Field Activities of Animal Husbandry Department

to be filled in by the OFFICER-IN-CHARGE and submitted to district control room and the department head)

Actions Taken	Y/N	Details/Remarks
Radio communications established with • Emergency Operations Centre • Divisional Secretary • District control room • Veterinary aid centres and • Hospitals (including private practitioners) within the division		
The District Animal Husbandry Officer designated as "OFFICER-IN-CHARGE-Veterinary Services" Emergency medical equipments required are stocked. All veterinary hospitals and centres staff informed about the disasters, likely damages and effects, and ways to protect life, equipment and property.		
Emergency electrical generator arranged.		
Emergency supplies of anesthetic drugs arranged.		
Hospital water storage tanks filled		
An area of the hospital prepared for receiving large number of livestock.		
Emergency admission procedures developed (with adequate record keeping).		
Transfer of seriously injured livestock from villages to veterinary aid centres and hospitals organised.		
Established at disaster sites • Cattle camps • Additional veterinary aid centres.		
Organised for cattle camps • Water • Fodder and • Animal feed.		
Adequate sanitary conditions maintained Cleaning operations being carried out Epidemiological surveillance is being undertaken		
Emergency accommodations available for veterinary staff from outside the area.		
Public information center established.		
The local police, and rescue groups informed of the resources of each veterinary aid centres and hospital.		

Inspected By:

Designation:

Signature :

Date :

SECTION XI

OPERATING PROCEDURE GUIDELINES FOR NATIONAL WATER SUPPLY & DRAINAGE BOARD (NWS&DB)

11. OPERATING PROCEDURE GUIDELINES FOR NWS&DB

11.1 Planning Assumptions

- There is no substitute for maintaining standards of services and regular maintenance during normal times. This affects the response of the department to any disaster situation.

- Operating Procedures for mobilising community participation during various stages of disaster management have been given in section on "Areas of Community Participation". Refer Section 15.5 of EMRP Part I. The department is required to study these and adopt appropriate measures to ensure that community participates substantially.

- For effective preparedness, the department must have a disaster response plan or disaster response procedures clearly defined in order to avoid confusion, improve efficiency in cost and time.

- Orientation and training for disaster response plan and procedures accompanied by simulated exercises will keep the department prepared for such eventualities. Special skills required during emergency operations need to be imparted to the officials and the staff. Select personnel can be deputed for training as "NODAL OFFICER - Water Supply" and "Officer-in-charge - Water Supply" at the state and district level respectively.

- To the extent possible, preventive measures as recommended in the preparedness and mitigation document of EMRP, should be undertaken to improve departmental Capacity to respond to a disaster.

Action Plan Objective in a Disaster Situation

- Restoration of water supply to the affected area.

11.2 Activities on Receipt of Warning or Activation of District EMRP

- Within the affected district/electoral ward, all available personnel will be made available to the District Disaster Manager. If more personnel are required. then out-of-station officers or those on leave may be recalled.

- All personnel required for Disaster Management should work under the overall supervision and guidance of District Disaster Manager.

- Establish radio communications with Emergency Operations Centre. divisional Secretary. district control room and your departmental and field offices within the division.

- Appoint one officer as "NODAL OFFICER - Water Supply" at the provincial level.

- Appoint one officer as "Officer-in-Charge - Water Supply" at the district level.
- Review and update precautionary measures and procedures and review with staff the precautions that have been taken to protect equipment and the post-disaster procedures to be followed.
- Fill department vehicles with fuel and park them in a protected area.
- Make sure the hospital storage tank is full and the hospital is conserving water.
- Inform people to store an emergency supply of drinking water.
- Organise on the receipt of disaster warning continuous monitoring of
  - Wells
  - Intake structures
  - Pumping stations
  - Buildings above ground
  - Pumping mains and
  - The treatment plant.
- Standby diesel pumps or generators should be installed in damage-proof buildings.
- A standby water supply should be available in the event of damage, saline intrusion or other pollution of the regular supply.
- Establish procedures for the emergency distribution of water if existing supply is disrupted.
- Make provisions to acquire tankers and establish other temporary means of distributing water on an emergency basis.
- Make provisions to acquire containers and storage tanks, required for storing water on an emergency basis.
- Prepare plans for water distribution to all transit and relief camps, affected villages and cattle camps and ensure proper execution of these plans.
- A minimum level of stock should be maintained for emergencies, and should include extra lengths of pipe, connections, joints, hydrants and bleaching powder. Adequate tools should be on hand to carry out emergency repairs.
- Cover pumps and motors with adequate protection (if the building is not disaster-proof) to prevent damage.
- Make sure auxiliary generators and standby engines are in good working order.
- Acquire a buffer stock of fuel for the motors and store in a protected place.
- Establish emergency work gangs for immediate post-disaster repairs.

11.2.1 Relief and Rehabilitation

Field Office Priorities

- Carry out emergency repairs of all damages to water supply systems.
- Assist health authorities to identify appropriate sources of potable water.
- Identify unacceptable water sources and take necessary precautions to ensure that no water is accessed from such sources, either by sealing such arrangements or by posting the department guards.
- Arrange for alternate water supply and storage in all transit camps, feeding centres, relief camps, cattle camps, and also the affected areas, till normal water supply is restored.
- Ensure that potable water supply is restored as per the standards and procedures laid down in "Standards for Potable Water".
- Plan for emergency accommodations for staff from outside the area.
- Report all activities to the head office.

Head Office Priorities

On the recommendations of the POC ("NODAL OFFICER-Water Supply")Divisional Secretary/District Secretary district control room/of the department in the district

- Provide for sending additional support along with food, bedding, tents
- Send vehicles and any additional tools and equipments needed.

11.3 Standards of Service

11.3.1 Water Supply

Investigation of source

Piped Water

- After any repair on the distribution system, the repaired main should be flushed and disinfected with a chlorine solution of 50 mg/litre for a contact period of 24 hours, after which the main is emptied and flushed again with potable water.
- If the demand for water is urgent, or the repaired main cannot be isolated, the concentration of the disinfecting solution may be increased to 100 mg/litre and the contact period reduced to 1 hour.

- At the end of disinfection operations, but before the main is put back into service, samples should be taken for bacteriological analysis and determination of chlorine residue

- When a water treatment plant, pumping station, or distribution system is so badly damaged that operation cannot be restored for some time, other methods described in the following paragraphs must be used.

Private systems (open well or tube)

- Water from these sources, with adequate chlorination as necessary, can be connected to a distribution system or hauled to the points of consumption.

Springs and wells (non-private)

- Ground water originating from deep aquifers (such as is obtained from deep wells and certain springs) will be free from contamination if certain simple protective measures are taken.

- When springs are used as a source of water supply for a disaster area, careful attention must be paid to geological formations. Limestone and certain rocks are liable to have holes and cracks, especially after an earthquake, that may lead to the contamination of ground water.

- A sanitary survey of the area surrounding a well site or spring is of utmost importance. This survey, which should be carried out by a qualified professional environmental health worker, should provide information on sources of contamination, geological structures (with particular reference to overlying soil and rock formations), quality and quantity of ground water, direction of flow, etc.

- The well selected as a source of water, should be at least 30 m away from any potential source of contamination, and should be located higher than all such sources. The upper portion of the well must be protected by an external impervious casing, extending at least 3 in below and 30 cm above ground level. The casing should be surrounded by a concrete platform at least I m wide, that slopes, to allow drainage away from the well; it should connect to a drain that will carry the spilled water away. The opening for drop pipes should be sealed to prevent outside water from entering the well. The rim of manholes should project at least 8 cm above the surrounding surface, and the manhole cover must overlap this rim.

- Immediately after construction or repair. the well should be disinfected. First the casing or lining should be washed, and scrubbed with strong chlorine solution containing, 100mg of available chlorine per litre. A stronger solution is then added to produce a concentration of 50-100 mg/litre in the water stored in the well. After adequate agitation, the well -water is left to stand for at least 12 hours, then pumped out. The well is then allowed to refill. When the residual chlorine of the water drops below I mg/litre the water may be used.

