DISASTER PREPAREDNESS IN MALAYSIA

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Defining Disaster

- Incident that occurs in a sudden manner, complex in nature, resulting in the loss of lives, damages to property or the environment as well as affecting the daily activities of local community.

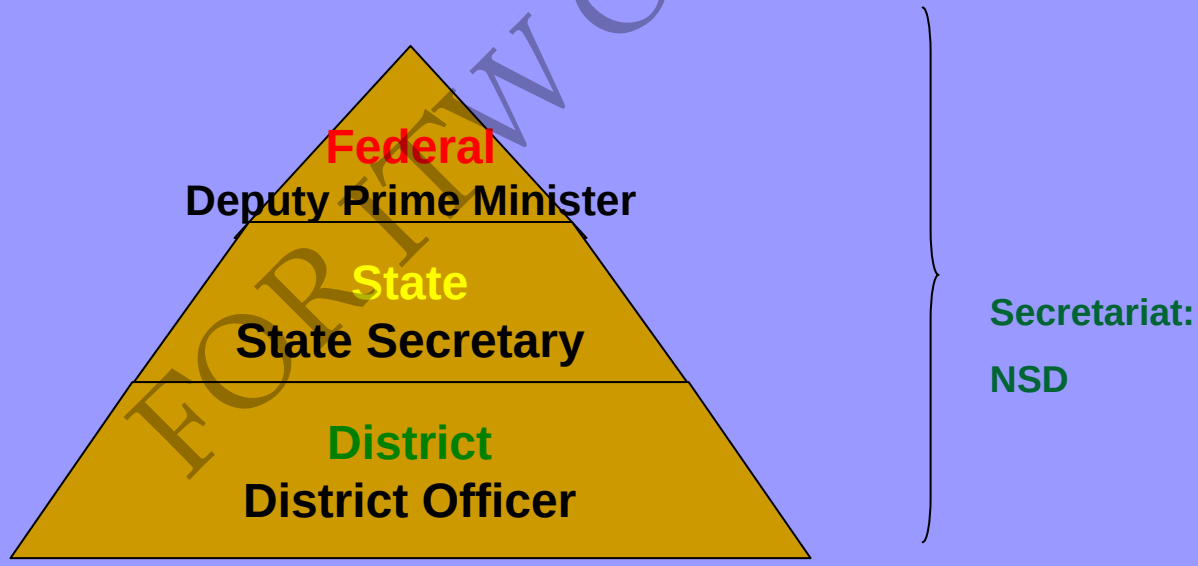
- Such incident requires the handling of resources, equipment, frequency and extensive manpower from various agencies as well as effective coordination and the possibility of demanding complex actions over a long period of time.

