


REGIONAL TECHNICAL WORKSHOP  
ON  
"Coastal Protection in the Aftermath of the Indian Ocean Tsunami:  
What Role for Forests and Trees?"  
FOOD AND AGRICULTURAL ORGANIZATION OF THE UNITED NATIONS

**CYCLONE DISASTER MITIGATION IN  
BANGLADESH**

Professor M Alimullah Miyan  
South Asian Disaster Management Center (SADMC)  
IUBAT—International University of Business  
Agriculture and Technology  
Dhaka, Bangladesh

Khao Lak, Thailand  
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## Topical Coverage

- Introduction
- Cyclone and Coastal Environment
- Cyclone Warning System in Bangladesh
- Standing Orders for Cyclones
- Institutional Arrangement
- Lessons of April 1991 Cyclone
- Mitigation Measures
- Activities in Progress
- Recommendations
- Conclusion

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## Introduction

- Area 148,000 sq km
- Population 130 million
- Per Capital Income US \$ 482
- Bay of Bengal in the South
- 710 km Long Coast Line
- Unitary Government

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## Cont'd.

- Subjected to Natural Disasters
- 67 Major Cyclones & Tidal Surges – 1791-1991
- Pre-monsoon – April – May
- Post Monsoon – October – November
- 11 Million People in Cyclone Range

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## Map of Bangladesh

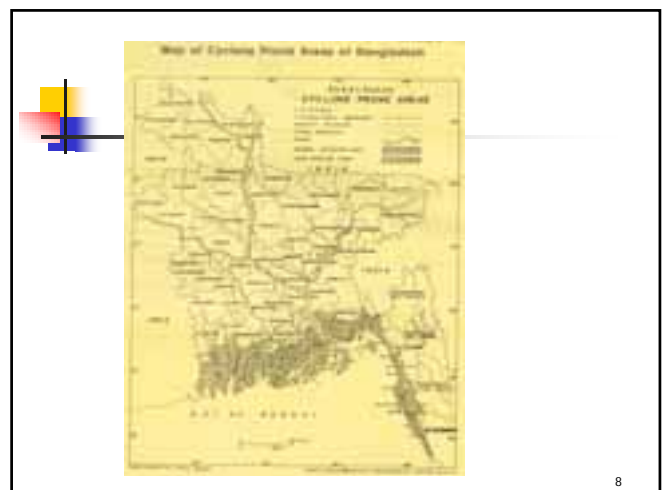
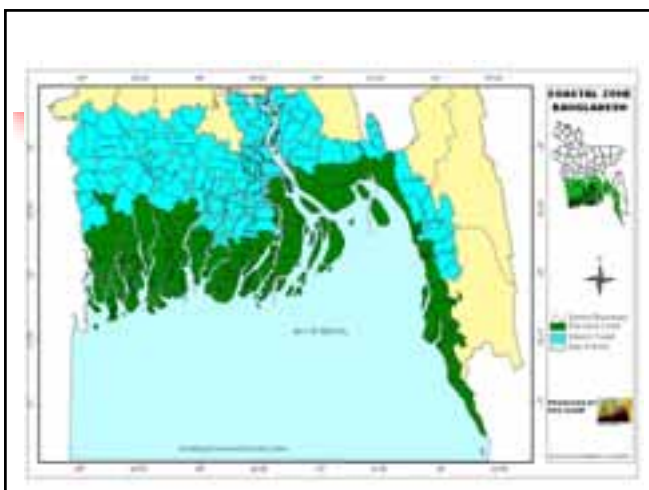


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## Cyclone and Coastal Environment

- 710 km Long Coast Line
- Coastal Zone:
  - ✓ 19 Southern districts
  - ✓ 250 islands
  - ✓ 35.1 million population (28% of total)
  - ✓ Many Development Opportunities
  - ✓ Constrained by Natural and Man-made Hazards

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## Contd.

- Low Lying Subject to Inundation
- Triangular Shape of Bay of Bengal
- Wide Shallow Continental Shelf Amplifies Tidal Surges
- Unorganized Human Settlement
- Community Efforts Difficult
- Environmental Conditions

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## Cyclone Warning System in Bangladesh

### Warning System for Maritime Ports

- Distance Cautionary I : Squally Weather
- Distance Warning II: Storm Formed
- Local Cautionary III: Port Threatened by Storm
- Danger V-VII: Port Will Experience Storm of Slight or Moderate Intensity
- Great Danger IX-X: Storm of Great Intensity
- Great Danger XI: Devastating Cyclone with Breakdown in Communication

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### - Warning System of River Ports

- Cautionary - I: Squally Wind
- Warning – II: Likely Storm
- Danger – III: Storm will Strike
- Great Danger - IV: Violent Storm

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### Weakness of Warning System

