The Role of Community in Integrated FLOOD Management

FLOOD RANGER

Initiated by

Global Water Partnership

MyWP Malaysian Water Partnership

Global Environment Centre

Jabatan Pengairan dan Saliran Malaysia

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Foreword

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At the end of 2014, Malaysia witnessed a tragic flooding in several states in the Peninsular, especially in the East Coast zone. The estimated number of victims nationwide were about 400,000 people which resulted in loss of properties and infrastructure damages amounting to RM2 Billion. However, the flooding did not only cause property and infrastructure damages, but it also effected crops, livestock, homes and loss of lives.

The main cause flooding is usually associated with the global climate change. However, there are others factors contribute to flood disasters such as loss of water catchment areas, unsustainable urbanisation, encroachment of flood plains, dumping of garbage and others, all of which are actions by irresponsible parties including the local community.

Therefore, the Module on the Role of the Community in Integrated Flood Management is an effective approach and can be used by all levels of the communities. The structured and unstructured flood management strategies outlined in this module will help to reduce the risks of flooding as well as the socio-economic losses that have to be borne by all parties.

In addition, this module provides exposure and educates the community to prepare for flood disasters which include actions and responses before, during and after the disaster. In conclusion, the Role of the Community in Integrated Flood Management is effective and is the best measures to be implemented in partnership with all stakeholders to ensure minimal losses and risks.

Faizal Parish
Director
Global Environment Centre

I would like to take this opportunity to congratulate everyone involved in the preparation and publication of the Module on the Role of the Community in Integrated Flood Management. Special acknowledgement to the Global Water Partnership, Malaysian Water Partnership (MyWP) and the Department of Irrigation and Drainage (DID) Malaysia.

This module was published to provide guidance to the local community and the public in dealing with the flooding situation in Malaysia. Flood disasters are inevitable disasters. The impact of climate change on the environment and human life has been widely discussed at the World Water Forum 2015 in South Korea. Among the things emphasized are risk forecasting and assessment; urban flooding and resilience; as well as readiness. It is generally agreed that preparedness and actions taken by all stakeholders before and at all the times can reduce the risk of property damage and life threats.

This module includes five (5) components, namely introduction, impact of flood, flood mitigations, community involvement in flood management and levels of flood management. Each of this component has its own importance which aims to provide a holistic understanding for the local community. This module has been specially designed with various illustrations to make it easier for the public to understand and to take efficient action before, during and after the flooding.

Finally, Global Environment Centre hopes that this module will complement the efforts of all stakeholders in managing flood issues in Malaysia and create a knowledgeable, skilled, and proactive community in dealing with flood disasters.

1.0 Introduction

In Malaysia, flooding is a natural disaster phenomenon that occurs almost every year. Flood disasters impact the country and its people. Therefore, various mitigation measures need to be taken to address this problem. Before mitigation measures are taken, we must first learn about flooding including the type of flooding, flooding events, history of flooding phenomena and the causes of flooding. An understanding of flooding is important to design preventive measures.

1.1 Type of Floods

There is no official classification of floods in Malaysia, but they are often categorised as monsoon floods, flash floods or coastal floods. In addition, floods are also described based on their location, characteristics, causes, time of occurrence and duration of occurrence. The followings are the type of floods listed based on the Flood Management Manual Volume One (JPS, 2009).

1.1.1 River Floods

River flooding is a natural process and part of the hydrological cycle of rainfall, surface, and groundwater flow as well as storage. Floods occur when the capacity of a natural or manmade drainage system cannot accommodate the amount of water produced by rainfall. These floods vary in terms of size and duration.

Source: dfianalysis.blogspot.my, 2014.

Prolonged rainy conditions over large area causes surface runoff to flow into a network of ditches, tributaries, and rivers. The total water capacity then increases as the flow of water flowing downstream merges with the flow from other waterways. When the water flows beyond the capacity of a river channel, the river water then overflows out of the riverbank and floods the adjacent floodplain.

1.1.2 Regional Floods

Regional flooding is also a type of river flooding, but it covers a larger area or region. It often happens in large river basins such as Kelantan River, Terengganu River, and Pahang River. Large floodplains with continuous river system can cause flooding to occur for a while even after the rain stops as it will take time for a large amount of water to flow out of the catchment area. This type of flooding usually occurs in Malaysia during the monsoon seasons, especially in the East Coast of Peninsular Malaysia during the Northeast Monsoon winds from October to March each year.

Source: m.utusan.com.my, 2015.

1.1.3 Localised Floods

Localised flooding often occurs in small lowland areas and sensitive to the rainfall. Due to the lowland's characteristics, natural drainage is difficult. Although most flooding areas last for a short period, there are some areas submerged in water for over a month, even when the water has receded. In this case, the removal of flood water depends a lot on the evaporation process that takes place. For example, the flooding at Buloh Kasap, Segamat and in Johor areas were dubbed with the term 'Flood Termenong', or in other words "just sit, wait and think" as the flooding takes time to recede.

1.1.4 Coastal Floods

Coastal flooding is floods that occur along the coastal plains. There are two basic mechanisms of coastal flooding; the effects of tidal currents that causes seawater to flow inland and overflows into lowland areas. This problem is also exacerbated when the river water from the upstream is flowing at a high rate and meets the water current while moving downstream. The flow of the river to the sea will also be disrupted when there are sudden coastal waves.

1.1.5 Urban Floods

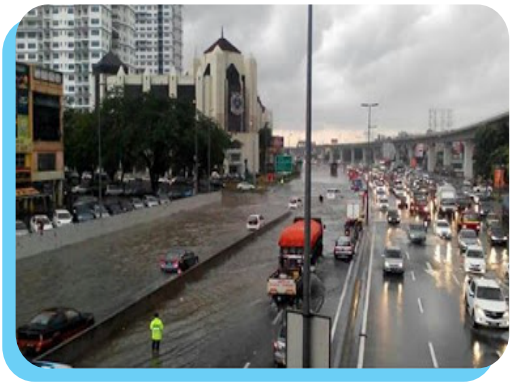
Urban flooding occurs in development areas such as in cities, towns, and residential areas. Urban flooding effects more people and property per unit area compared to in the agricultural and rural areas. It also effects the traffic and services outside the flooding area. Urban flooding can also become serious and life-threatening when the flooded roads, bridges and traffics experience high water flow.

1.1.6 Rural and Agriculture Floods

Rural and agriculture flooding occurs in rural settlements (villages) and agricultural production areas. Besides being a threat to life and property, prolong flooding that submerge an entire area can decrease crop yields and agricultural production.

1.1.7 Flash Floods

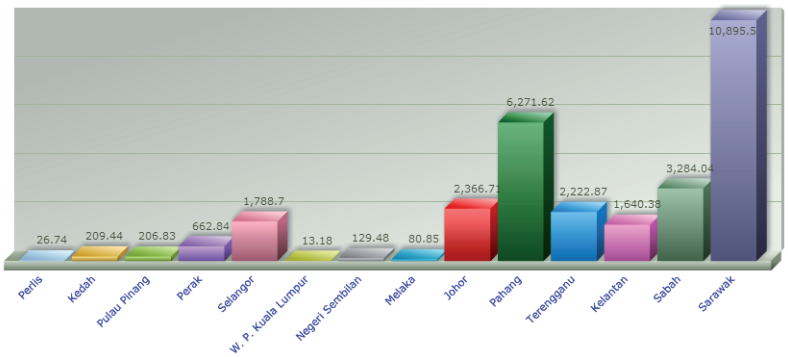
Flood water that rise and recede rapidly with or without prior warning is called flash flood. Flash floods are usually caused by heavy rains in relatively small areas and local storms. Flash floods usually occur in urban environments. The depth of flash floods is shallow (100mm or more), however, there are some cases of flash floods with depth of up to 2 meters. The effect is not as severe as the major flooding but it will disrupt the daily routine of the community, especially the urban population.