Defining Lead Responsibilities

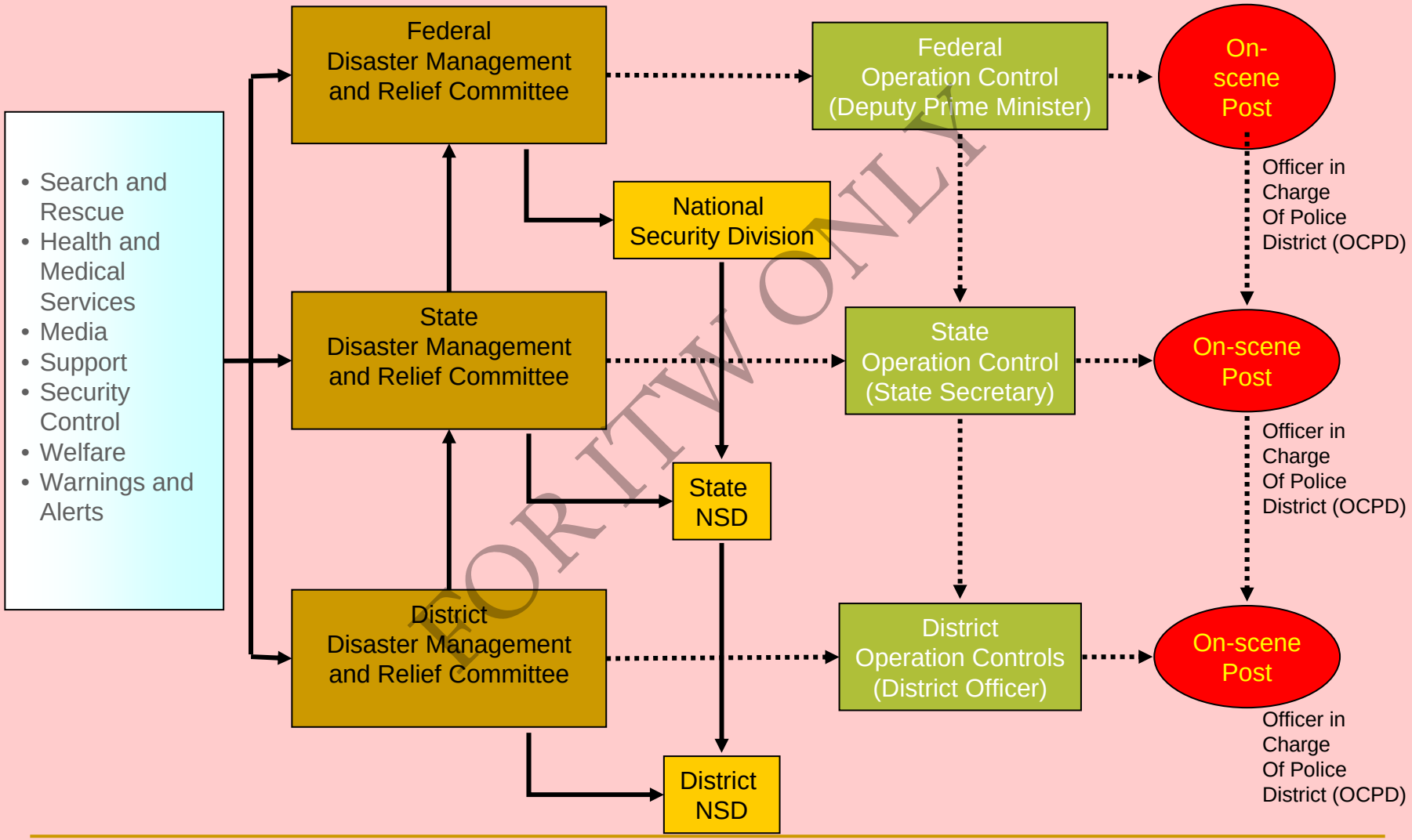
- Several agencies designated to be lead agency in specific disaster:
  - Pandemic/ Endemic for human being (Ministry of Health)
  - Pandemic/ Endemic for bird/animal (Ministry of Agriculture)
  - Sea Disaster (Marine Department)
  - Air Disaster (Dept. of Civil Aviation)
  - Haze/ Open Burning (Dept. of Environment)
  - Nuclear and Radiology (Atomic Energy Licensing Board)
  - Chemical (Chemistry Dept.)