- Most of what is stated above applies also to the location and protection of springs. The following points may be added:

  - The collection installation should be so built as to prevent the entrance of light.
  - The overflow should be so located as to prevent the entrance of surface water at times of heavy rainfall.
  - The manhole cover and gates should be locked.
  - Before using the water, the collection chamber should be disinfected with a chlorine solution.
  - An area within a radius of 50 in around the spring should be fenced off to prevent ground surface contamination.

Surface water

- Surface water should be used as a source of water supply only as a last resort.

- Measures should be taken to protect the watershed from pollution by animals and people. As it is usually difficult to enforce control regulations, the point of intake for water supply should be located above any tributary carrying grossly contaminated water. The pump intake should be screened and placed so that it will not take in mud from the stream bed or floating debris. The device can be something extremely simple, such as a perforated drum fixed in the middle of the stream.

Treatment

- Water should be tested for the presence of Escherichia coli and unsafe concentrations of nitrate as soon as possible. Detection of E. coli indicates contamination by human waste and therefore requires immediate protective and corrective measures.
- Monitoring of water quality should be restored or initiated immediately. During the disasters, daily determination of the chlorine residual in public water supplies is sufficient.

Disinfection

- Chlorine and chlorine-liberating compounds are the most common disinfectants. Chlorine compounds for water disinfection are usually available in three forms:

  - Chlorinated lime or bleaching powder, which has 25 % by weight of available chlorine when fresh. Its strength should always be checked before use.

  - Calcium hypochlorite, a more stable compound, sold under various proprietary names. This compound contains 70 % by weight of available chlorine. If properly stored in tight containers and in a dark cool place, it preserves its chlorine content for a considerable period.

  - Sodium hypochlorite, usually sold as a solution of approximately 5 % strength under a variety of proprietary names. Its use in water disinfection is limited to small quantities under special circumstances.

Methods of chlorination

Gas chlorinators

- These machines draw chlorine gas from a cylinder containing liquid chlorine, mix it in water and inject it into the supply pipe. Mobile gas chlorinators are made for field use.

Hypochlorinators

- These are less heavy than gas chlorinators and more adaptable to emergency disinfection. Generally, they use a solution of calcium hypochlorite or chlorinated lime in water and dis charge it into a water pipe or reservoir. They can be driven by electric motors or petrol engines and their output can be adjusted.

- Hypochlorinators are small and easy to install. They consist usually of a diaphragm pump and standard accessories, including one or more rubber-lined .solution tanks, and a chlorine residuar testing set. The usual strength of the solution is 0. 1 %, and it seldom rises above 0.5%.

The Batch Method

- In the absence of chlorinators, Water is disinfected by the batch method. This method is more likely to be used in emergencies. It involves applying a predetermined volume of chlorine solution of known strength to a fixed volume of water by means of some gravity arrangement. The strength of the batch solution should not be more than 0.65 % of chlorine by weight, as this is about the limit of solubility of chlorine at ordinary temperatures.

For example, 10 g of ordinary bleaching powder (25 % strength) dissolved in 5 litres of water gives a stock solution of 500 mg/litre. For disinfection of drinking water, one volume of the stock solution added to 100 volumes of water gives a concentration of 5 mg/litre. If after 30 minutes contact the chlorine residual is more than 0.5 mg/litre, this dosage could be reduced.

- After the necessary contact period, excess chlorine can be removed to improve the taste by such chemicals as sulpher dioxide, activated carbon, or sodium thiosulphate. The first two are suitable for permanent installations, whereas sodium thiosulphate is more suitable for use in emergency chlorination. One tablet containing 0.5 g of anhydrous sodium thiosulphate will remove 1 mg/litre of chlorine from 500 litres of water.

Continuous Chlorination

- This method, in which porous containers of calcium hypochlorite or bleaching powder are immersed in water, is used mainly for wells and springs but is also applicable to other types of water supply. A free residual chlorine level of 0.7 mg/litre should be maintained in water, treated for emergency distribution. A slight taste and odour of chlorine after half an hour gives an indication that chlorination is adequate. In flooded areas where the water distribution system is still operating, higher chlorine residuals should be maintained. Occasionally, an unpleasant taste develops from the reaction of chlorine with phenolic or other organic compounds. This taste should be accepted, as it is an indication of safe disinfection.

Coagulation-Disinfection

- Removal of the organic matter greatly lessens the amount of chlorine needed for disinfection. There are many factors that govern the coagulation process. These include:

1. Hydrogen-ion concentration. The optimum pH value for coagulation is the value that provides the best floe formation and settling. The pH value of water changes when coagulants are used and has to be adjusted to its optimum value by the addition of alkalis or acids.

2. Mixing. Coagulants must be thoroughly mixed with the water to give satisfactory results. This may be accomplished by (a) pump action, whereby the coagulant solution is added to the suction pipe of the pump and the pump does the mixing; (b) the drip-bottle method, i.e., hanging a drip-bottle over the discharge pipe or hose of raw water that feeds the tank and letting the coagulant solution drip on to the water Jet; or (c) dissolution, i.e., allowing the discharge of raw water to splash on to a basket containing solid coagulant.

3. Coagulant dosage. The amount of coagulant and chemicals required to adjust the pH value of water may be calculated when the pH and the type of alkalinity are known. However, optimum dosage for a given water may be determined approximately using the jar test.

Coagulation-Filtration-Disinfection

- In this method filtration is added to the procedures described above. If temporary reservoirs can be arranged, it is preferable to let the water settle before filtering it. In mobile purification units, however, the water is filtered through a pressure filter without settling. They usually have a capacity of 4000-7000 litres per hour, and consist essentially of:

  - A centrifugal pump directly coupled to a gasoline engine
  - A filter (pressure, rapid sand filter)
  - A hypochlorinator
  - Cemical solution tanks (one for alum and one for soda ash)
  - A chlorine solution tank
  - Hose adapters
  - Valves (pump suction, inlet, drain, air release, outlet, flow control, etc.) and
  - A tool box. Instructions in the manuals supplied with such units must be followed.

Filtration-Disinfection

In this method water is mixed with diatomaceous earth, then passed through the filter unit in which filtering partitions (septa) are installed. Mobile purification units using this process have been produced with capacities up to 50,000 litres per hour. They consist essentially of:

- A centrifugal pump driven by a rope-started gasoline engine
- A filter (diatomite)
- A hypochiorinator
- A slurry feeder and an air compressor
- A precoat and recirculating tank A chlorine solution tank
- Hose adapters
- Valves (pump suction, inlet,- drain, outlet, flow control, air release, etc.) and
- A tool box. Instructions in the manuals supplied with such units must be followed.

Physical protection

- In disaster situations, physical protection of water supplies for use, is a major consideration.In addition to such barriers as walls and fences, guards may be necessary to prevent mobs from overrunning and damaging treatment units, pumping stations, tankers, distribution stations, and temporary collection facilities. Intake structures, wells, and springs should also be protected against misuse. The character and extent of such protection will depend on the local situation.

Ice supply

- Required ice should be supplied from a commercial manufacturing plant where it is made from safe water and where sanitary regulations are observed.

- It should be distributed in trucks designed for the purpose, equipped with tools for the safe handling of ice.

After drinking water is secured within stricken areas, making water available for domestic uses (such as cleaning and washing) should be considered.

11.3.2 Stockpile of Equipment and Supplies

A tentative list of sanitation equipment and supplies required to satisfy the needs of I 0,000 people is given below for guidance. The relief body and governmental departments concerned with relief work in each country should make a rational appraisal of their needs. The equipment and supplies may be either stockpiled in one place or distributed to several regions with adequate provision for their immediate transfer froni one region to another in the event of disaster. This is only a sample list. This can be modified after a need assessment.