Source: www.astroawani.com, 2013

1.2 Flood Prone Areas in Malaysia

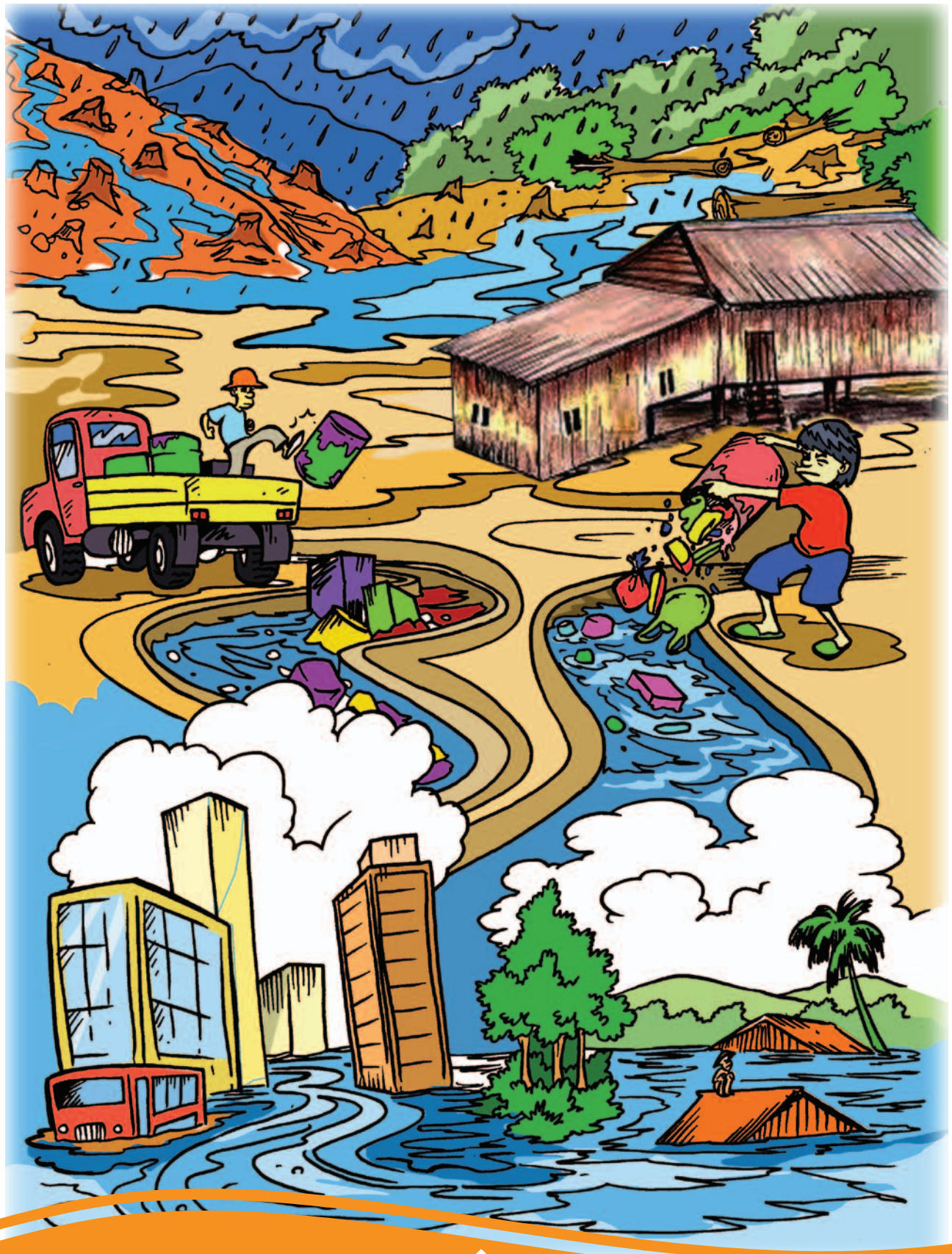
Flood prone areas are located on the banks of rivers where the area will be inundated by river water when a flood occurs with a depth of twice the maximum bankful depth. In Malaysia, an estimated 29,799 km or 9% of the country's land areas are flood prone areas.



Source: forum.mygeoportal.gov.my/smanre/sungai/kaw_banjir_msia.php

Total population affected by floods in each state.