  - Search and Rescue Team (Multi Function) – Fire and Rescue Dept., Royal Malaysian Police, Malaysian Armed Forces, Special Malaysian Disaster Assistant and Rescue Team (SMART), Emergency Medical Team, Atomic Energy Licensing Board and Civil Defense Dept.

Level of The Disaster Management and Relief Committee

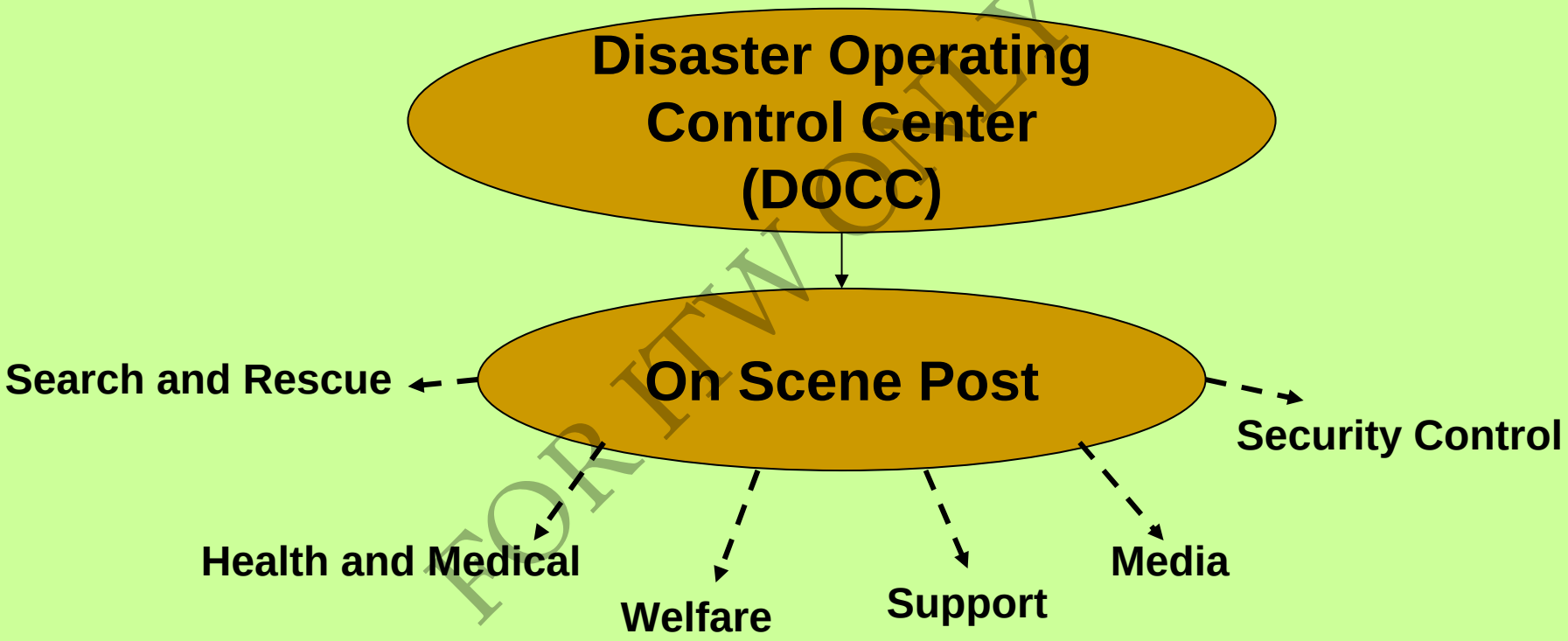
- Policy and Strategic Planning
  - The **District** Disaster Management and Relief Committee
  - The **State** Disaster Management and Relief Committee
  - The **National** Disaster Management and Relief Committee



