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Identifying the Causes of Urban Floods for Efficient Disaster Preparedness Plan -A Case Study of Chennai

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Abstract: Disaster management is the creation of plans through which communities reduce vulnerability to hazards and cope with disasters. Disaster management does not avert or eliminate the threats; instead, it focuses on creating plans to decrease the effect of disasters. Failure to create a plan could lead to damage to assets, human mortality, and lost revenue. Events covered by disaster management include acts of terrorism, industrial sabotage, fire, natural disasters (such as earthquakes, hurricanes, etc.), public disorder, industrial accidents, and communication failures. The present paper endeavors to study the concept of disaster management, with special reference to Chennai flood 2015. The present study covers the concept of disaster management, causes of Chennai flood and an efficient disaster preparedness plan.

Keywords: Disaster Management, Chennai Flood 2015, Causes of Urban Floods, Disaster Preparedness Plan.

INTRODUCTION

Disaster management is the creation of plans through which communities reduce vulnerability to hazards and cope with disasters. Disaster management does not avert or eliminate the threats; instead, it focuses on creating plans to decrease the effect of disasters. Failure to create a plan could lead to damage to assets, human mortality, and lost revenue. Currently, in the United States, 60 percent of businesses do not have emergency management plans. Events covered by disaster management include acts of terrorism, industrial sabotage, fire, natural disasters (such as earthquakes, hurricanes, etc.), public disorder, industrial accidents, and communication failures.

Aim and Objectives of the Study

1. To analyse the Reasons for Chennai Flood.
2. To prepare an efficient disaster preparedness plan.

Causes of Chennai Floods

The following are the factors which hamper the living in Chennai due to floods though it can be categorized broadly under changes in climate & micro-regional environmental factors. Each factor is dealt in detail in the subsequent clauses.

Causes of Chennai Floods

CAUSES	TYPES OF FACTORS	ELEMENTS
Direct factors	Increase in Rainfall	Due to global climatic change
	Urbanization	Encroachment of all water bodies, wetlands, etc
		Construction of transportation networks all along the major watercourses
		Increase in concrete spaces which stops percolation of water
		Decrease in Open area / green spaces
Topography	Plain terrain lacking natural gradient for free run off	
Indirect factors	Inadequate & poor drainage systems	Sewage systems were planned originally before 4 decades and only few minor modifications made which is far below the required capacity
Indirect factors		Heavy siltation all along the drainage channels
		Lack of coordination between the agencies
	Disposal of solid Waste & other debris	Attitude of people
	Vehicle parking on roads	Lack of management measures by the agencies
		Increase in concrete spaces
	Discrepancies between public & local authority	

Chennai Floods are Not Only a Natural Disaster – They've Been Created by Unrestrained Construction

A report in NDTV quotes her as saying, “Losses are unavoidable when there's very heavy rain. Swift rescue and relief alone are indicators of a good government.” These words are intended to normalize a human-made disaster, and gloss over the pathology of urban development under successive administrations. It is quite usual for politicians and civic officials to blame so-called unprecedented rains for the civic and humanitarian crisis each monsoon brings, and decouple development from disaster. But unprecedented rains occur quite regularly in Chennai. As a city on the high-energy coast facing the Bay of Bengal, Chennai is no stranger to heavy rains and cyclonic storms. Chennai has experienced particularly heavy rains roughly once every 10 years – 1969, 1976, 1985, 1996, 1998, 2005, 2015.”

Disaster Preparedness Plan and Policy of Chennai

Flood Alleviation Scheme funded by Government with a cost Rs.3000 million was launched in 1998 focusing mainly on structural measures with the objectives like adequacy of flow in the arterial drainage system, safeguard against tidal and fluvial flooding, removing impediments, relocation, and rehabilitation of encroachers. Cleaning of certain waterways and lakes was also undertaken under packages 2 and 3 of the scheme.

Chennai City River Conservation Project which was launched in 2000[2] is aimed to improve the waterways, with an estimated outlay of Rs.17, 000 million. The Master Plan 1992–1993 incorporated Madras Metro Flood Relief/ Storm Water Drainage study outcomes in the form of structural and non-structural measures. Funds under JNNURM project have been visualized for implementation of underground sewerage schemes and detailed project reports are being developed. In 2010, the State Government has launched a massive flood mitigation project for the city, involving the construction of new micro and macro drainage systems in four basins and making improvements to existing drainage, at a cost of Rs.1, 447 crores under JNNURM. The works like improvements work to divert surplus water, desolation, strengthening existing city drainage network, etc.

Both humans and nature put together the ground for the perennial flood tribulations. The immediate need is to create a *scientific inventory* of water bodies and delineate flood zones within the city. The flood zone will have to be identified based on the location of the water bodies, natural drains, water shed area and it has to be made as a no building zone. More campaigns have to be conducted at the local level in order to *create awareness* to the public about the causative factors for the flood disasters. In addition to the above, the wide-ranging management measures will help Chennai to be relieved from the recurrent flood menaces almost every monsoon.