1.3 Causes of Flood

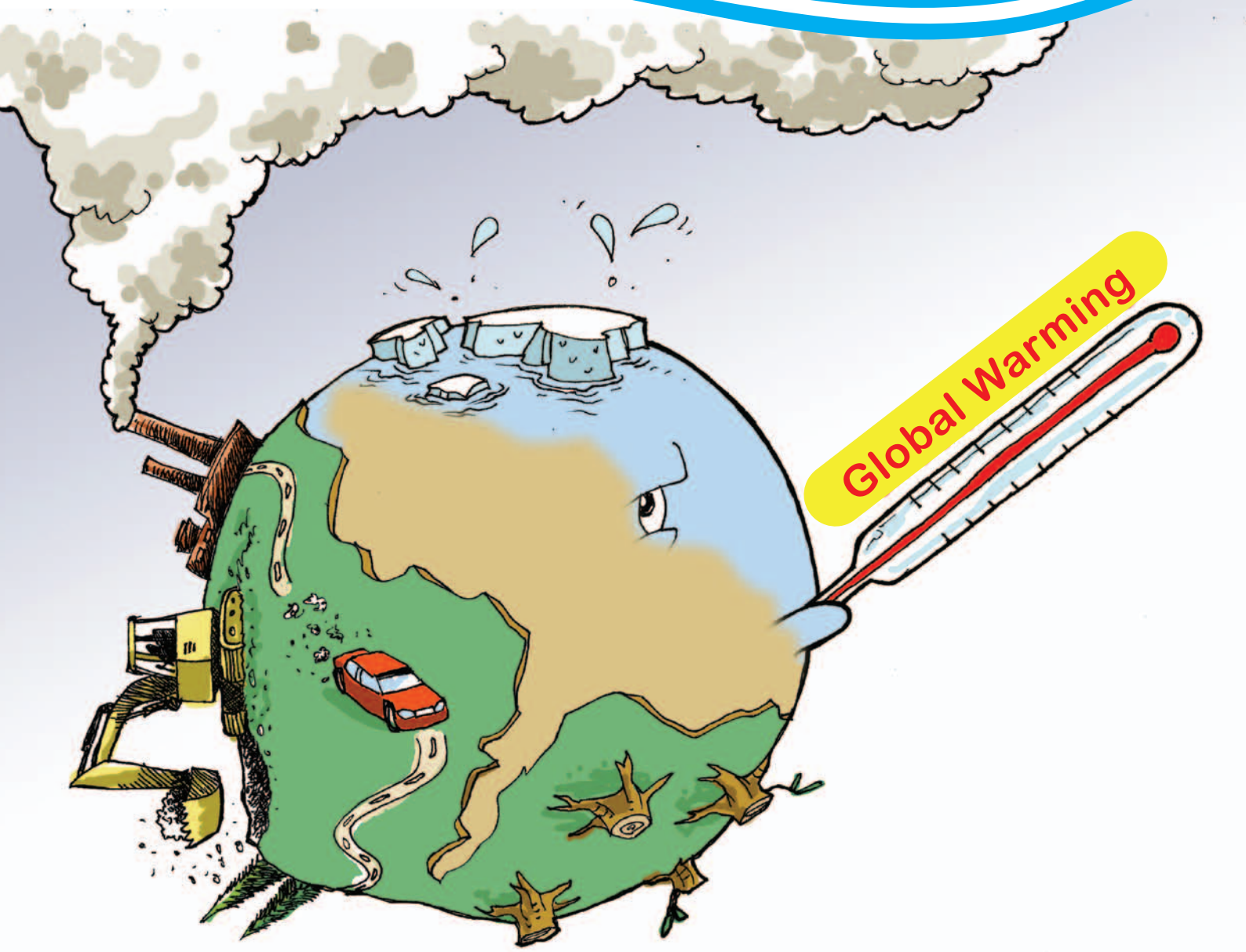


1.3.1 Climate Change

Global

- Human activities such as industrialisation, deforestation, logging and open burning can increase greenhouse gas emissions, which is the major cause of climate change.
- According to the IPCC (Intergovernmental Panel on Climate Change) 2011 report, climate change leads to the rise of global temperature, increase in rainfall frequency, changes in rainfall amount, haze occurrence and global warming caused by carbon dioxide emissions into the Earth's atmosphere.
- In addition, the warming temperature can also increase the energy of the world's climate system and causes heavy and continuous rainfall. Scientists believe that climate change will increase the frequency of rainfall, putting communities at risks of the impacts of flooding.

Source: http://www.nrdc.org/globalwarming/fcons/fcons1.asp

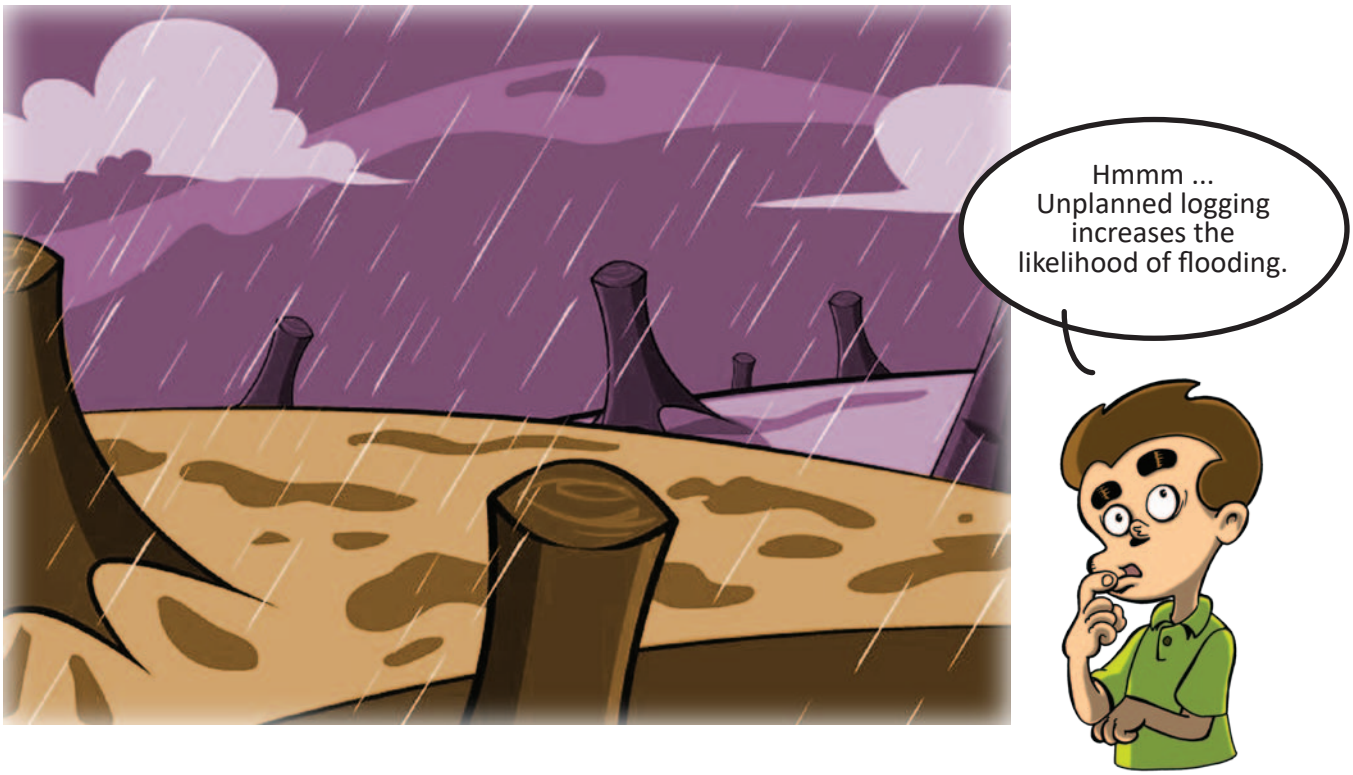


According to the IPCC report 2011, climate change leads to the rise of global temperature, increase in rainfall frequency, changes in rainfall, haze occurrence and global warming caused by carbon dioxide emissions into the Earth's atmosphere.

Local

- Based on a study conducted by the National Hydraulic Research Institute of Malaysia (NAHRIM), climate change has changed the rainfall patterns in Malaysia.
- There is more rainfall in the central and southern parts of Peninsular Malaysia, which is concentrated in certain areas compared to in the past, which was distributed throughout the region.
- One example of an early scenario in Malaysia is the heavy rainfall and massive flooding that occurred in Johor at the end of 2006.

Source: http://www.konsumerkini.net.my/v1/index.php/ berita-terkini/perubahan-iklim/595-kesan-perubahan-iklim-dan-banjir-kepada-pengguna



1.3.2 Loss of Water Catchment Area

- Forests and soils play important role as natural absorbing agents of rainwater
- The destruction of water catchment areas can cause direct rainfall on the earth's surface, increase the surface runoff and eventually causes flooding.

1.3.3 Unsustainable Urbanisation Process

- Lowland areas are covered mountain soil for reclamation process as an urban area.
- There are also tributaries buried into flat land as a building site.
- Waterways covered with soil can block to flow of water from the upstream to the lowland areas, lead to stagnant water flow and eventually cause flooding due to an overflow.

Unplanned drainage system and maintenance

- Unplanned drainage systems will cause an overflow before the water even reach the river.
- This situation will cause flash floods because the drainage system cannot accommodate the large amount or quantity of rainwater.

Increased watertight area

- Rapid development can significantly increase the sealing surface of an area and loss of vegetation protection areas which lead to an increase in surface runoff.
- This situation prevents the water on the surface to seep through the ground and causes a rapid runoff into the ditches and drains which then leads to flash floods.