Organizational Structures



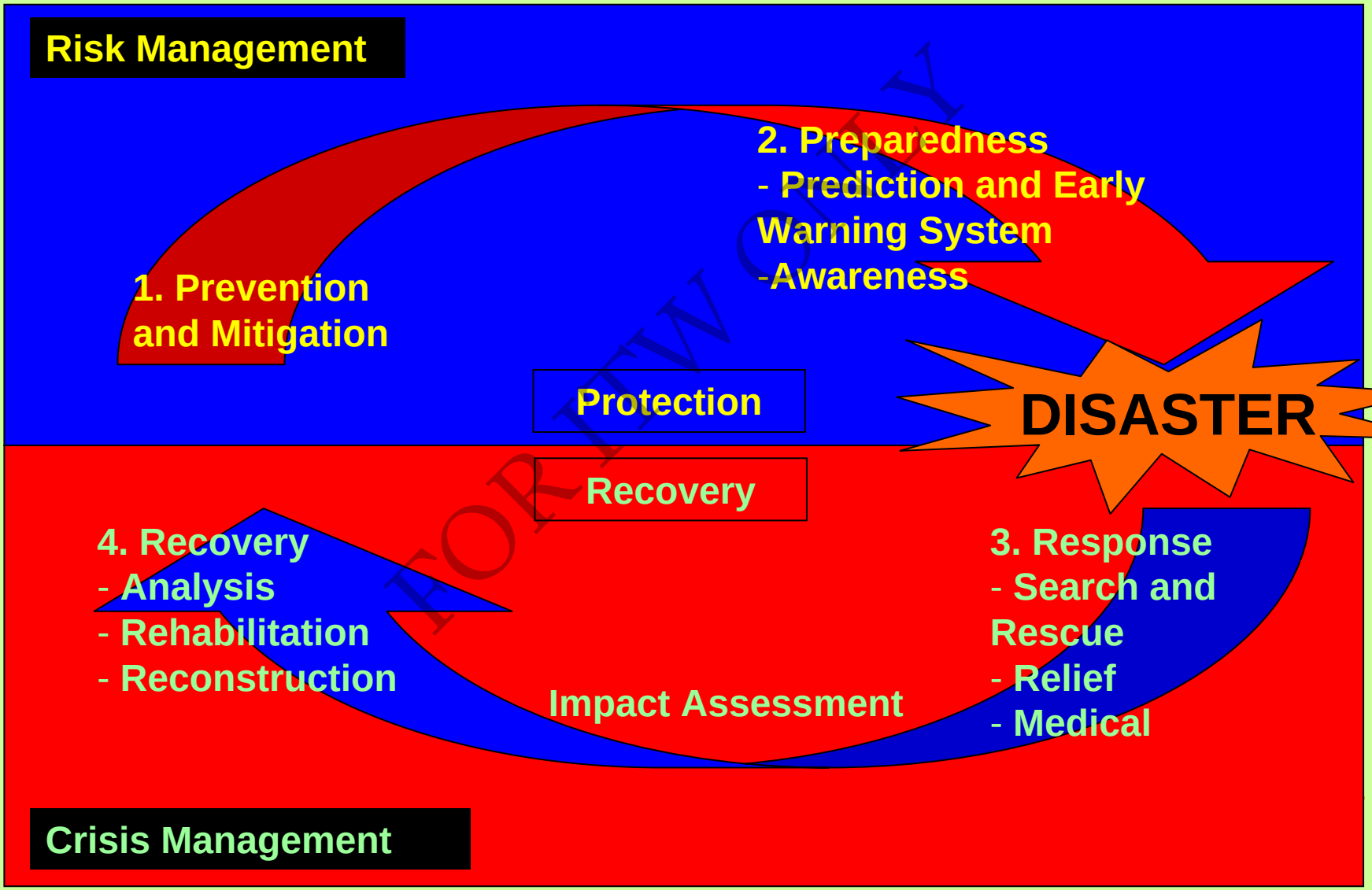
Sub System



Operational Approach

- Bottom Up Approach
- If the District has shortage of Manpower, Fund and Asset, the state level or federal level will assist and coordinate

Phases of Disaster Management



Phase 1: Public Awareness Program

- Publication of Public Awareness Guideline on Disaster (on review)
- 26 December is declared as National Disaster Awareness Day

Phase 2: Preparedness

- Early Warning System
- Structural - Flood Mitigation Structure i.e. **The Stormwater Management and Road Tunnel (SMART)** and National Disaster Relief Fund (NDRF)
- Policy, Guidelines and Standard Operating Procedures (S.O.P)
- Development Program by Town and Country Planning Dept.
- Capacity Building
- Bilateral, Regional and International Cooperation

Early Warning System

- Malaysian Meteorological Department (MMD)
  - Tsunami Early Warning System
  - Weather Forecasting
  - Disaster Alert System (D.A.S)

- Malaysian Department of Irrigation and Drainage (DID)
  - Telemetry System - Flood Forecasting Models and Infobanjir

- Malaysian Centre for Remote Sensing (MACRES)
  - National Disaster Data and Information Management System (NADDI)

- Department of Environment (DOE)
  - Air Pollutant Index (API) - Haze

Malaysian Tsunami Early Warning System

- After the Asian Tsunami in Dec 2004
- Developed by Malaysian Meteorological Dept.
- Three technologically advanced deep water buoys to be deployed at locations around Malaysia.
- The first buoy was installed near Pulau Rondo, Sumatra on 30 December 2005
- The second buoy installed at Peninjau Island on the South China Sea in early March 2006
- The third buoy in the Sulu/ Sulawasi Sea by end of March 2006
- Dissemination System: Short Messaging System (SMS), mass media, telephone, fax and website

Disaster Alert System (DAS)

- Enable government agency to perform mass broadcast of alert voice messages by making outbound calls to fixed line subscribers during disasters such as tsunami
- Quick broadcasting of clear, concise warning alert
- Customized alert message that suits to the recipients need

Deployment of the first tsunami buoy near the Andaman Sea off Rondo Island (latitude 6º north, longitude 95º east), Indonesia and Layang Layang Island and next will be at Kagayan near Philipine.

Flood Forecasting and Warning System

- Developed by Malaysian Drainage and Irrigation Dept.
- Currently two flood forecasting models have been applied i.e the **Linear Transfer Function Model (LTFM)** at Pahang River and the **Tank Model** at Kelantan River
- The agencies involve in flood relief have use the information to decide when they should mobilize their staffs and equipments to the areas that are potentially hit
- Dissemination System: Warning siren, Short Messaging System (SMS), telephone, fax and website **http://infobanjir.water.gov.my**

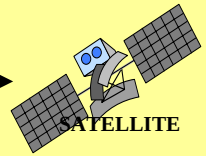
Manual Telemetry System

RAIN TELEMETRY STATION (283 pcs)

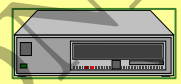
RIVER LEVEL TELEMETRY STATION (224 pcs)

TELEMETRY SYSTEM

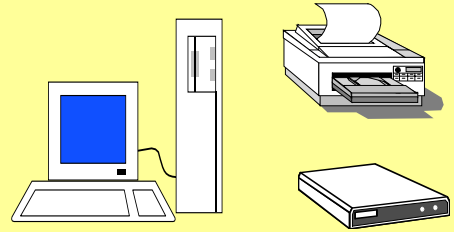
- FOR FLOOD FORECASTING MODELS AND INFOBANJIR