Item	*Quantity*
For Water supply	
Mobile chlorinator, mounted on truck or trailer, with 2 liquid chlorine cylinders	1
Mobile hypochlorinator, mounted on truck or trailer, with solution tanks, hose and accessories	5
Mobile water purification unit, capacity 200-250 litres/mm	4
Mobile workshop or repair unit: including repair and pipe laying tools, fittings, jointing materials, excavation tools, winch, pipe wrenches, valves, hose, welding equipment and materials, boots, working gloves, goggles, etc.	1
Tank trucks for water, capacity 7 m^3	10
Portable elevated storage tanks with supporting elements and accessories, easy to assemble, capacity 10-20 m^3	5 - 10
Well-driving equipment and well points	2 sets
Hand-operated pumps for water, capacity 15 -20 litres/min	100
Electric or diesel -driven pumps, capacity 200-250 litres/min	4
Pipes (cast iron, galvanized, asbestos cement), diameter 1.25 -10 cm, with valves and fittings	a*
Chlorinated lime (25-30 %), stored in a cool and dry place and renewed every 6 months	10-20 tons
Calcium hypochlorite (60-70 %), in powder or granule form, stored in a cool and dry place and remiewed every 2 years	5 - 10 tons

Alum, ferric chloride and other chemicals for water treatment Masonry tools, complete	2 - 5 tons 2 - 5 tons
Carpentry tools, complete	2 - 5 tons
Truck-mounted generators	2
For waste water, sewage and excreta disposal	
Mobile mud pump	2 - 5
Sludge pump (non-clogging diaphragm or other type)	2 - 5
Sludge tank trucks, capacity 7 ml	5
Mobile repair shop with necessary tools and equipment, masks, boots, working gloves, excavation tools, etc	1 unit
Pipes (cast iron, asbestos cement, concrete), witll joining materials and equipment, diameter 10-30 cm	a*
Moulds (iron or wood) for concrete pipes and slabs	10-20 sets
Timber. Bamboo mats, nails, etc.	a*

a* Quantity depends on availability and on distribution points

11.3.3 The Sanitarian's equipment (A sample list. Actual list has to be prepared after a need assessment)

Item	Quantity
Work equipment	1
Comparator for chlorine residual and pH, together with orthotolidine and pH indicator solutions	1
Thermometer, 0-100, C. with protective casing	1
Tape measure, cloth or metal, 30 m graduated in m and cm	1
Tape measure, metal, pocket size, 2 m	1
Standard housellold measuring cup, 500 ml	1
Clip board	1
Flashlight (pocket type) with spare batteries and bulbs	1
Magnifying glass (pocket type), 5x to 20x	1
Collection vials	1 dozen
Felt-tip ink marking pen	1
Pocket compass, with plastic case	1
Plumb rod	1
Spirit level	1
Mosquito larvae dipper	1
Aspirator with stoppered tubes, for collecting mosquitoes	1
Kit for membrane filter for water testing (complete)	1
Water pressure gauge, positive and negative pressure	1
Hand level	1
Rapid phosphate determination kit	1
Drawing board and instruments	1

11.3.4 Preparedness Checklist for NWS&DB

(to be filled in by the department head and submitted to the district secretary before May and November every year)

Preparedness Measures Taken	Details/Remarks
The department is familiar with disaster response plan and disaster response procedures are clearly defined Orientation and training for disaster response plan and procedures undertaken Special skills required during emergency operations imparted to the officials and the staff.	
Reviewed and updated • Precautionary measures and procedures • the precautions to be taken to protect equipment • the post-disaster procedures to be followed.	
Adequate warning mechanisms for informing people to Store an emergency supply of drinking water have been developed.	
Procedures established for the emergency distribution of water if existing supply is disrupted.	
An officer has been designated as Nodal Officer for Disaster Management	
Sources of materials required for response operations have been identified.	

Reported By:
Designation:
Signature :
Date :

11.3.5 Checklist for NWS&DB

(to be filled in by the OFFICER-IN-CHARGE and submitted to district control room and the department head)

Actions Taken	Y/N	Details/ Remarks
Radio communications established with • Emergency Operations Centre • Divisional Secretary • District control room • Departmental and field offices within the division.		
One officer appointed as "OFFICER-IN-CHARGE — Water Supply"		
Ensured that the hospital storage tank is full and the hospital is conserving water		
Informed people to store emergency supply of drinking water		
Continuous monitoring carried out for • Wells • Intake structures • Pumping stations • Buildings above ground • Pumping mains and • The treatment plant.		
Standby diesel pumps or generators installed in damage proof buildings.		
Provision for standby water supply made.		
Procedures were established for the emergency distribution of water if existing supply was disrupted.		

SECTION XII

OPERATING PROCEDURE GUIDELINES FOR PROVINCIAL PUBLIC WORKS DEPARTMENT

12. OPERATING PROCEDURE GUIDELINES FOR PROVINCIAL PWD

12.1 Planning Assumptions

- There is no substitute for maintaining standards of services and regular maintenance during normal times. This affects the response of the department to any disaster situation.

- Operating procedures for mobilising community participation during various stages of disaster management have been given in section on "Areas of Community Participation". Refer Section 15.5 of EMRP Part I. The department is required to study these and adopt appropriate measures to ensure that community participates substantially.

- For effective preparedness, the department must have a disaster response plan or disaster response procedures clearly defined-in order to avoid confusion, improve efficiency in cost and time.

- Orientation and training for disaster response plan and procedures accompanied by simulated exercises will keep the department prepared for such eventualities. Special skills required during emergency operations need to be imparted to the officials and the staff. Select personnel can be deputed for training as "NODAL OFFICER - PWD" and "Officer-in-charge PWD" at the state and district level respectively.

- To the extent possible, preventive measures as recommended in the preparedness and mitigation document of EMRP should be undertaken to improve departmental. capacity to respond to a disaster.

Action Plan Objective in a Disaster Situation

- Restoration of roads to their normal condition.
- Repair/reconstruction of public utilities and buildings.

12.2 Activities on Receipt of Warning or Activation of District EMRP

- Within the affected district/electoral ward, all available personnel will be made available to the District Disaster Manager. If more personnel are required, then out-of-station officers or those on leave may be recalled.

- All personnel required for Disaster Management should work under tlle overall supervision and guidance of District Disaster Manager.

- Establish radio communications with Emergemlcy Operations Centre, divisional Secretary, district control room and your departmental offices within the division.

- All district level officials of the department would be asked to report to the collector,
- Appoint one officer as "NODAL OFFICER-PWD" at the state level.

- Appoint one officer as "Officer-in-Charge — PWD" at the district level.
- The "Officer-in-Charge -PWD" will be responsible for mobilising staff and volunteers to clear the roads in his section, should a disaster strike.
- The "NODAL OFFICER-PWD" should be familiar with pre-disaster precautions and post-disaster procedures for road clearing and for defining safe evacuation routes where necessary.
- All officers (technical officers) should be notified and should meet tlle staff to review emergency procedures.
- Review and update precautionary measures and procedures, and review witll staff the precautions that have been taken to protect equipment, and the post-disaster procedures to be followed.
- Vehicles should be inspected, fuel tanks filled amld batteries and electrical wiring covered as necessary.
- Extra transport vehicles should be dispatched from headquarters and stationed at safe strategic spots along routes likely to be affected.
- Heavy equipments, such as front-end loaders, should be moved from areas likely to be damaged and secured in a safe place.
- Inspect all roads, road bridges by a bridge engineer, including underwater inspection of foundations and piers. A full check should be made on all concrete and steelworks.
- Inspect all buildings and structures of the state government (including hospital buildings) by a senior engineer and identify structures which are endangered by the impending disaster.
- Emergency tool kits should be assembled for each division, and should include:

  1. Crosscut saws
  2. Axes
  3. Power chain saw with extra fuel, oil
  4. Sharpening files
  5. Chains and tightening wrenches
  6. Pulley block with chain and rope.

- The designation of routes strategic to evacuation and relief should be identified and marked, in close coordination with police and district control room.
- Establish a priority listing of roads which will be opened first. Among. the most important are the roads to hospitals and main trunk routes.
- Give priority attention to urgent repair works that need to be undertaken in disaster affected areas.