1.3.4 Invasion of Flood Plains

- Human inhabitation and rapid development on floodplains, especially in the large cities, is one of the main reasons for the increasing incidences of flash floods.
- This problem is exacerbated by the human activities to develop floodplains for settlement and other activities by destroying the forest areas and cutting the hill slopes.
- Other factors that increase the frequency of flash floods include eroded riverbed due to rapid development in the floodplains; obstructed river flow due to garbage disposal; and the use of riverbanks for illegal agriculture and housing (squatters) as well as other purposes.

1.3.5 Garbage Disposal

- Communities are prone to dispose garbage where it would end up in the drains, ditches, and rivers.
- Irresponsible disposal of garbage can clog the drains.
- During a sudden rainfall, the clogged drains, ditches and rivers can lead to flooding.

1.4 Flood Forecasting and Warning System in Malaysia

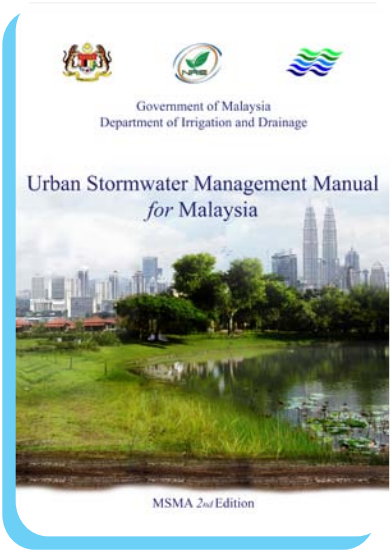
Source: http://forum.mygeoportal.gov.my/smanre/sungai/infoLSM.php

Telemetry stations used for flood practice systems.

Flood forecasting and warning system is one of the methods often used by countries that are often hit by floods. This method is one of the effective unstructured controls to reduce the loss of property and human lives due to flooding. The flood forecast and warning system can provide a forecast of flood levels based on the actual water level of the river due to rainfall and the inflow of water through the boundaries of the river system. This system is important in providing early forecasting and warning to lowlands population. In Malaysia, the agencies involved in the flood forecasting and warning system are the Malaysian Meteorological Department (MMD), Department of Irrigation and Drainage (DID) Malaysia and the Public Works Department (JKR). Flood siren is an example device used to provide a flood warning.

1.5 Environmental Friendly Drainage Manual

The Environmental Friendly Drainage Manual covers all aspects and requirements of flood water management for urban areas throughout Malaysia. The purpose of this manual is to provide guidance to all regulators, planners and designers involved in the management and prevention of flood events through the "control-at-source" method. Flood management in the catchment areas is usually carried out by several organisations. The challenge is to ensure that the administration, design planning and maintenance of runoff management systems are in line with the efforts of relevant Local, State and Federal Authorities and professionals, environmental and civil engineering and landscape architecture.

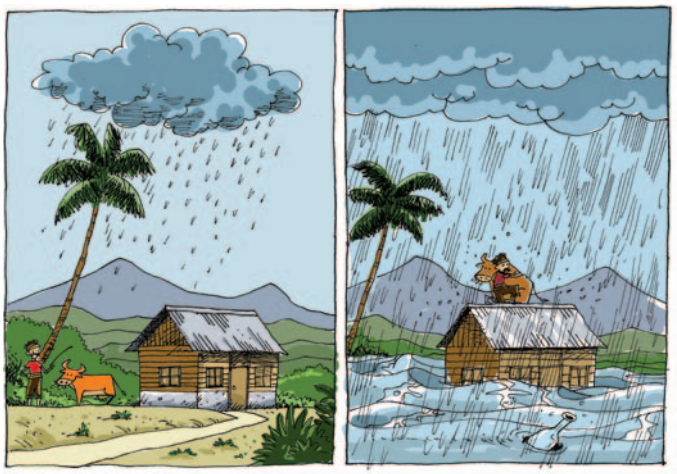


Source: DID Malaysia.

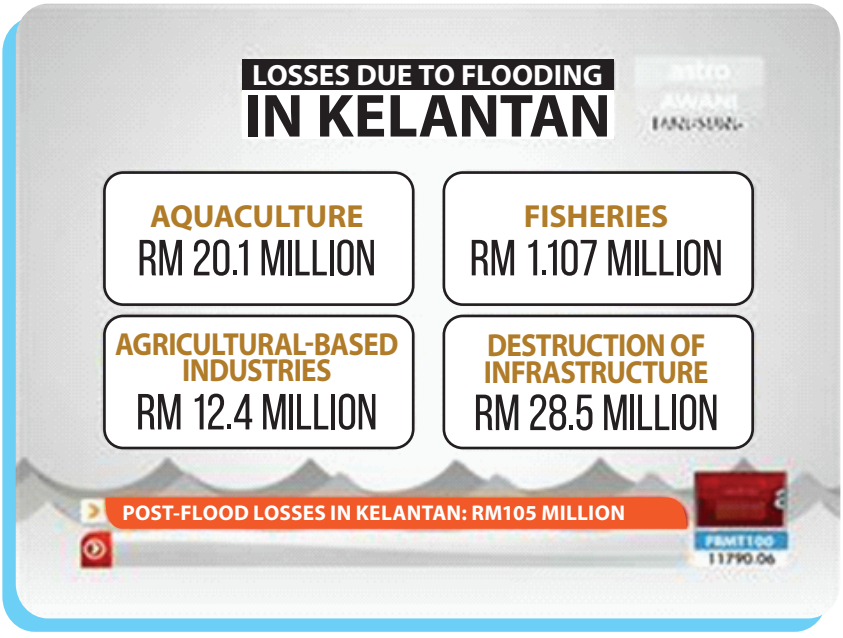
Environmentally Friendly Drainage Manual.

2.0 Impact of Floods

Flood disasters impacted the people living near the flooding areas. The impact varies according to the place and type of flooding. However, the impact of flood disasters could also include the loss of lives. Therefore, these impacts need to be identified in order to draw preventive measures and address the problem as well as reduce flooding impacts in the future.



2.1 Socio-economic loss



Source: www.astroawani.com, 19 January 2015.

Impact to business operators

- Damage of goods and stocks.
- Suffer from losses or earn negative profits from selling goods below purchasing costs for flooded items.

Impact to land and house prices

- Drop of land and house prices due to the frequent flooding.
- Affect the selling value of an area and possible abandonment for a long period.

Impact to the economic sector

- In the agricultural sector, flooding will destroy all vegetable crops, fruits and including the harvesting cycle or tree fertilisation. For example, rubber trees were found to be experiencing the 'autumn season' earlier than due, after flooding.

  Source: An article titled ' Pertanian selepas banjir', Utusan Malaysia, 2007.

- Other economic sectors will also directly or indirectly suffer from the effects of flooding such as the tourism industries, fisheries and industrialisation.

The frequency of flooding can also reduce investment rates of our country.

2.2 Property Damage

- Property is defined as personal belongings such as furniture, houses, agricultural areas and public property.
- Property is defined as personal belongings such as furniture, houses, agricultural areas and public property.

Source: wargamarhaen.blogspot.my, 2015.

Destroyed properties.