SATELLITE

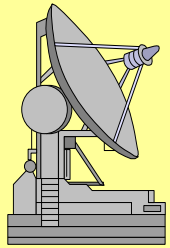


FRONT END PROCESSOR

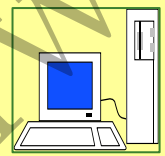


MASTER TERMINAL

RTU



LAND EARTH STATION

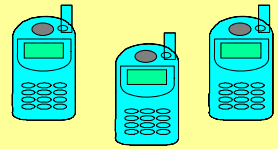


NETWORK CONTROL CENTER

LAND LINE

CONNECTION TO WORK STATION BY LAN,WAN,INTERNET

WORK STATIONS



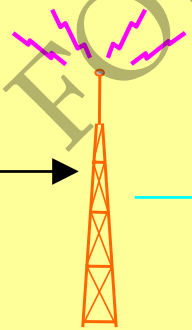
SMS TO MOBILE PHONE

RAINFALL

WATER LEVEL

SIRENS, WEB CAMERA

HYDROLOGICAL SENSORS



RADIO REPEATER STATION

RADIO LINK

The National Disaster Data and Information Management System (NADDI)

- **Objective:** to establish a central system for collecting, storing, processing, analyzing, and disseminating value-added data and information to support the relevant agencies in the mitigation and relief activities of disaster management in the country
- Emphasizes on the utilization of remote sensing technologies, Geographical Information System (GIS) and Global Positioning System (GPS) technologies to provide up-to-date and reliable data to support the three components of disaster management, namely,

  (i) early warning,

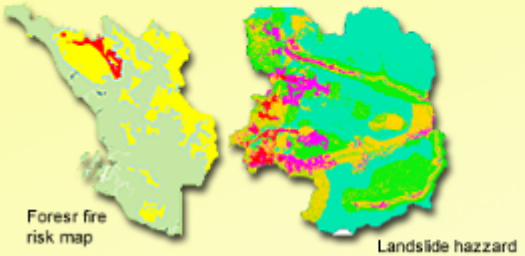
  (ii) detection and monitoring, and

  (iii) mitigation and relief for pre, during and post disaster management activities.

INTEGRATED NATIONAL DISASTER MANAGEMENT PROGRAMME

NATIONAL DISASTER MANAGEMENT PROGRAMME

EARLY WARNING



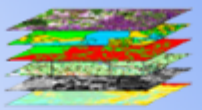
DISASTER RISK MAPS

FOREST FIRE
FLOOD
LANDSLIDE
OIL SPILL
HOT INSTALLATION
TSUNAMI

NATIONAL DISASTER INFORMATION CENTRE

INFORMATION DISSEMINATION SYSTEM
DATA ANALYSIS AND MANAGEMENT SYSTEM
DATA INPUT SYSTEM

Data Warehouse & Model Base



MITIGATION & RELIEF

Surveillance
Emergency Response
Enforcement
Awareness
etc

COMMUNICATION SATELLITE

Regional Centre for Disaster Management
National Oil Spill Control Centre (NOSCC)
Maritime Enforcement & Coordinating Centre (MECC)
Department of Drainage and Irrigation
Department of Public Works
Department of Environment
Fire and Rescue Department
Arm Forces
etc

Network
Intranet
Internet
etc

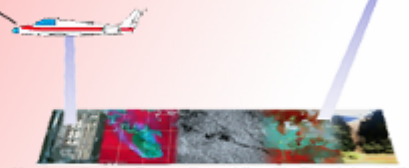
NATIONAL DISASTER MANAGEMENT COUNCIL

Coordination
Mission Planning
Relief & Recovery Plan
Mobilization
Communication, Control & Command

DETECTION AND MONITORING

EARTH OBSERVATION SATELLITE
SPOT, Landsat TM, Radarsat, and NOAA
Multi-resolution
Multi-temporal
Multi-spectral
Synoptic view

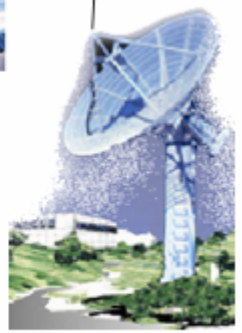
AIRBORNE REMOTE SENSING
Multi-spectral, Hyper-spectral and SAR
Immediate response to crisis
Real-time data
Easily mobilized
All weather operations



GROUND SURVEY AND MONITORING SYSTEMS

River water level monitoring system
GPS data collection
Meteorological monitoring stations
Tide gauge
etc.