- Work under construction should be ,secured with ropes, sandbags, and covered with tarpaulins if necessary.
- Emergency inspection by mechanical engineer of all plant and equipment in the district workshops.
- If people are evacuating an area, the evacuation routes should be checked and people assisted.
- Identify locations for setting up transit and relief camps, feeding centres and quantity of construction materials and inform DCR accordingly.

12.2.1 Relief and Rehabilitation

- All work teams should be issued two-way communication link.
- Provide a work team carrying emergency tool kits, depending on the nature of the disaster, essential equipments such as

  - Towing vehicles
  - Earth moving equipments
  - Cranes etc.

- Each unit should mobilise a farm tractor with chain, cables and a buffer stock of fuel.
- Adequate road signs should be installed to guide and assist the drivers.
- Begin clearing roads. Assemble casual labourers to work with experienced staff and divide into workgangs.
- Coordinate with Building Department and RDA
- Mobilise community assistance for road clearimlg by contacting community organisations.
- Undertake cleaning of ditches grass cutting, burning or removal of debris, and the cutting of dangerous trees along the roadside in the affected area through maintenance engineer's staff
- Undertake repair of all paved and unpaved road surfaces including edge metalling, pothole patching and any failure of surface, foundations in the affected areas by maintenance engineer's staff and keep monitoring their conditions.
- Undertake construction of temporary roads to serve as access to temporary transit and relief camps, and medical facilities for disaster victims.
- As per the decisions of the district control room, undertake construction of temporary structures

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required, for organising relief work and construction of relief camps, feeding centres, medical facilities, cattle camps and SOC/s.

- An up-to-date report of all damage and repairs should be kept in the district office report book and communicate the same to the district control room.

- If possible, a review of the extent of damage (by helicopter) should be arranged for the field Officer-in-Charge, in order to dispatch most efficiently road clearing crews, and determine the equipments needed.

12.3 Standards for Relief Camps

12.3.1 Tent Camps

- The layout of the site should meet the following specifications:
    1. 3-4 hectares of land 1000 persons
    2. Roads of 10 meters width
    3. Minimum distance between edge of roads and tents to be 2 mtrs
    4. Minimum distance between tents to be 8 meters
    5. Minimum floor area/tent to be 3 square meters per person.

- Water distribution in camp sites should consist of
    1. Minimum capacity of tanks to be 200 liters
    2. Minimum capacity/capita to be 15 is liters/day
    3. Maximum distance of tanks from farthest tent to be 100 meters.

- Solid waste disposal containers in tent camps should be
    1. Waterproof
    2. Insect-proof and
    3. Rodent-proof
    4. The waste should be covered tigiltly with a plastic or metallic lid

- The capacities of solid waste units should be, 1 litre/4-8 tents; or 50-100 liters/25-50 persons.
- Excreta and liquid waste should be disposed in bore-hoied or deep trench latrines in tent camps. Specifications for these are:

    1. 30-50 meters from tents
    2. 1 seat provided/10 persons.
    3. Modified soakage pits should be used for waste water by replacing layers of earth and small pebbles with layers of straw, grass or small twigs. The straw needs to be re moved on a daily basis and burned.

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4. Washing should take place with an ablution bench that is:
   - 3 meters in length
   - Double-sided
   - 2/100 persons.

12.3.2 Buildings

Buildings used to accommodate victims during relief should provide the following:

1. Minimum floor area of 3.5 sq.meters/person
2. Minimum air space of 10 sq.meters/person
3. Minimum air circulation of 30 cubic meters/person/hour and
4. There should be separate washing blocks for men and women.
5. Washing facilities to be provided are:
   - 1 hand basin/10 persons or
   - 1 wash bench of 4-5 meters/100 persons and 1 shower head/50 persons in temperate climates
   - 1 shower head/30 persons in hot climates.

6. Toilet accommodations in buildings housing displaced persons, should meet these requirements:
   - 1 seat/25 women and
   - 1 seat plus 1 urinal/35 men
   - Maximum distance from building of 50 meters.

7. Refuse containers are to be plastic or metallic and should have closed lids. To be provided as follows :
   - one container of 50-100 liters capacity/25-50 persons

12.3.3 Preparedness Checklist for PWD

(to be filled in by the department llead and submitted to the district secretary before May and November every year)

Preparedness Measures taken	Details/Remarks
The department is familiar with disaster response plan and disaster response procedures are clearly defined	
Orientation and traimling for disaster response plan and procedures undertaken	
Special skills required during emergency operations imparted to the officials and the staff	
Reviewed and updated : • Precautiomlary measures and procedures • The precautions to be taken to protect equipment • The post-disaster procedures to be followed	
All officers are familiar with pre-disaster precautions and post-disaster procedures for road clearing and for defining safe evacuation routes where necessary.	
An officer llas been designated as Nodal Officer for Disaster Management	
Sources of materials required for response operations have been identified	

Reported By:

Designation:

Signature :

Date :

12.3.4 Checklist for Public Works Department

(to be filled in by OFFICER-IN-CHARGE and submitted to district control room and the department head)

Action taken	Y/N	Details/Remarks
Radio Communication established with • Emergency Operations Centre • Divisional Secretary • District control room and • Departmental officers within the division		
An officer appointed as "OFFICER-IN-CHARGE-PWD"		
Extra transport vehicles dispatched from headquarters		
Work under construction secured		
Heavy equipment, such as front-end loaders, have been secured -		
All work teams issued two-way communication link		
Inspection and emergency repairs, if necessary, carried out for all buildings and structures of the central government (including hospital buildings)		
• Roads,		
• Road bridges		
• Underwater inspection of foundations and piers. • Concrete and steelworks.		
Inspection and emergency repairs, if necessary, carried out for all buildings and streuctures of the central government (including hospital buildings)		
Emergency inspection by mechanical engineer of all plant and equipment in the District workshops carried out.		
Emergency tool kits assembled for each division		
Routes strategic to evacuation and relief marked		
Adequate road signs installed to guide and assist the • Earth moving equipments • Cranes etc made available. Begin clearing roads.		
Community assistance mobilised for road clearing		

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Community assistance mobilised for road clearing		
The following activities were undertaken • Cleaning of ditches • Grass cutting • Burning or removal of debris and • Cutting of dangerous trees along the roadside in the affected area.		
The following repair works were undertaken for • All paved and unpaved road surfaces • Pothole patching and • Any failure of surface foundations in the affected areas.		
Construction work undertaken for temporary roads to serve as access to • Temporary transit camps • Relief camps • Medical centres		
Construction work undertaken for temporary structures required for organising relief work such as • Relief camps • Feeding centres • Medical facilities • Cattle camps and • SOC/s.		
An up-to-date report of all damage and repairs keep in the district office report book.		

Reported By:

Designation:

Signature :

Date :

13. OPERATING PROCEDURE GUIDELINES FOR TELECOMMUNICATION

13.1 Planning Assumptions

- There is no substitute for maintaining standards of services and regular maintenance during normal times. This affects the response of the department to any disaster situation.

- Operating Procedures for mobilising community participation during various stages of disaster management have been given in section on "Areas of Community Participation". Refer Section 15.5 of EMRP Part I. The department is required to study these and adopt appropriate measures to ensure that community participates substantially.

- For effective preparedness, the department must have a disaster response plan or disaster response procedures clearly defined in order to avoid confusion, improve efficiency in cost and time.

- Orientation and training for disaster response plan and procedures accompanied by simulated exercises will keep the department prepared for such eventualities. Special skills required during emergency operations need to be imparted to the officials and the staff.

- To the extent possible, preventive measures as recommended in the preparedness and mitigation document of EMRP should be undertaken to improve departmental capacity, to respond to a disaster.

Action Plan Objective in a Disaster Situation

- Restoration of communication lines.

13.2 Activities on Receipt of Warning or Activation of District EMRP

- Establish radio communications with Emergency Operations Centre, divisional secretary, district control room and your departmental offices within the division.