2.3 Disease Outbreak

A heavy rain will cause an overflow and carry with it rubbish, sewage and chemicals from the factories and industries. This situation causes pollution and various bacteria, viruses and organisms that can cause infectious diseases, especially *Escherichia coli* (*E. coli*) and *Salmonella*. Dangerous disease outbreak that can and may happen during or after flood occurrence are:

Typhoid fever
It is caused by the *Salmonella typhi* germs found in the urine and the feces of typhoid fever patients. The patients may die if no proper treatment being done.

Cholera
An infectious and often fatal bacterial disease of the small intestine, typically contracted from contaminated water supplies and causing severe vomiting and diarrhoea.

Leptospirosis
An infectious bacterial disease occurring in rodents, dogs, and other mammals, which can be transmitted to humans.

Murine typhus
Mild disease that is marked especially by fever, headache and rash caused by a rickettsia (*Rickettsia typhi* synonym *R. mooseri*). It is widespread in nature in rodents, and can be transmitted to humans by fleas.

Hepatitis A and E
Inflammation of the liver due to virus infections caused by the contaminated food and drinks. The symptoms are similar to *Leptospirosis*. Patients may suffer from jaundice, loss of appetite and weight.

Source: paramedik.bbfr.net

Besides that, dirty water that contains bacteria can enter the human body through wounds and scratches, thus can cause skin inflammation and scabies.

2.4 High Cleaning and Repair Costs

- The costs of reparation and maintenance are borne by the government or flood victims.
- Amongst the reparation needed are: restoration of damages, transportation, settlement, food supply and medical equipment.
- Malaysia experienced the worst flooding in 2014 with over 300,000 people displaced, at least 21 people were reported dead and eight people were missing. The flooding was believed to be caused by the three days of heavy rain that recorded the highest rainfall of 1,295mm, which is equivalent to 64 days of rainfall in Kelantan. The Malaysian Meteorological Department issued 38 bad weather warnings; 15 warnings in the 'red' stage, 15 and 8 warnings in 'orange' and 'yellow' stages respectively.

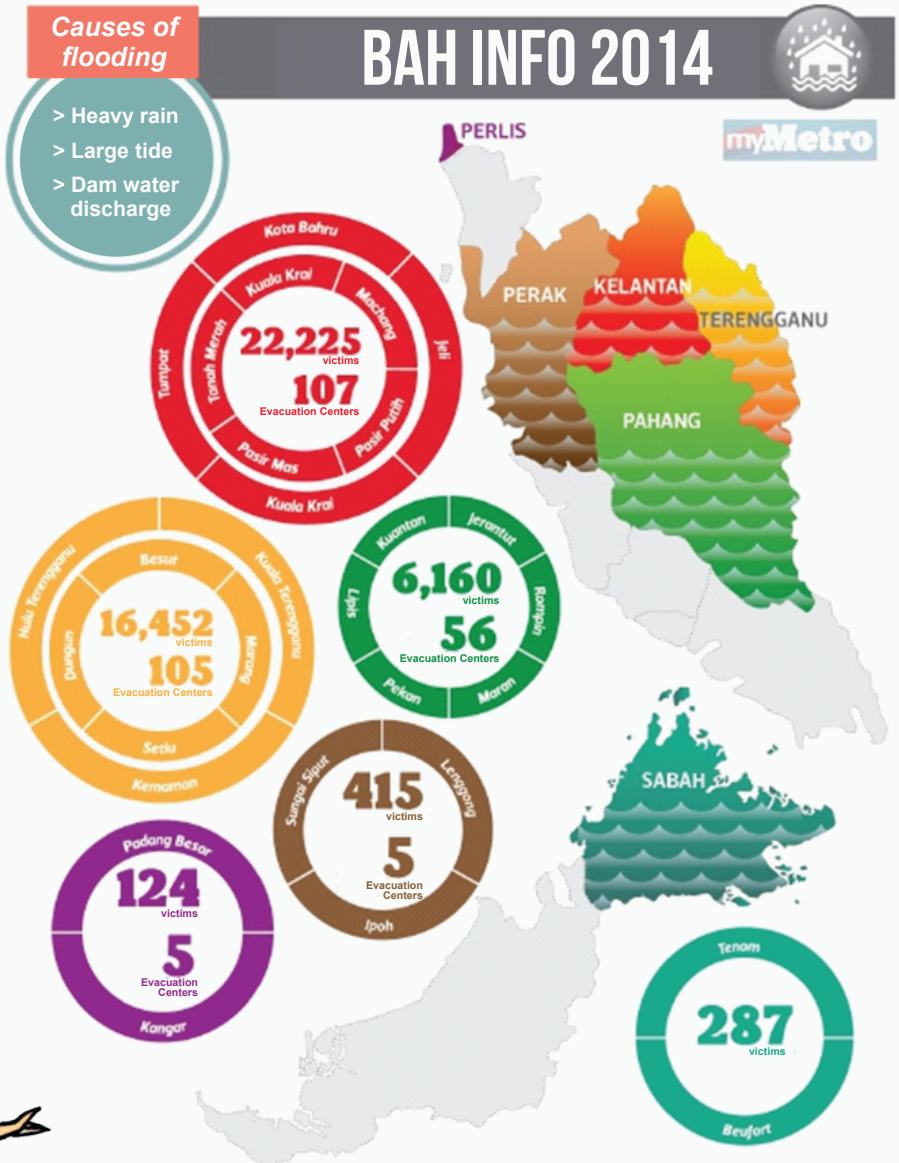
Source: Utusan Malaysia, 2007.

2.5 Loss of Life

The worst effect of flooding is the loss of life due to drowning or injuries, cut off from food and water supplies, disease and absence of medicines, difficulty to get treatment from the doctors, or violence due to desperate needs of basic necessities. This impact is prone to happen in low areas and near the river.

Drowning is the main cause of death during flooding. Children are highly at risk of drowning as shown in the flood statistics of year 2007, which saw 29 deaths were recorded with 41 percent are children with drowning as the main cause.

Source: http://www.infosihat.gov.my/infosihat/media/video/B/Video%20Banjir/Banjir_BM.php



Source: www.hmetro.com.my

3.0 Flood Mitigation

Flood management is a major task that needs to be addressed immediately to reduce the massive loss annually in Malaysia. Integrated Flood Management is a holistic approach to overcome flood problems and reduce socio-economic loss as well as its impact on humans. One of the ways is by integrating land development and water resources. The Department of Irrigation and Drainage (DID) has adopted guidelines in the "Integrated River Basin Management" and "Integrated Flood Management" for the flood management programme. The programme provides balanced measures between structured flood control and non-structured flood control as well as increase of public participation.

3.1 Structured Flood Control

Structured flood control refers to the water management through upgrading of existing infrastructure. It needs support from the government and local agencies and requires financial resources and long-term management. Structured flood control activities include:

Construction of flood mitigation dam
With a dam construction, most of rainwater at upstream can be stored and flooding at the lowlands downstream can be avoided.

Construction of flood reservoir
The construction of a flood reservoir is to accommodate the excessive rainfall. It is also an effective way to lower the peak discharge so that excessive runoff does not overflow the riverbank. (Eg: Jinjang Stone, KL)

Construction of diversion
The purpose of a diversion is to act as a runoff water retention from heavy rainfall and then, slowly released to a nearby river. (Eg: SMART tunnel).

River improvement works (increase the depth and width of river)
The aim is to increase a river's capacity to carry excess runoff to downstream.