GROUND RECIEVING STATION
Data Reception snd Recording
Rapid data transmission
Programmeable
Wide area coverage



MACRES HQ ◄——————————————————————► MGRS, TEMERLOH

Flood Mitigation Structure i.e. The Stormwater Management and Road Tunnel (SMART)

- Developed by Malaysian Drainage and Irrigation Department
- **The Stormwater Management and Road Tunnel** also known as **SMART Project** is being developed to alleviate flash flood problems in the city. The **9.7 kilometers** and **11.83 meters'** in diameter tunnel integrates both stormwater management and motorway in the same tunnel.

Stormwater Management And Road Tunnel (SMART) Project

A Solution for the City of Kuala Lumpur.

SMART System

What is SMART?

- SMART is an acronym for Stormwater Management and Road Tunnel, a project under the Federal Government initiated to alleviate the flooding problem in the city centre of Kuala Lumpur.

- The project is implemented through a joint venture pact between MMC Berhad and Gamuda Berhad with the Department of Irrigation And Drainage Malaysia and the Malaysian Highway Authority as the executing government agencies.

How Does SMART Helps?

- Studies had indicated that the critical stretch of Sungai Klang between Sg Klang /Sg Ampang confluence and Sg Gombak/ Sg Klang confluence to be flood prone areas and the fact that the river is further constrained by the Jalan Tun Perak Bridge (near Masjid Jamek) which is low, has resulted in the surrounding areas to experience flash floods.

- The SMART system will be able to divert large volumes of flood water from entering this critical stretch via a holding pond, bypass tunnel and storage reservoir. This will reduce the flood water level at the Jalan Tun Perak Bridge, preventing spillover.

Other benefits of SMART

- The Stormwater Management and Road Tunnel (SMART) project was incepted by the project proponent, namely MMC Berhad-Gamuda Berhad Joint Venture, primarily to mitigate the recurring floods in the city of Kuala Lumpur, the financial, business and commercial hub of Malaysia.

- However, at the design stage of SMART, the dual purpose concept was born from the ingenuity of the project proponents and the motorway tunnel was integrated into the system to relieve traffic congestion at the main Southern Gateway to the city centre.

The Motorway to Ease Congestion

- The motorway tunnel will provide an alternative route for motorists from the Southern Gateway, i.e. KL-Seremban Highway, Federal Highway, Besraya and East-West Link entering and exiting the city centre. This will reduce traffic congestion at the Southern Gateway leading to the city centre. The travel time will be reduced significantly.

- For example from the Jalan Istana Interchange-Kampung Pandan the expected travel time is a mere four minutes compared to ten to fifteen minutes using the existing roads.

Components

- A 9.7km stormwater tunnel.
- A 3km motorway tunnel (within the stormwater tunnel).
- Ingress and Egress connections to the motorway tunnel linking KL-Seremban Highway.
- Ingress and Egress connections linking the motorway tunnel to Jalan Sultan Ismail and Jalan Tun Razak.
- A holding basin at Kampung Berembang (off Jalan Ampang).
- A storage reservoir at Taman Desa (ex mining pond).
- A twin-box culvert to release flood discharge from storage reservoir to Sungai Kerayong.
- An operation control centre complete with administration, supervision, river management and traffic management facilities for management, operation and maintenance of the SMART system.

Stormwater Tunnel

- Length : 9.7km
- Diameter : 11.7m
- Storage Capacity : 1,000,000 cubic meter
- Tunneling Method : Tunnel Boring Machine (TBM)
- Origin of Tunneling Technology : Germany TBM
- Type : Slurry Shield
  Largest in South East Asia &
  2nd Largest in Asia

Motorway Tunnel

- Length : 3 km
- Structure type : Double Decker
- Ingress and Egress Connections'
  Length :1.5km at Jalan Sultan Ismail.
  1.4km at Jalan Tun Razak.
  1.6km at KL-Seremban Highway.
- Links : Connects city centre near Kampung Pandan roundabout to KL-Seremban Highway near Sungai Besi.