- All personnel required for Disaster Management should work under the overall supervision and guidance of District Disaster Manager.

- Appoint one officer as "NODAL OFFICER - Communication" at the state level.

- Appoint one officer as "Officer-in-Charge - Communication" at the district level.

- Review and update precautionary measures and procedures, and review with staff the precautions that have been taken to protect equipments, and the post-disaster procedures to be followed.
- Ensure that all staff are aware of recommended precautions to protect life and personal property.

SECTION XIII

OPERATING PROCEDURE GUIDELINES FOR TELECOMMUNICATIONS

- Fill department vehicles with fuel and park them in a protected area.

- Inspect and repair all

  - Radio masts
  - Anchorages
  - Foundations and cables
  - Poles
  - Overhead circuits.

- Upgrade outside equipment to withstand wind speeds and other adverse weather conditions.

- Designate at each exchange a member of staff (such as an inspector) as a disaster officer.

- He must live in the area, be instructed in the likely effects of a disaster, and should be knowledgeable about necessary precautions and post-disaster procedures.

- House all electrical and switching equipment in damage-proof buildings.

- Store batteries clear of areas likely to be affected.

- All storage batteries should be charged fully during an alert, for use in the post disaster period, when the electricity supply is not likely to be available.

- Establish an emergency tool kit at each exchange, including:

  a cable cutters
  b. Cutting pliers
  c. Spanners
  d. Ropes
  e. Ratchet tension
  f. Crosscut saws
  g. Pulley blocks with rope
  h. Hand gloves

- Check emergency tool kits and assemble any additional equipment needed.

- Provide at least two tarpaulins in every building with radio equipment, teleprinter equipment, and manual and auto-exchanges.

- Install standby generators in all exchange buildings for the recharging of batteries.

- Secure all outside equipment to the extent possible.

- Arrange for the transport of additional vehicles for inspectors.
- Assemble equipment and emergency stocks of materials likely to be necessary for restoration of services.
- Arrange emergency standby cable for dispatch to the affected area immediately after the disaster.
- Remove fuses from the lines and disconnect the power supplies to equipment in disaster areas, if necessary.

13.2.1 Relief and Rehabilitation

Field priorities

- Give priority and concentrate on repairs and normalisation of communication in disaster areas.
- Identify the public services within the affected community for which communication links are most vital, and establish a temporary service, if feasible.
- Carry out an assessment of overall damage, listing specifically:

  - Overhead route damage (in miles/kilometers).
  - Cable damage (in yards/meters).
  - Specific equipment damaged.

- Establish a temporary communication facility, wherever necessary through mobile exchanges, on priority for use by

  - District control room
  - Non-officials (Central govt. and provincial govt and PC, MPs. Mayors and council members, etc)
  - Transit. and relief camps
  - Cattle camps
  - Medical centres
  - Site operations centre and
  - Temporary establishment of all government and non-government agencies engaged in relief activities.

- Establish a temporary communication facility for use by the public

- Identify requirements, including:

  - Manpower needed
  - Vehicles needed
  - Materials and equipments needed.

- Begin restoration by removing and salvaging wires and poles from the roadways through recruited casual labourers.

- Establish a secure storage area for incoming.equipments and salvaged materials.

- Carry out temporary building repairs for new equipments.

- Report all activities to head office

Head Office priorities

- Dispatch standby technical work groups to the affected area, ensuring that they take with them adequate food, bedding, tents, and tools.
- Dispatch additional vehicles, emergency equipment, and stocks for restoration of the affected area.

13.2.2 Preparedness Checklist for Telecommunications

(to be filled in by the department head and submitted to the district secretary before May and November every year)

Preparedness Measures Taken	Y/N	Details/Remarks
The department is familiar with disaster response plan and disaster response procedures are clearly defined.		
Orientation and training for disaster response plan and procedures undertaken Special skills required during emergency operations imparted to the officials and the staff.		
Reviewed and updated • Precautionary measures and procedures • Precautions to be taken to protect equipments • Post-disaster procedures to be followed		
All staff are aware of recommended precautions to protect life and personal property.		
An officer has been designated as Nodal Officer for Disaster Management		
Sources of materials required for response operations have been identified		

Reported By:

Designation:

Signature :

Date :

SECTION XIV

OPERATING PROCEDURE GUIDELINES FOR ROAD DEVELOPMENT AUTHORITY & TRANSPORT AUTHORITIES

14. OPERATING PROCEDURE GUIDELINES FOR RDA & TRANSPORT AUTHORITIES

14.1 Planning Assumptions

- For effective preparedness, the department must have a disaster response plan or disaster response procedures, clearly defined, in order to avoid confusion, improve efficiency in cost and time.

- Operating procedures for mobilising community participation during various stages of disaster management have been given in section on "Areas of Community Participation". Refer Section 15.5 of EMRP Part I. The department is required to study these and adopt appropriate measures to ensure that community participates substantially.

- Orientation and training for disaster response plan and procedures accompanied by simulated exercises will keep the department prepared for such eventualities. Special skills required during emergency operations need to be imparted to the officials and the staff.

- To the extent possible, preventive measures as recommended in the preparedness and mitigation document of ERMP, should be undertaken to improve departmental capacity to respond to a disaster.

Action Plan Objective in a Disaster Situation

- Restoration of roads
- Ensuring smooth vehicle line and movement and relief materials.

14.2 Activities on Receipt of Warning or Activation of District EMRP

- Establish radio communications with Emergency Operations Centre, Divisional commissioner, district control room and your departmental offices within the division.

- Appoint one officer as "NODAL OFFICER-Transport Services" at the provincial level by RDA.

- Appoint one officer as "Officer-in-Charge — Transport Services" at the district level by RDA.

- Review and update precautionary measures and procedures. and review with staff, the precautions that have been taken to protect equipments, and the post-disaster procedures to be followed.

- Officers should ensure that all staff are well aware of precautions to be taken to protect their own lives and personal property.

- Fill department vehicles with fuel and park them in a protected area.

- Plans should be finalised for sending auxiliary staff and repairmen into the affected areas to assist local staff.

- Maintenance and repairmen should be instructed to assemble and check repair equipments.
- Contingency plans should be established for providing food and emergency shelter for local staff, and for auxiliary staff being sent into the affected area.
- Arrangements have to be made to assist the increased volume of traffic.
- A schedule, for the departure of the last buses prior to the disaster, should be developed with the transport authorities and SLCTB
- An evaluation of the number and location of sidings and passing places should be carried out, to ensure that an increased number of private and SLCTB buses can operate in an emergency situation.
- Emergency transport procedures, should be developed. All staff should be well trained to implement the emergency systems.
- Within the emergency operating framework, emergency procedures should be developed to provide the bus depots with authority, to dispatch or hold bus services and take other emergency decisions in a disaster threatening situation.
- Systems should be developed for increasing the ability to carry increased number of passengers in an emergency situation.
- If halting or termination of buses are intended, arrangements for alternate means of transport and availability of adequate food supplies must be ensured.
- Arrange for transport to the affected area
  - Tractor-shovel
  - Tripper, and
  - Auxiliary jeeps.
- All new construction and repair activities should be halted, and the work secured, as far as possible with sandbags, tarpaulins, etc
- Polythene should be acquired for the protection of freight and equipments.
- All perishable and breakable items should be loaded into lorries and padlocked.
- For any coaches, buses remaining in the area, shutters should be pulled down and doors closed.
- Reserve stocks of fuel should be checked.
- Inspection of all bridges, by a bridge engineer including an underwater survey of foundations, piers and abutments. A full check on all concrete and steelworks should be included, and any repairs needed should be promptly carried out.

- Continuous regular weeding. cleaning of ditches -and the burning and removal of debris should be carried out by the maintenance engineers staff.

- Continuous inspection and repair by maintenance engineer of all
  - Roads
  - Ballasting.
  - Cess damage
  - Fish plates and
  - Holding down bolts.