Pump house
The aim is to pump rainwater from low areas to prevent flooding. (Eg: Kampung Baru Pump House, Kuala Lumpur)

Construction of river bund
Construction of river bund around the lowlands and along the river to protect the low area from water.

Hydro-Mechanical Automatic Door
The hydro-mechanical automatic door will be closed automatically and drain the excess water above the channel level. The door will also open automatically when the water level decreases.

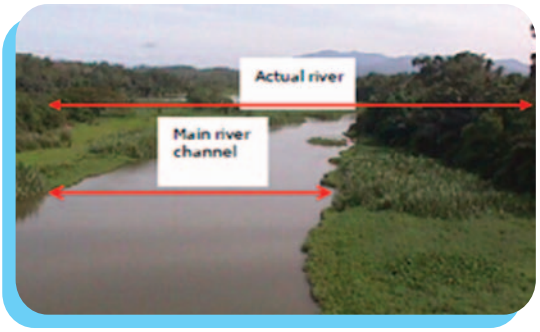
3.2 Non-structured Flood Control

Source: DID Malaysia.

Apart from structured flood control, Malaysia also implement non-structured flood control activities to overcome flooding problems. Community involvement is important in the non-structural flood control activities that do not involve infrastructure construction. Among the activities under the non-structured flood control programme are:

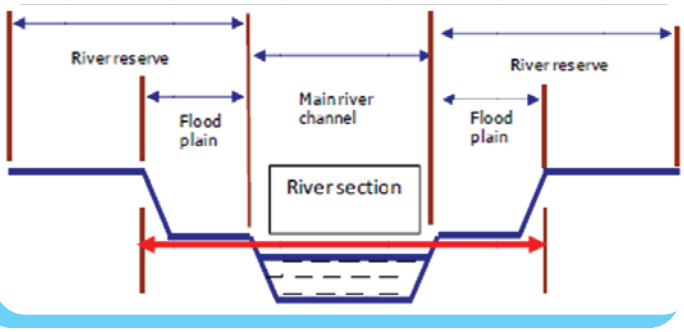
Water catchment area management

ater catchment area is important to store water and increase the capacity of the waterways especially during heavy rain. In addition, the management of water catchment areas can also ensure the balanced quality and quantity of water to achieve sustainable development. The communities need to ensure that there are no human activities at the water catchment areas such as farming, settlement or husbandry. The frequent openings at a water catchment area is the main cause of flash floods and mud floods.



Source: DID Malaysia Report.

Natural river resources.



Source: Flood Management Manual Volume 1, DID Malaysia.

River Reserve Protection in Flood Management Requirements .

Integrated River Basin Management, IRBM

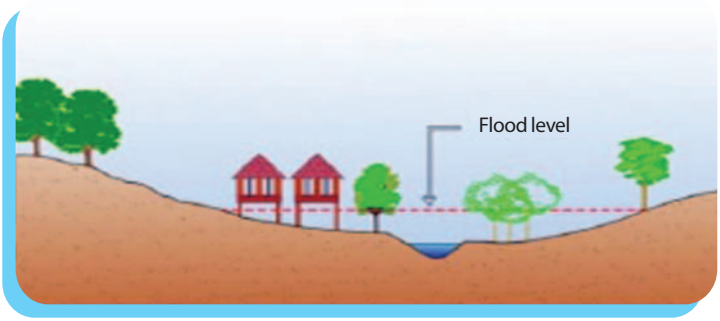
The integrated river management concept considers factors such as river bank, natural flood catchment areas, wetland rehabilitation and others in the preparation of flood management plans. Communities can get more information about the IRBM from DID Malaysia (www.water.gov.my). The IRBM cannot be implemented if the local community does not comply with the guidelines and laws that have been prepared or set. This is because the development and exploration of water catchment areas is the main cause of increasing flooding.

Preparation of Guidelines and Reference Manual

Communities can refer to the guidelines and reference manuals that help in the preparation of regular and perfect drainage systems in flood management aspects. For example, the MASMA guidelines printed by the DID, provide a disaster resource control reference and an integrated flood reduction proposal.

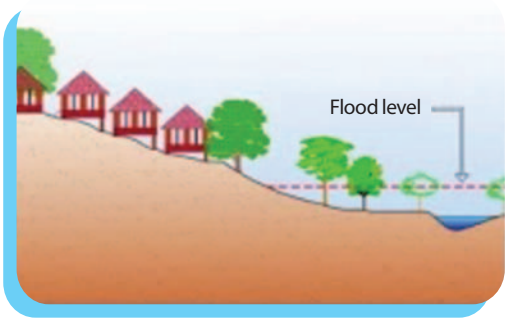
Flood proofing

Preventing water from entering the house and certain places such as car parking area with non-easily submerged walls are very important and need to be understood by all, especially the local community. Application of flood proofing in home designs can reduce damage and loss during flooding.



Source: Draft Guidelines on Conservation and Development Planning

Example of flood proofing building with floor level exceed the flood level.



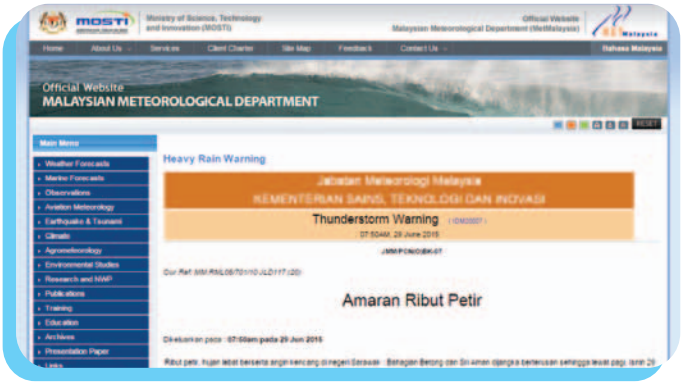
Example of building placement at a higher place or safe from the flood level.

Flood Forecast and Warning

- Community should be vigilant towards the rainfall precipitation and the rise of river water level to a critical level.
- Communities should always be aware of flood forecasts and warnings from mass media.
- Communities should be prepared for a displacement.
- Communities should always be aware of information on flooding from the websites:

Source: publicinfobanjir.water.gov.my

Early warning flood system .



Source: www.met.gov.my/index.php?option=com_content&task=view&id=4964

Weather forecast.