Storage Reservoir

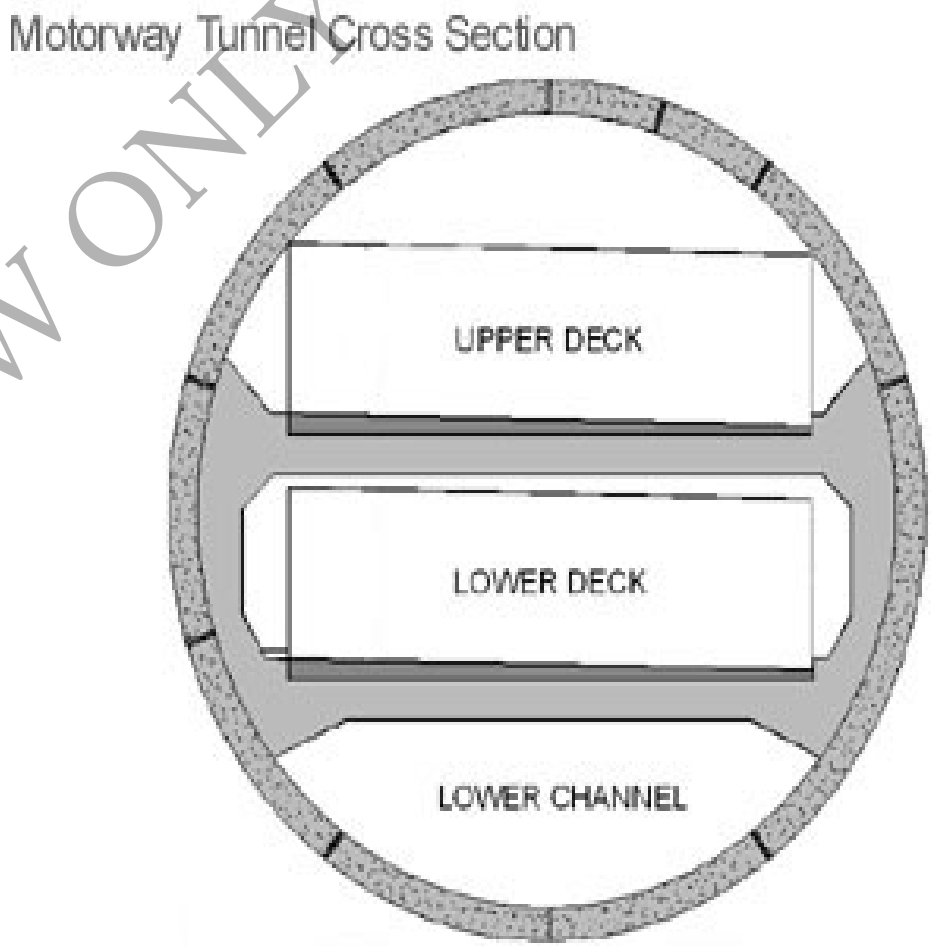
- Location : Ex-mining pond in Taman Desa
- Surface Area : 22 ha (216 594 sq m)
- Storage Capacity : 1,400,000 cubic metres

Holding Basin

- Location : Kampung Berembang (behind Gleneagles Hospital in Jalan Ampang)
- Surface Area : 10 ha (104 008sq m)
- Storage Capacity : 600,000 cubic metres

Special Feature

- The unique feature of this project is the 3km double-deck motorway within the stormwater tunnel.
- The operation of the SMART system works on the three-principle mode of operation based on the flood discharge at the Klang River / Ampang River confluence and the operation status of the motorway.



- The first mode, under normal condition where there is no storm or low rainfall, no flood water will be diverted into the system.

- Under the second mode, SMART system will be activated and this happens when there is moderate storm.

- When the second mode is activated, flood water is diverted into the bypass tunnel in the lower channel of the motorway tunnel and it is important to note, that, up to this stage, the motorway section is still open to traffic.

- At the third mode of operation the motorway will be closed to traffic. With extensive and effective monitoring stations, when the third mode of operation is needed, the motorway will be closed to traffic.

- Sufficient time will be allocated to allow the last vehicle to exit the motorway before the automated water-tight gates are opened to allow flood water to pass through. The motorway will be reopened to traffic within 48 hours after the closure.

Tunnel Safety

- Ventilation/ escape shafts at 1km intervals: these powerful air ventilators will constantly renew the air and maintain the air quality within the motorway.

- To protect the ventilation system during the flooding, the systems consist of a series of shafts each containing an exhaust and fresh air injector.

- This design enables the fans to be situated outside the SMART tunnel to create a longitudinal flow in the tunnel between the shafts that permits the air in the tunnel to be continuously renewed and to enable extraction of the exhaust fumes. The feature also allows for smoke control in the event of a fire.

- Equipped with fire fighting, telecommunication and surveillance equipment at 1 km interval.

National Disaster Relief Fund (NDRF)

- Annual allocation from the Government
- Public Contribution
- Operating Expenditure from various agencies for recovery and reconstruction

- The NDRF shall be disbursed in the following situations:
  - Relief for losses and damage suffered by disaster victims, such as flood, typhoon and other types of disaster;
  - Relief to welfare organizations which its aims and objectives are to lessen the burden and sufferings of disaster victims, such as flood, typhoon and other types of disaster; and
  - Relief to state governments and other institutions which involve in disaster management.