An integrated approach, therefore, needs to combine watershed and land-use management with development planning, engineering measures, flood preparedness, and emergency management in the affected lowlands, while taking into account the social and economic needs of communities in both the highland source areas, and also the lowland flood-prone areas.

Efficient Disaster Preparedness plan for Urban Flood

The management of urban flooding is an emerging subject, and as such it has to be treated holistically in a multi-disciplinary manner. There are many issues that need to be considered in order to develop sound, reliable and most representative urban flood/disaster management strategies. The Standard Operating Procedures covers the following three phases of disaster management for effective and efficient response to urban flooding:

Pre-Monsoon Phase:

Preparedness: Planning for Disaster Reduction

During Monsoon Phase:

Early Warning

Effective Response and Management

Relief planning and execution

Post-Monsoon Phase:

Restoration and Re-habilitation

In the Preparedness Phase following activities are done:

- i) Setting up of EOC and CCR with Ham Radio or other relevant technology.
- ii) Issue directions to repair/restore/maintain roads, drains, trees (prune), etc.
- iii) Prepare city Disaster Management Plan, with ward level DM actions.
- iv) Define triggers for issuing of alerts and warnings – rainfall / special event, etc.
- v) Update data on flooding spots and landslide prone area.
- vi) Conduct coordination meetings with MTNL/BSNL, Mobile companies, NGO's etc.
- vii) Undertake TNA & capacity building measures for staff & personnel.
- viii) Conduct Mock Drills.
- ix) Maintain stock of potable water, food packets, insecticide, etc.

Establishment of Emergency Operations Centers (EOC)

Each city to establish Emergency Operations Centre (EOC) which will be under Control of District Commissioner/ District Magistrate / Municipal Commissioner. The EOCs/Control Rooms at the city will be the brain & nerve for coordination and management of all emergencies. EOC may be located either in Municipal corporation office or at a suitable safe location. The EOC will be the lead agency of the city for Disaster preparedness/Rescue/Relief / Restoration and Rehabilitation functions.

Functions of EOC

The Key functions of EOC in managing urban flooding would be:

- Coordination with line agencies
- Policy Making and plan preparation including action plans as per SOP
- Direction and Monitoring of Operations Management.
- Information gathering and record keeping
- Preparation of web enabled resource inventory under India Disaster Resource Network.
- Public Information and Citizen updating.
- Resource Management
- Reporting

Composition of EOC

The members of EOC will be representative officers from all line agencies likely to be involved in managing urban floods such as:

- a) Municipal Corporation
- b) Municipal Health and Sanitation Department
- c) Urban Development Authority
- d) Fire Brigade
- e) Public Transport
- f) Police Commissioner
- g) Traffic Police
- h) Home Guards and Civil Defense
- i) District Collector (City & Suburban)

Tasks for Municipal Corporation in Disaster Preparedness Plan

- Setting up of EOC and CCR in the corporation office and in municipal wards.
- Drain flood waters and remove impediments to movement from all roads under its control.
- Repair, restore and maintain all roads, storm water drains, etc. along with other infrastructure.
- Transport/shift/ evacuate stranded/affected persons and Rescue teams.
- Transport injured persons to hospitals/health camps and also dispose of the corpse.
- Organize temporary shelters with food and water supply.
- Issue passes/identification stickers for vehicles and personnel on relief duty.
- Coordinate the activities of NGOs and other private entities engaged in relief work.
- Coordinate rescue plan with departments like Industries (Chemical accidents), Fire Brigade, Police (Landslides and collapse), Health Department (Epidemics and Food Poisoning)
- Undertake all duties and functions not specifically assigned to any other public agency.
- Set up information Centre for sharing information with the media and the public.

CONCLUDING REMARKS

The 2015 floods in Chennai city and surrounding areas in Tamil Nadu have brought to the fore the need for developing a scientific understanding of urban floods to help enhance the engineering, administrative and societal resilience. To help timely administrative responses, real time flood alerts with sufficient lead time are necessary. Such flood alerts should be developed by integrating spatially distributed forecasts of high intensity rainfall in the City with hydrological models to simulate overland flow and storm water drainage. Radar measurement of rainfall and monitoring of the flow at critical locations in the rivers running through the City and drainage systems would greatly help in flood forecasting. Also, high resolution terrain data from digital elevation models will be necessary for such an exercise. The real time flood alerts can then be employed to develop Expert Systems to provide decision alternatives for flood management.

With the lessons learnt from the deluge, the scientific community and the administrators of the city of Chennai now have an opportunity to pro-actively demonstrate the effectiveness of scientific and technological interventions in managing urban floods in the country. It is expected that the issues flagged in this rapid assessment report provide a starting point for further in-depth scientific studies.

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