Source: bencanaalam.jkr.gov.my

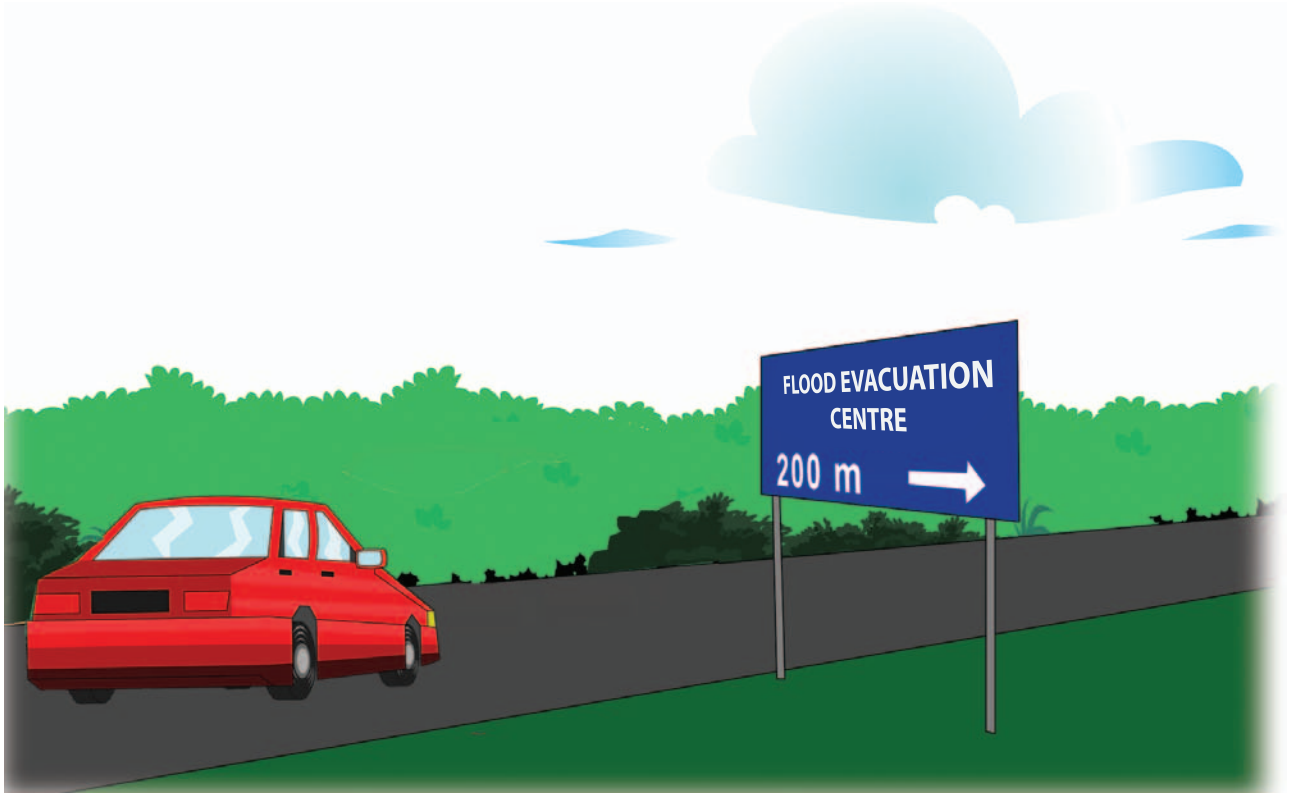
Information about landslides.

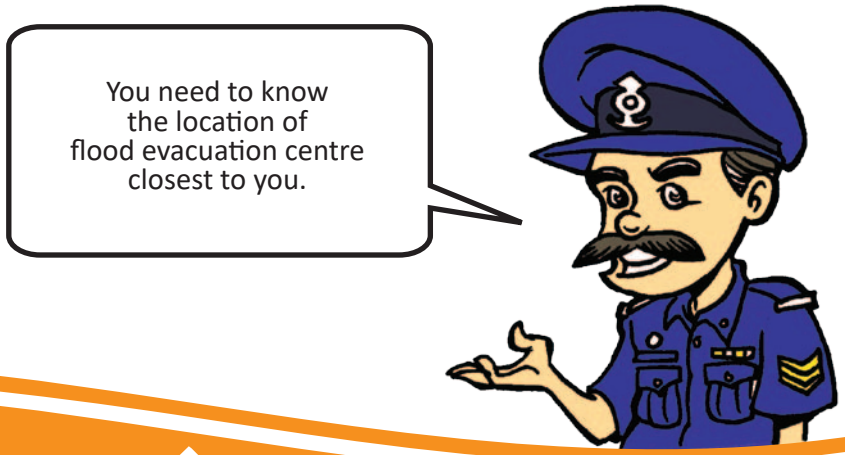
Awareness campaign and education programme

The aim is to increase awareness amongst the community to maintain environmental hygiene so that the society or community does not simply throw garbage into the drains and drainage systems as they will clog and cause flooding problems.

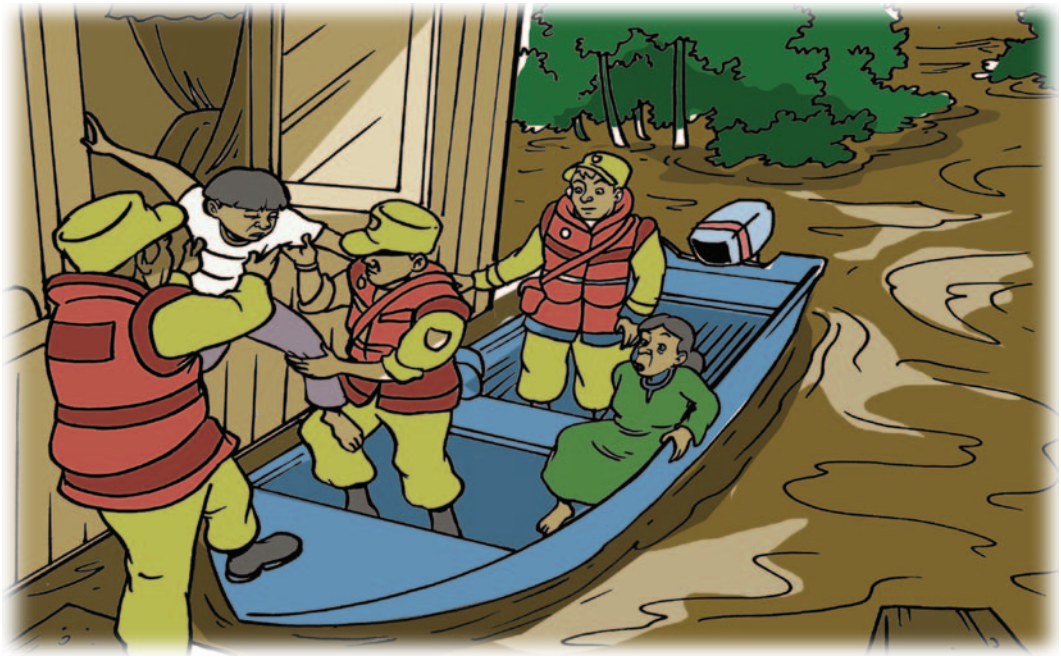
Flood victim evacuation

At a flood prone area where structured flood control activities cannot be undertaken, evacuation to a safe area is a positive measure taken to reduce losses and damages. Thus, the community should always be aware of the latest information on the evacuation centres as an early preparation of a flood disaster.





4.0 Community Involvement on Flood Management



Community involvement plays a crucial role in flood management. Flooding due to unexpected climate and unprecedented flooding require community involvement in all aspects.

4.1 Community Roles Through Flood PREPARE Approach

The flood **PREPARE** approach was customised to suite the bottom-up and civic science approach specifically on community-based flood resilience through the following steps: (1) **Preparedness**; (2) **Action**; and (3) **Recovery**. Under the step number 2 of **Action**, a Town Watching activity will be executed through the development of Community-based Flood Hazard Map and Community-based Flood Response Plan.

4.1.1 Preparedness

Planning Process

- Identify stakeholders related to community activities.
- Draft a vision that reflects the needs and concerns of the community.
- Organise awareness campaigns for the public to inform the community and ensuring community involvement in consultation and local decision-making and research.
- Identify the information required and develop local data collection methods.