Standard Operating Procedures (S.O.P)

- Standard Operating Procedures (S.O.P.) on preparation, prevention, response, recovery and rehabilitation
- Three major S.O.P.
  - **S.O.P. for Flood (Chapter 1),**
  - **S.O.P. for Industrial Disasters (Chapter 2), and**
  - **S.O.P. for Forest Fire/Open Burning and Haze (Chapter 3).**
- National Contingency Plan for Oil Spill Combat
- S.O.P. for Earthquake and Tsunami Disasters (after 26 December 2004) – in progress
- S.O.P. on Pandemic/ Endemic Preparedness Plans – on revision

Development Program by Town and Country Planning Dept.

- **Applying the Building Code for Seismic Risk on High Rise Buildings for local planning at Kota Kuala Muda, Kedah**
- **Applying Other Relevant Code and Guideline With Regard to Development**
  - Urban Stormwater Management Manual (MASMA) Guideline
  - Dept. of Environment – permissible density and cutting slope for development
  - Guideline on Development within gas pipeline
  - Permissible Height for Building Around Airport

Bilateral, Regional and International Cooperation

- **Bilateral**
  - **MoU with Thailand**
  - **MoU with Indonesia (Disaster Cooperation and Assistance)**
  - **MoU with France (Disaster Cooperation and Assistance)**
  - **Singapore Civil Defense Force (SCDF) (Bilateral networking/ Cooperation and Assistance)**

Bilateral, Regional and International Cooperation

- **Regional Membership**
  - **ASEAN Committee on Disaster Management (ACDM) (Regional Cooperation and Assistance)**
  - **ASEAN Regional Forum (ARF) (Confidence Building)**
  - **Asian Disaster Reduction Centre (ADRC) (Information Sharing)**
  - **Asian Disaster Preparedness Centre (ADPC) (Educational and Training Cooperation)**

Bilateral, Regional and International Cooperation

- **International Membership**
  - **FEMA – (USA) (International Networking)**
  - **United Nations – International Search and Rescue Advisory Groups (UN – INSARAG) (Humanitarian Assistance Networking)**
  - **Typhoon Committee (Mitigation, Coordination and Early Warning Cooperation)**
  - **Participating in UN-ISDR (United Nations – International strategy for Disaster Reduction).**
  - **Malaysian Meteorological Department (MMD) – World Meteorological Organization**

Phase 3: Response and Relief

- Search and Rescue
- Health and Medical – i.e. Emergency Medical Services and Malaysian Armed Forces
- Welfare/ Evacuation Centre – i.e. Welfare Dept.
- Support – i.e. District Office, Municipal/Town Council, Malaysian Telecommunication Ltd.
- Media – i.e. Information Dept. and Broadcasting Dept.
- Security Control – Royal Malaysian Police

Role of Non Government Organization (NGOs)

- To provide assistance in disaster mitigation, response, recovery, rehabilitation and construction;
  - Malaysian Red Crescent Society (MRCS) – medical assistance and rehabilitation
  - MERCY – medical assistance and rehabilitation
  - Haluan Malaysia – rehabilitation and reconstruction
  - Global Peace Malaysia – medical assistance and rehabilitation
  - Global Sikh Malaysia – health assistance and rehabilitation
  - AMAN Malaysia – rehabilitation and reconstruction
  - St. John Ambulance – medical assistance
  - Force of Nature – fund

Progress and Situations of the Hyogo Framework for Action (HFA)

- HFA has been documented in UN World Conference on Disaster Reduction (WCDR) at Hyogo Japan on **January 2005.**
- Asian Conference on Disaster Reduction had been held in Beijing, China on **September 2005** to facilitate the implementation of HFA among Asian regions.
- HFA had been adopted by Malaysia during the National Disaster and Relief Management Committee Meeting chaired by the Deputy Prime Minister on **November 2005**.

Progress and Situations of the Hyogo Framework for Action (HFA)

- Malaysia is still in the phase of restructuring and reorganizing the disaster management system to fit in the HFA.

- Malaysia is also in the phase of enhancing the coordination of responsibility between the government bodies in terms of disaster management system.

Search and Rescue in Aceh, Indonesia

Search and Rescue in Pakistan

Search and Rescue in Leyte, Philippines

Emergency Medical Service (EMS)

Welfare/ Evacuation

Permanent Houses

THE CONSTRUCTION OF PERMANENT HOUSES IN KOTA KUALA MUDA, KEDAH AFTER TSUNAMI 2004

Permanent Houses

Repair Works

Repair works at the affected area
(Location: Seberang Perai Utara & Daerah Barat Daya, Penang)

Transitional Houses

Transitional Houses
(Location: Kota Kuala Muda, Kedah & Daerah Timur Laut, Penang)

THANK YOU

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http://smarttunnel.com.my/

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