- Incomprehensible to People
- Confusing Numbering
- Delay in issue of Warnings
- Complex Language
- No Information on Rainfall
- Low People Confidence on Forecast

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## **Standing Orders for Cyclones (SOC)**

- Guidelines for Disaster Preparedness and Management

### **Pre-Disaster Stage**

- Awareness Activities

### **Alert Stage**

- BMD to Issue Alert
- CPP to Alert People
- Special Weather Bulletins in the Media
- Control Room Organization

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## **Warning & Disaster Stage**

- Warning – 24 hrs in Advance
- Danger – 18 hrs in Advance
- Great Danger – Minimum 10 hrs in advance
- Warning Message Content
- Issue of Warning Messages

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## **Post Disaster Stage**

- Impact Evaluation
- Damage Data Collection
- Public Opinion on Signals

Detailed Guidelines for all Agencies at Central to Village Levels

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## **Institutional Arrangement**

- Elaborate Institutional Arrangement in Place
- Disaster Management Council
- IMDMC
- MFDMR
- NDMAC
- DMB

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- Directorate of Relief & Rehabilitation
- District Disaster Management Committee
- Upazila Disaster Management Committee
- Cyclone Preparedness Program (CPP)

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## Lessons of April 1991 Cyclone

People Affected – 11 Million  
 Loss of Human Lives – 138882  
 Economic Loss – 2.07 billion US dollar

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## Details of Damage

1. Total affected districts:	19
2. Total affected sub-districts (upazillas) :	102
3. Total affected municipalities:	9
4. Total number of affected population:	10,798,275
5. Damages to crops (area in acres) :	9,24,893
6. Total number of houses damaged:	1,7,02,358
7. Total number of people died:	1,38,882

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8. Total number of animal died :	1,061,029
9. Total number of people injured:	1,39,054
10. Total number of educational institutions damaged:	9,666
11. Total area of earthen-roads damaged (in miles) :	764
12. Total number of bridges, & culverts damaged:	496
13. Total length of embankments damaged(in miles):	707
14. Number of people missing:	1,225

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## Future Preparedness

- Efficient Tracking, Forecasting & issue of Warning
- Complexities of II Storm Signals
- Technical Nature of Warning Dissemination by Public Media
- Public Awareness and Consciousness should be enhanced for Future Preparedness
- Inadequacy of Shelters
- Limitation of External Assistance to Island Communities
- Transferring Administration to Field

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- Housing Strategy
- Long Term Mitigation Measure Adoption
- Reduction in Environmental Degradation & Ecology
- Review of SOC
- Extension of CPP Network
- Strengthening of CPP Wireless Network
- Absence of Contingency Plan
- Community Preparedness

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## Mitigation Measures

- Structural Measures
  - Cyclone Shelters



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- - Killas
- - Coastal Embankment
- - Improved Housing

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## • Non-Structural Measures

- Coastal Afforestation
- Public Awareness

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## COASTAL AFFORESTATION

- Coastal Embankment Project
- Afforestation in the Slopes since 1966 for
  - Protection against cyclonic surge and monsoon waves
  - Historical Evidence of Reduction in the Impact of Surge
- Species used in Afforestation
  - A CA CIA ARABILA
  - CA TECH U
  - SONNERATIA APA TALA
  - AU1CENNIA OFFICINALS

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- BRUGUIERA GYMNORHIZA
- NYP FRUTICANS

- Protection Afforded by Natural Sundarban Mangrove Forest Prompted Afforestation in Coastal districts:

- Chittagong
- Noakhali
- Bholā
- Barisal
- Patuakhali

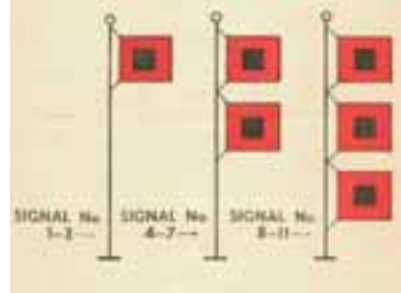
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## Plantation