14.2.1 Relief and Rehabilitation

- Emergency repairs of roads if affected, must be carried out.

- A system for priority transport of relief goods and personnel must be developed.

- Relief goods may be considered for exemption from freight charges.

- All bus depots should be quipped with emergency communication equipments.
- Every work gang should have tools which will be needed in an emergency. This should include crosscut saws, axes and rope. Each district tree - cutters gang should have a chain saw.
- Raincoats, caps and gumboots should be made available to workgangs in an emergency.

SECTION XV

STANDARDS FOR RELIEF WORK, TRANSIT AND RELIEF CAMPS AND FEEDING CENTRES

15.1. STANDARDS FOR RELIEF WORK, TRANSIT AND RELIEF CAMPS AND FEEDING CENTRES.

15.1.1 Standards for Food For Marooned Persons

- A senior medical officer should accompany the rescue team along with required medical kit and ensure priority of shifting seriously injured, or those requiring immediate medical attention. The procedure for tagging should be followed.
- Provision for both infants and adults must be included in the food supplies.
- Only non-perishable, ready to eat, and long-lasting food items should be included.
- Food must be packed in small packets for individual use.
- Drinking water should be packed in one litre bottles/plastic bags.
- Air-dropping should be done from minimum height with ropes and hooks to ensure that supplies reach the people with minimum damage.
- As far as possible, supplies should be dropped from stationary helicopters, and not when they are on the move.
- Use of boats should be preferred over helicopters, for supplies to marooned people.

15.1.2 Storage

- Keep food in the driest and coolest spot in the store - a dark area if possible.
- Keep food covered at all times.
- Wherever necessary, store food items in plastic bags and keep in tight containers to prevent from moisture.
- Open food boxes and cans carefully, so that they can be closed tightly after each use.
- Store packages susceptible to pests, like open packages of sugar, in screw-top jars or airtight cans.
- Store wheat, rice, dhal and edible oil in sealed containers.
- Store powdered milk in packed cans for long term storage.
- Keep salt and spices air-tight in their original packages.

- Inspect all items daily, to make sure that the stocks are in good condition. and that there are no signs of degradation.
- Post guards at warehouses and supply depots, to prevent looting.
- Stimulate community action, to clear roads to warehouses and stores.
- Separate the damaged stocks from other stocks, to protect from odour and damage.
- Maintain food stock condition register, and report to appropriate authorities.
- Arrange for immediate disposal of all unusable food items.
- Maintain prompt transport schedules for delivery of perishable food stocks.
- Store kerosene and other combustible items, including pest control chemicals, in a separate room, away from food stores.

15.1.3 Cooking

- Food should be cooked using firewood, or a charcoal grill or kerosene stove, preferably out doors.
- Canned foods should be heated in a different container and not in the supply can.
- Follow the checklists for feeding centres supplying cooked food, to ensure food sanitation.

15.1.4 Standard for assessment (This is a sample list. This may be upgraded to suit the situation)

Staff		Required Number for	
		1000 persons	2000 persons
Cooks	Food preparation	2	3
Assistants		4	6
Kitchen helpers		10	15
Servers	Food distribution	6	10
Queue controllers		4	6
Hygiene	(washing up/garbage disposal)	4	6
Total		30	46

15.2 Standards for Potable Water

- Warn people of the hazard, of drinking contaminated water. Such sources should be identified and informed to the people.
- Sources located in the vicinity of sewage outfalls, chemical plants, solid waste disposal fields, abandoned mines, and other hazardous places should be considered suspect
- Stinking, highly coloured, or highly polluted water should be avoided.
- Water suspected of contamination by human or chemical waste should not be used until it has undergone laboratory analysis.
- Wells which have been contaminated by disaster should be emptied immediately.
- It is important that all debris in the wells, such as leaves, sticks, silt and mud, etc. be removed after the water is pumped or dipped out.
- Topical chlorinated lime (TCL) or bleaching powder, should be added to all wells to avoid further contamination.
- The post-disaster emphasis for the provision of drinking water, should be on the restoration of local water sources; rather than on transporting water from outside the area.

15.2.1 Requirements

Minimum water requirements for drinking, cooking, and basic cleanliness are

(l) Field hospitals and first aid stations: 40-60 litres per person per day.
(2) Mass feeding centres: 20-30 litres per person per day.
(3) Temporary shelters and camps: 15-20 litres per person per day.
(4) During Evacuation - 6 litres per person per day.

[With no restrictions, use of water may approach 100 litres per person per day].

15.2.2 Storage

- Emergency storage of water can be improvised in plastic containers, with capacity up to 10 m^3. Polyethylene containers erected in pits, dug to size, can provide upto 50 m3 storage capacity. If the purpose of storage is only to provide contact time after chlorination, the minimum capacity should be such as to secure contact for at least 30 minutes. The total storage capacity for water distribution should be equal to the amount required for 12-24 hours. Elevated tanks can be set up within a short, time by using drums, iron sheeting, or asbestos-cement tanks. Wooden poles, timber, or iron tubing can be used for the supports. In many countries, elevated storage tanks are manufactured, in standard sizes with all parts prefabricated. They can be transported and erected rapidly.

- In long-term relief camps. all reservoirs should be covered, primarily, for protection from sunlight and consequent growth of algae, which produce tastes in water, and secondarily; for protection from birds, insects, and dust. The roof may be made of asbestos-cement sheets or corrugated iron sheets. An overflow pipe should be provided, care being taken that the overflow water should not endanger the foundations. The inlet pipe will normally discharge at the top of the reservoir and be fitted with a float valve. The outlet pipe should be about 5 cm above the bottom of the tank. A small drain pipe should be installed flush with the bottom of the tank. and a manhole on the roof is necessary to permit cleaning, inspection and repair. Theopenings of vent pipes should be screened to keep out insects and small birds.

15.2.3 Distribution

- In most disasters, water is distributed from tankers, which may be provided by fire brigades,the army, dairies, beverage plants. or other sources. Each family may be issued with a water container, made of plastic or galvanized iron. A tanker with a storage tank (or tanks) at the site should be able to provide water for displaced persons. Environmental health workers are responsible for seeing that the tankers are filled from acceptable sources in a hygienic manner and chlorinated under their supervision.
- If there is a municipal distribution system within reasonable distance, it may be possible to extend this to a temporary camp, by means of light and quick-coupling steel or plastic pipes. In long-term camps, distribution pipes may be laid to feed water points.

- Water points usually have two or more taps, and one tap should be provided for every 100 persons. No shelter should be more than 100 in away from a water point.

15.3 Standards for Feeding Centres

- The location and layout of field centres for mass feeding should be selected and arranged in consultation

- Only potable water may be used in feeding premises. Where there is no piped supply, water must be transported. stored, and handled in a sanitary manner.

- Sufficient number of basins, each with soap. nail brush and a clean towel, must be provided exclusively for the use of food handlers.

- Separate washing place must be provided for washing all sorts of eating and cooking utensils.

- Before washing, any grease or food scraps on the utensils should be scraped into a refuse bin.

- Washed utensils should be disinfected by immersing in boiling water for 5 minutes.

