

### 3.3.6 Malaysia

#### Malaysia

#### Mitigation and Management of Flood Disasters in Malaysia

The most severe climate-related natural disasters in Malaysia are monsoon floods and flash floods. These floods are common hydrological phenomena in Malaysia, on average affecting an area of 29,000 km<sup>2</sup>, more than 4.82 million people (22% of the population) and inflicting annual damage of RM 915 million.

##### **Flood Mitigation Policy and Strategy**

Structural measures consist of controlling flood flows, whereas non-structural measures such as land conservation regulate human activities to mitigate the impact of flooding. Another indispensable non-structural measure is the adoption of a flood forecasting and warning system. With this in mind, policy guidelines for implementing flood mitigation measures will include the following:

- (1) Implementation of structural flood mitigation in terms of engineering and socio-economic environment,
- (2) Implementation of complementary non-structural measures,
- (3) Implementation of non-engineering measures where there is no engineering solution, and
- (4) Continuation on strengthening flood forecasting and warning systems.

##### **Flood Mitigation and Management**

In 1982 the government conducted a National Water Resources Study on structural and non-structural measures for flood mitigation and management. Subsequently, a number of flood mitigation projects were completed, such as canalization of rivers, raising river embankments and multi-purpose dams.

The financial involvement for such projects was increased in Malaysia's five yearly development allocations. Such escalating expenditures require the government to be more proactive in finding ways and means to address the flood problems in a holistic manner. Government machinery allows the Economic Planning Unit of the Prime Minister's Department to coordinate all aspects of planning, design and implementation of water resources in the country.

##### **Flood Disaster Relief and Preparedness Machinery**

After the disastrous flood of 1971, the National Disasters and Relief Committee was formed to be responsible for planning, coordinating and supervising relief operations during floods. Most of the committee members are governmental departments/agencies and social organizations that are able to provide shelter, rescue, food and medical supplies. Through the nationwide State Security Committee, police, the armed forces, social and welfare departments and various voluntary organizations, the task of rescuing and evacuation of flood victims to predetermined relief centers could be organized effectively.

##### **Flood Forecasting and Warning System**

To date, the following infrastructures for flood forecasting and warning systems have been installed:

- 233 telemetric rainfall stations;
- 190 telemetric water level stations;
- 256 manual stick gauges;
- 84 flood warning boards;
- 217 flood sirens;
- real-time flood forecasting and warning systems in nine river basins.

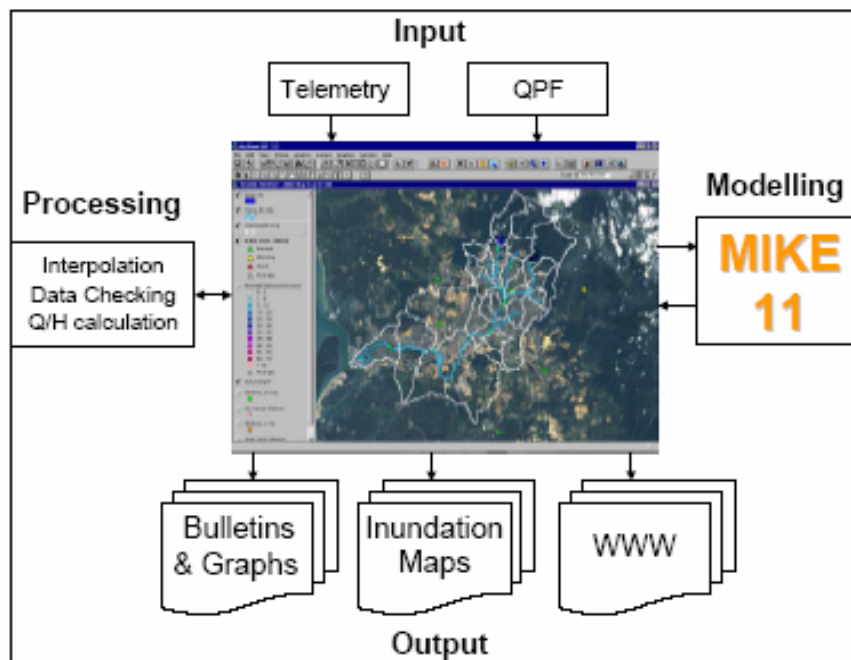
The Department of Irrigation and Drainage Malaysia (DID), responsible for providing flood forecasting and warning service to the public, has established an Internet-based National Flood Monitoring System known as Infobanjir (<http://infobanjir.moa.my>), via which rainfall and water level data can be collected for the whole country.

The government has been working closely with the Canadian government to establish the GEOREX Monsoon Flood System for the Kelantan River Basin, a flood monitoring system integrating remote sensing, hydrological model and geographical information systems (GIS).

This system allows the merging of hydrological data, such as river water levels and potential flooded areas, with geographical data on demography and transportation infrastructure.

### Urban Stormwater Management

Flash floods from intense thunderstorms are becoming very common phenomena, especially in urban areas. Under a program of the Asian Development Bank, a flood forecasting and warning system known as Flood Watch has been established as a powerful forecasting and warning tool with GIS.



[Outline of Kuala Lumpur Flood Watch System]

Recently, an Urban Stormwater Management Manual for Malaysia (MSMA) has been introduced to contribute to flood mitigation in urban areas. The MSMA was formulated by incorporating best practices for stormwater control measures such as runoff quantity and quality controls.

#### - Background

Malaysia is directly influenced by the abundant rainfall brought by the Asian monsoon, which causes a number of floods and flash floods.

#### - Objective

To formulate a holistic, integrated and sustainable framework for the management of rivers in the country.

#### - Term/Time Frame

Since 1982 when the National Water Resources Study was conducted.

#### - Activities Undertaken

1. National Water Resources Study;
2. Development of infrastructures for flood forecasting and warning systems;
3. "Infobanjir" (National Flood Monitoring System);
4. "Flood Watch" (a flood forecasting and warning system);
5. Urban Stormwater Management Manual for Malaysia (MSMA).

#### - Total Budget

Malaysia's five-yearly development allocations for design and construction of flood mitigation projects account for RM700 million (1991-1995), RM940 million (1996-2000) and RM1.6 billion (2001-2005).

#### - Contact Details

Hj. Hosni bin Bardan, Deputy Director General II, Department of Irrigation and Drainage, Malaysia