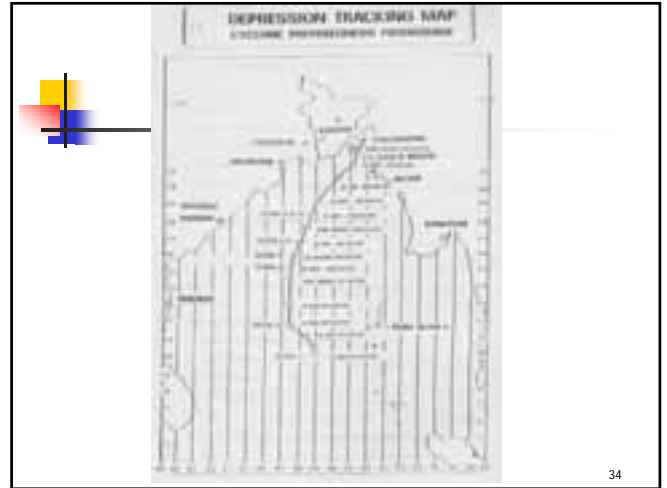
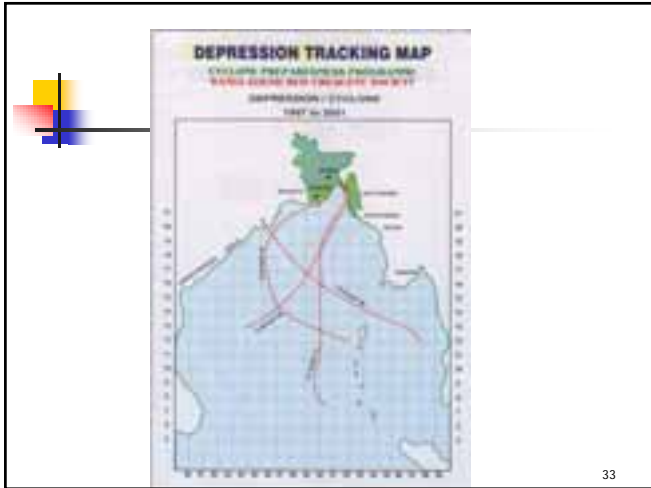
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## PROCEDURE OF HOISTING SIGNAL FLAGS



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- Activities in Progress**
- UNDP Technical Assistance Project of 5 Million
  - Visible Impact in 1994 Cyclone Response
  - On-going Comprehensive Disaster Mitigation Programme
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- Logistics and Operational Support
- Community Participation Perspective
- Social and Gender Issues
- Public Health
- Physical Facilities
- Urban Disaster

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## Integrated Cyclone Zone Management (ICZM)

- MWR Lead Ministry
- WARPO Lead Agency
- Coastal Zone Policy-2005

### Emphasis on

- Sea Dykes and Afforestation
- Planned Tree Plantation in Coastal Zone
- Social Forestry
- Plant Care and Maintenance
- Afforestation in Newly Created Chars
- Conservation of Chars
- Extension of Social Forestry

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## Integrated Coastal Zone Management (ICZM) Institutional Set-up

- National Council**
- Inter-Ministerial Steering Committee (SC)**
- Inter-Ministerial Technical Committee (TC)**
- Ministry of Water Resources (MWR)**
- Water Resources Planning Organization (WARPO)**
- Program Coordination Unit (PCU)**

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### Focal Points in 22 Line Agencies of GOB:

- Department of Women Affairs (DWA) Ministry of Women and Children Affairs
- Local Government Division (LGD), Ministry of Local Government, Rural Development and Cooperatives
- Department of Public Health Engineering (DPHE), Ministry of Local Government, Rural Development and Cooperatives

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- Bangladesh Water Development Board (BWDB), Ministry of Water Resources
- Local Government and Engineering Department (LGED), Ministry of Local Government, Rural Development and Cooperatives
- Forest Department (FD), Ministry of Environment and Forest
- Ministry of Land (MoL)
- Department of Agricultural Extension (DAE), Ministry of Agriculture

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- Bangladesh Rural Development Board (BRDB), Ministry of Local Government, Rural Development and Cooperatives
- Bangladesh Parjatan Corporation (BPC), Ministry of Civil Aviation and Tourism
- Department of Fisheries (DoF), Ministry of Fisheries and Livestock
- Department of Livestock (DLS), Ministry of Fisheries and Livestock
- Coast Guard (CG), Ministry of Home Affairs
- Bangladesh NGO Network for Radio Communication (BNNRC)

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## Forest Department Priority Project

### Development and Settlement of Accreted Land

- Newly accreted land in the form of mud shall be utilized for planting mangrove plant
- The existing mangrove forests shall be managed through participatory way
- The degraded/depleted forests land shall be planted and plantation will act as green wall/wind break for cyclones and water flow reduction in storm surges
- Limited Emphasis on Afforestation for Mitigation
- Inadequate Coordination
- Lack of Integration for Synergistic Impact

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## Recommendations

- Improved Storm Surge Forecasting
- Public Awareness of Storm Surge, Flooding and Rainfall related to Cyclone
- Increased Investment on Warning Presentation, Dissemination and Public Understanding
- Simplification in the Contents of Warnings
- Investment in Public Awareness on Cyclone Mitigation including Role of Forest
- KAP Survey on Cyclone Warning
- KAP Survey for Service Providers
- KAP Survey on Non-Structural Mitigational Measures
- Social Impact Study
- Integration of Disaster Management in Development Planning

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## Conclusion

### Investment Requirement in

- Preparedness
- Shelter Construction
- Afforestation
- Institutional Arrangement
- Policy Formulation
- Community Involvement