- An alternative method of disinfecting washed utensils is, to immerse them in a sterilizing solution, preferably hot, of either chlorine (100 mg/litre for 30 seconds) or quaternary ammonium compounds (200 mg/litre for 2 mm).
- Wiping the utensils dry is unnecessary and undesirable.
- The baskets or trays being laid down for drying utensils must be in a dust-free place.
- Arrangements should be provided for washing all fruits and vegetables before cooking. The serving of raw vegetables and soft-skinned fruits should be forbidden.
- In special diet cases the vegetables and fruits must be thoroughly washed, immersed in a chlorine solution (100 mg/litre for 3 mm), and rinsed until the smell of chlorine disappears.
- Sanitation facility for the staff should be provided close to the mass feeding centre with adequate standards.
- Liquid wastes from kitchens should be disposed of by sanitary methods, such as a soakage pit or covered cesspool. A strainer must always be provided and properly maintained to prevent choking.
- Solid wastes from kitchens must be deposited immediately in garbage bins. No filled bins should remain in preparation and cooking areas, without being tightly covered, and should be removed outside for collection and disposal, after every cooking session.
- Basins, tables, chopping blocks, and all other furniture and equipments must be kept as clean as possible when in use, and thoroughly cleaned after each meal.
- Only food that is to be used the same day may be kept in the kitchen. Food not in the process of preparation or cooking, or which has already been prepared. must be kept in fly-proof containers.
- Where refrigeration facilities are non-existent or inadequate, perishable foods should be bought on a daily basis and cooked and served as soon as possible.
- No non-vegetarian food should be made available through feeding centres.
- Supplies of powdered milk, biscuits and other food items for infants must be arranged.
- Left-over food shouldn't be used/served for next meal.
- Condensed or powdered milk must be reconstituted with potable water only, and under the best possible sanitary conditions. If natural milk is available for infants and hospital patients,it must be boiled before use.
- An adequate supply of detergents. disinfectants, brushes, cloths, brooms, and other house keeping necessities must be provided to kitchen staff.

- Disposable (bio-degradable) plates. cups. etc. may be used in mass feeding tentres and especially when disaster victims are on the march.
- Common drinking cups must not be tolerated

15.4 Standards for Environmental Health Measures

15.4.1 During Search, Rescue and Evacuation

- There are very few sanitary measures that can be taken while people are being moved to transit or relief camps, and the journey should therefore be as short as possible. They should be told to take along as much food, water, and clothing as they will need.

- The relief or welfare authorities should be advised that, during this transitional period, only unperishable foods which do not require cooking should be distributed.

- It is very difficult to ensure sanitary excreta disposal while people are on the march, and not much can be done about refuse collection.

- At rest points, however, sanitation squads should bury excreta and solid wastes in holes or trenches at least 60 cm deep. After use, the hole or trench should be filled in with the excavated earth and trampled on.

- It may also be necessary to control body vermin by the application of insecticides.

15.4.2 Solid Waste disposal in the camps or in affected villages

15.4.2.1 Excreta disposal

Unsatisfactory disposal of exereta is common immediately after natural disasters. The measures applicable depend on the nature of the existing facilities.

I. Cities and towns with sewerage systems

- When a disaster occurs, sewerage and sewage treatment installations in cities and towns may be put out of service.

- Generally, any repairs made to sewer lines during the emergency should be of a permanent nature. However, temporary repairs may be necessary where a sewer line or manhole must be replaced quickly, to restore traffic on a main street. Asbestos-cement pipes,

wooden conduits or some other type of quick-coupling pipes should be used to expedite emergency repairs.

2. Temporary shelters and camps

Depending on the time that temporary shelters or camps are expected to be in use, excreta disposal installations of different types, and varying service life, must be provided. The area must be adequately lighted and the approach road clearly demarcated. The most suitable types are:

(a) Shallow trench latrines
(b) Deep-trench latrines
(c) Pit privies
(d) Borehole latrines
(e) Aqua (or septic) privies
(f) Urinals: and
(g) Mobile latrines.

As far as possible people must be discouraged from open defeaction

15.4.2.2 Community Latrines

- Attempts should be made to provide communal latrines with water, so that cleaning is practicable.
- Five seats should be provided for every 100 persons, in separate blocks for men and women.
- Latrines should be located downhill from any water source, and at least 15 m away from it.
- Where the groundwater is used for drinking or other purposes, the bottom of the latrine should be at least 1 .5 in above the ground-water table. In the presence of limestone formations and fissured rocks, additional precautions are necessary to protect sources of water supply.
- The site should be dry, well drained, and above flood level; the immediate surroundings of latrines should be cleared of all vegetation, wastes and debris.

Various types of excreta disposal installation are described briefly below:

1 5 s h a l l

- This is simply a trench dug with ordinary tools (picks and shovels). The trench is 30 cm wide and 90-150cm deep.
- Its length depends on the number of users: 3 - 3.5m are necessary for every 100 people.
- Separate trenches should be provided for men and women.

- The earth from the trench should be piled up at the side. Shovels should be left at the site, and people should be instructed to cover faeces with earth each time they use the latrine. However, these instructions may not be carried out, and it will be necessary for the sanitation squad to complete the work, twice a day, to keep the fly population and odour under control.

- It may be necessary to place lumber or boards along the sides of the trench, to provide for footing and to prevent the walls from caving in.

- Privacy may be secured by the use of brush, canvas, wood, or sheet-metal fencing.

- Water should be provided.

- The shallow trench is a rudimentary arrangement for a short period (up to one week). When the trench is filled to 30 cm below ground level, it must be covered with earth, heaped above ground level and compacted. If necessary, a new trench must be dug. Before a trench is abandoned, sanitation personnel should see that it is properly filled in.

15.4.2.4 Deep trench latrine

- This type of latrine is intended for camps of longer duration, from a few weeks to a few months.

- The trench is 1.8-2.5 in deep and 75-90 cm wide. The top of the trench is covered by a fly-proof floor.

- A squatting hole isprovided.

- A superstructure is built for privacy and protection.

- Other requirements are the same as for shallow trenches.

15.4.2.5 Bore-hole latrine

- In estuaries and places where the subsoil does not contain rock, this type of latrine offers a fast solution for exereta disposal in disasters.

- Mass production of concrete slabs for the latrine floor may be undertaken on the site.

15.4.2.6 Aqua (or septic) privy

- This type of privy consists essentially of a watertight tank (filled with water) in which exereta are discharged. stored and digested.

- It has been used with success in some long-term camps as a communal latrine.

- Aqua privies take rather a long time to construct, and are not recommended during disasters,except. perhaps, for field hospitals, first-aid stations, and mass feeding centres.

15.4.2.7 Urinals

- These may be provided in communal blocks of latrines for men to reduce the number of seats needed.
- One urinal space for 25 males is recommended.
- Odour from urinals can be kept under control by applying chlorine solution.

15.4.2.8 Mobile latrines

- Mobile latrines are tanks mounted on a truck or a rail wagon; they are used in post-disaster situations.
- They are necessary in disaster areas where the ground-water table is high
- Sanitation personnel are responsible for supervising the proper disposal of the tank contents and the washing, and disinfection of tanks after each emptying.

15.4.3 Miscellaneous installations

In temporary shelters and camps, communal facilities for maintaining personal cleanliness should be provided. These may include showers, washrooms, laundries, and disinfestation and disinfection rooms. They will help to prevent skin diseases and infestations, that lead to vector-borne diseases. Disinfection rooms are necessary for preventing the spread of. infectious diseases. Proper operation and maintenance of these services depend on constant supervision by sanitation personnel.

15.4.3.1 Baths and showers

- One bath should be provided for every 100 persons.
- Over-all consumption of water for bathing should be calculated on the basis of 30-35 litres per person per week.
- For both hygienic and economic reasons, proper arrangements should be made for the disposal of waste water from baths.
- People should be discouraged from using ponds, and stagnated water for baths for both sanitary and safety reasons.

15.4.3.2 Laundries

- In temporary encampments people may be expected to wash their clothes in plastic or iron tubs.
- One washing stand for every 100 persons is recommended.
- Proper drainage and soap traps should be provided for the waste water.

15.4.3.3 Disinfection and disinfestation

- Methods used in disinfection and disinfestation involve the use of chemical agents such as sulfur dioxide, phenol, and carbolic acid. Some of these agents are dangerous, and should only be used under expert supervision.

15.4.3.4 Waste disposal

Waste disposal should be in a shallow, all purpose trench of the following dimensions:

- 10cm deep x 45cm wide x 3m long/1000 persons

15.5 Facilities for Relief Workers

15.5.1 Sleeping and cooking equipments for a team of 5 relief workers (Please treat this as a sample list)

Tent	1
Blankets	5
Camp beds	5
Bed sheets	5
Sleeping bags	5
Pillows with spare covers	5
Kerosene or gas stove	1
Kerosene lantern	1
Flashlights (with spare batteries)	5
Rubber boots	5 pairs
Felt-covered water bottles	5
Cooking utensils (assorted)	1 set
Eating utensils (assorted)	1 set
Detergents, soap, water disinfecting tablets, etc.	As required
Bath unit	1
Water containers (plastic or metal). capacity 10-20 litres	2
Kerosene containers (plastic or metal), capacity 10-20 litres	2
Camp chairs	5
Camp tables	2

15.6 Checklists for Transit Camps, Relief camps and Feeding Centres.

15.6.1 Checklist for each Transit Camp (to be inspected by Camp Officer and sent to SOC)

Action	Y/N	Details/Remarks
Locatio n approved/conveyed to • District Control Room • Police Control		
Accommodation should provide for the following • Protection against adverse weather conditions • Treatment for minor ailments and minor injuries • Control over access and egress-evacuation routes. • Equipped with a mobile PA system • Update on disaster situation • Drinking water • Food arrangements • Adequate lighting arrangements • Sanitation facilities • Easy accessibility for transport to and from the SOC • Facilities for storage of bulk belongings of evacuees • Facilities for accommodation of cattle and pets • Police personnel provided • Information desk available		

Inspected By:

Designation :

Signature :

Date :

15.6.2 Checklist for Feeding Centre

(to be filled in by site manager, SOC and submitted to district control room and the department head)

Action	Y/N	Details/Remarks
Managed By: - Government - Voluntary relief organisations - Red Cross - Salvation Army - Meals on Wheels - Religious organisastions		
Location approved by district control room		
Protection against adverse weather conditions		
Person In-charge designated for - Overall In-charge of feeding centre - Shifts(supervisor) - Kitchen - Stores / stock control - Food distribution - Hygiene and sanitation.		
Care and comfort and transport of volunteers		
Adequate arrangements made for - Crowd control - Police protection - Food resources - Storage of rations appropriate for control of insects and rodents in stores - Infant foods - Milk distribution centres - Fire control measures - Cleaning of premises where food is handled - Area for eating on-site - Drinking water - Cleaning of utensils - Disposal of leftovers - Disposal of waste water - Kitchen equipments - Cooking - Utensils - Detergents. disinfectants, brushes, cloths, brooms, and other housekeeping necessaries.		

Inspected By:

Designation

Signature

Date

15.6.3 Checklist for Relief Camps and transit camps of more than three days duration

(to be inspected by camp officer and sent to SOC)

Action	Y/ N	Details/Remarks
Location approved /conveyed to district control room		
Protection against adverse weather conditions		
Whether the site has adequate building/s		
Site has adequate space for building temporary shelters		
Separation of groups necessary		
Separation of sexes necessary		
Is there sufficient slope for drainage during rains		
Managed by - Government - Voulntary relief organisations - NGO's - Religious organisations - International relief organisations		
Person In-charge designated for - Officer In-charge of Relief Camp - Shifts(supervisor) - Kitchen - Stores / stock control - Relief distribution - Hygiene and sanitation		
Adequate arrangements made for - Telephone lines and other communication links - Easy accessibility for transport to and from SOC - Facilities for storage of bulk belongings of evacuees - Access points - Exit points - Fire fighting - Crowd control - Feeding centre (refer to checklist) - Medical facility - Potable water - Water for other purposes - Food storage - Storage of relief materials - Lighting - Recreation space - Educational facilitY - Counselling facility - Sanitation blocks - Disposal of waste water - Disposal of waste		
Police desk		

Arrangements for staff and volunteers - Tents, bedding, etc. - Transport - Rest and recreation facility - Space for office work - Personal kits - Sanitation blocks		
Records or register for - Expenses on administration and management - Cash and credit vouchers - Issue of relief tickets - Issue of gratuitous relief - Cash disbursements - Issue of relief materials - issue of rations - Receipt of relief materials - Receipt of cash - Receipt of rations - Inventory of valuables with families - Missing persons - Persons requiring special assistance - Births and deaths - New arrivals - Departures - Inventory of non-consumables (dead stock register).		

Inspected By:

Designation:

Signature :

Date :

ADPC Materials on Urban Disaster Mitigation

Working Papers

1. Integrating Natural Hazards in the Planning Process: Risk Control Planning Workbook, Prepared by Linda Noson for the Sri Lanka Urban Multi-Hazard Disaster Mitigation Project, January 2000.

2. Standard Operation Procedure for Urban Disaster Management in the Municipality of Bandung, Prepared by the Indonesian Urban Disaster Mitigation Project, March 2000.

3. Lessons Learned from Community-Based Flood Mitigation and Preparedness Project in Cambodia, Prepared by the Cambodian Red Cross, International Federation of Red Cross and Red Crescent Societies and Pact Cambodia, August 2001.

4. Emergency Management and Response Plan for Ratnapura, Sri Lanka, Developed by the Centre for Housing, Planning and Building, National Building Organization, and Urban Development Authority, July 2000.

5. Naga City Disaster Mitigation Plan, Prepared by the Naga City Government and Philippines Business for Social Progress, August 2001

6. The Kathmandu Valley Earthquake Risk Management Action Plan, Developed by National Society for Earthquake Technology-Nepal and GeoHazards International, USA, January 1999.

7. Kathmandu Valley's Earthquake Scenario, Developed by National Society for Earthquake Technology-Nepal and GeoHazards International, USA.

Project Reports

1. Cambodia Community-Based Flood Mitigation and Preparedness Project, Prepared by Cambodian Red Cross, International Federation of Red Cross and Red Crescent Societies, and Pact Cambodia, August 2000.

2. Sri Lanka Urban Multi-Hazard Disaster Mitigation Project, Prepared by the Centre for Housing, Planning and Building, National Building Organization, and Urban Development Authority, August 2000.

3. Kathmandu Valley Earthquake Risk Management Project, Prepared by National Society for Earthquake Technology-Nepal and GeoHazards International, USA, September 2000.

4. Indonesia Urban Disaster Mitigation Project, Prepared by Institute of Technology Bandung, September 2000.

Proceedings

1. Workshop on Urban Risk Reduction in Asia, Ahmedabad, 29 March 2001, Organized by Ahmedabad Municipal Corporation, Centre for Environmental Planning and Technology, and Asian Disaster Preparedness Center, April 2001.

Safer Cities Case Studies

Guidelines for Safer Cities: Case Studies on Mitigating Disasters in Asia and the Pacific, January 2002.

Safer Cities 1: Community-Based Initiatives in Kathmandu Valley, January 2002

Safer Cities 2: Coping with Flood in Cambodian Communities, February 2002

Safer Cities 3: Mitigating Flood Risk in Cambodian Communities, March 2002

Videos

1. Of An Event Foretold ..., Tele-Drama produced by Sri Lanka Urban Multi-Hazard Disaster Mitigation Project, August 2000.

2. Towards Safer Communities: Risk Based Mitigation Planning - The Sri Lankan Experience, Produced by Sri Lanka Urban Multi-Hazard Disaster Mitigation Project, July 2001.

3. A Case Study of Training Masons in Sri Lanka, Produced by Sri Lanka Urban Multi-Hazard Disaster Mitigation Project, December 2001.

4. Enlightening the Future Generation: A Case Study of Awareness Creation Focused on School Children in Sri Lanka, Produced by Sri Lanka Urban Multi-Hazard Disaster Mitigation Project, December 2001.

5. Of Creating Awareness: The Case of Public Awareness Creation on Earthquake Safety in Kathmandu Valley, Nepal, Produced by the Asian Urban Disaster Mitigation Program of the Asian Disaster Preparedness Center, Bangkok, January 2002.

6. Building for Safety: The Case of Retrofitting Schools in Kathmandu Valley, Nepal, Produced by the Asian Urban Disaster Mitigation Program of the Asian Disaster Preparedness Center, Bangkok, January 2002.

All the videos listed here are available in both VHS/PAL and VCD formats.

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