Risk Assessment

- Understand flooding through past records or opinions from vulnerable communities to the flood (local knowledge).
- Create an inventory database to determine:
  - current land use practices
  - future potential land use patterns
  - human placement patterns
  - resources (nature or man-made)
  - river and drainage mapping
- Conduct hazard assessments from a variety of perspectives.
- Conduct risk assessment at the community level.
- Cross check to ensure the risks identified are the same as predicted by all stakeholders.

Problem Analysis

- Conduct vulnerability and capacity assessments to identify at-risk communities:
  - Identify houses with people with special needs (senior citizen, disabled community, baby/kids, etc)
- Identify the community causes (activities) that lead to floods.
- Identify flood plain areas to determine flood risk.

Goal Setting

- Determine objectives based on risk assessment results.
- Determine the scope of community activities.

4.1.2 Action

Planning

- Assess the various measures necessary to address their local flood risk:
  - such as land use planning, building codes, conservation zones, drainage repairs and others.
- Develop an action plan listing specific mitigation/activities, roles and stakeholder responsibilities.
- Set timelines and expected results.
- Establish monitoring, evaluation and study procedures.
- Distribute agreed draft plans, especially to those directly involved.

Execute

- Town Watching activity is an effective way to create a flood resilient community.
  - Community-based Flood Hazard Mapping (CBFHM)
  - Community-based Flood Response Plan (CBFRP)
- Test the CBFHM, CBFRP and the availability of the parties involved for their respective responsibilities.
  - Training, drilling activities and discussions related to flood management can increase the availability and capability of individuals to deal with flood scenarios.
- Increased individual capacity and ownership will have a 'synergy' impact for community.

Sharing

- Once finalised, hand over the Town Watching Map to district office, local authorities and other key related/relevant stakeholders for further action and acknowledgement.
- Distribute the Town Watching Map to all community members and place at main gathering area of the neighbourhood such as community hall, mosque, school and others.
- Always share and promote the Town Watching Map to all community members during an event or gathering.
- Regular reminders through meetings will also create an impact for sustainable flood management.

4.1.3 Recovery

Creating networks between the community and relevant agencies

- Including government, national disaster management agencies, and donors focused on flood recovery.
- To support the flood mitigation, recovery activities.

Community be proactive and alert regarding their local hazard situation

- Be the eyes and ears.
- To minimise flood risk.

4.2 Town Watching

4.2.1 Introduction

Town Watching is an activity that engages the communities in integrated flood management. It was originally used in town planning; however, it can also be used in prevention of disaster impact such as flooding. It is used to identify areas prone to danger and routes that are safe for travel during the flooding within the community residential area. The Town Watching activity focuses on two main outputs (Community-based Flood Hazard Map and Response Plan) that will be combined into one simple map known as Town Watching Map.

Community-based Flood Hazard Map (CBFHM)

emphasises on how local community can develop their own map using:

- local knowledge and experience; and
- the current condition.

Community-based Flood Response Plan (CBFRP)

is a list of actions to take in preparing the safe route during flooding and emphasise on things to be done prior involving:

- individual;
- community;
- agencies; and
- others

4.2.2 Components of Town Watching

Component 1: Selection of Project Site

- Based on the need:
  - Flood prone areas
  - Frequently affected community
- Suggestion/Recommendation by:
  - Local authorities
  - Agencies
- Project needs/funder/supporter

Component 2: Early Preparation

- Identifying area of concern:
  - targeted location of Town Watching activity (flood prone areas or interested community groups)
  - local leaders/champions to take lead of the activity for their respective community
  - local government, relevant agencies, NGOs, associations, etc. to assist

- Preparation of area map
- Preparation of necessary tools
- Prepare Town Watching Mapping Form to:
  - Identify the Local Community Flood Gathering Centre (LCFGC);
  - Propose the safe route(s) to LCFG from respective houses;
  - Identify all hazards & risks along the proposed safe routes;
  - Collect information on related community profiles; and
  - Identify any resources in that area.
- Identification of Resource Person:
  - that is familiar with the area (local knowledge);
  - knows the area or experienced in disaster management and community preparedness is an added advantage; agencies, NGOs, experience community champions or subject-matter experts (if available);
  - to plan the details and divide the tasks/roles within the community group accordingly.
- Determine the meeting/discussion facility:
  - identify the area/building (within targeted area) suitable for group discussion and presentation that has basic facilities and is accessible to all.
- Insurance coverage for participating members during the event (training).

Component 3: Implementation of Town Watching Activity

- Preliminary Review of the Area:
  - participants make notes and take photographs of the aspects found within the area: disadvantageous (hazards/risks) and advantageous (resources).
  - interview other local residents to obtain specific local information and past experiences, identify the people that requires special assistance.

Early flood preparation.

Source: DID Malaysia.

Community-based Flood Hazard Map (CBFHM).

- Town Watching Map Development:
  - Once preliminary review is completed, participants need to tidy up their finding(s)/observation(s) and compile all data (of potential risk areas, hazard obstacles, previous inundation areas, evacuation shelters and routes, locations of the vulnerable people, etc.) to be converted into a flood hazard map and flood response plan;
  - with photos, records and sketch all observations and surveys.
- Presentations and Discussions:
  - Discuss the OVERALL vulnerabilities, possible counter measures, priorities, degrees of difficulty and responsibilities to implement each proposed mitigation, etc.;
  - Then, the trainer/coordinator/leader combines and merges all the sub-plans into one main plan; and
  - summarise the problems, proposed mitigation and future action plans that had been developed by this Town Watching exercise.
- Submission and Sharing:
  - The completed Town Watching Map will be handover to the related/relevant agencies for their record and action;
  - Distribute to public spaces (community hall, religious centre); and
  - Promote its use to the community and remind constantly during meetings/ gathering.

4.2.3 Conclusion

The 'Town-watching' method is very beneficial and would help the community in disaster management as well as able to prevent undesirable accidents during a disaster. Besides, this method contribute to the establishment of collaboration between communities, government agencies as well as experts in addressing this issue. Furthermore, it raises awareness amongst the community to play their roles in disaster management as well as able to identify safe routes and dangerous areas.

5.0 Levels of Flood Management

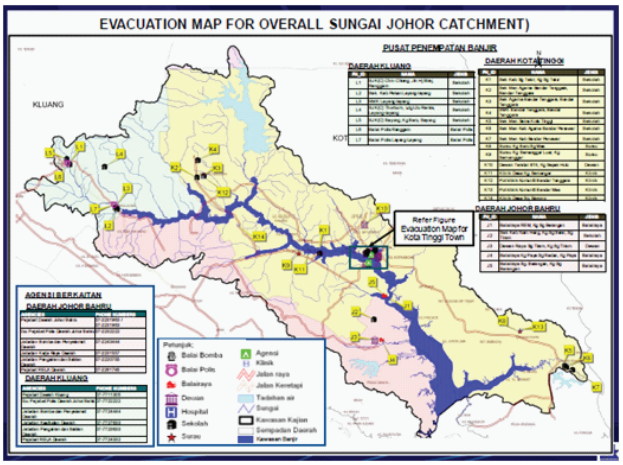
Flood management at a scene is very important and it needs to be carefully understood. Therefore, flood management can be divided into various levels such as **before**, **during** and **after flooding**. In addition, the community should be made aware on the list of emergency contacts during flooding. Precautionary measures according to the level of flooding are also important to avoid serious impacts.

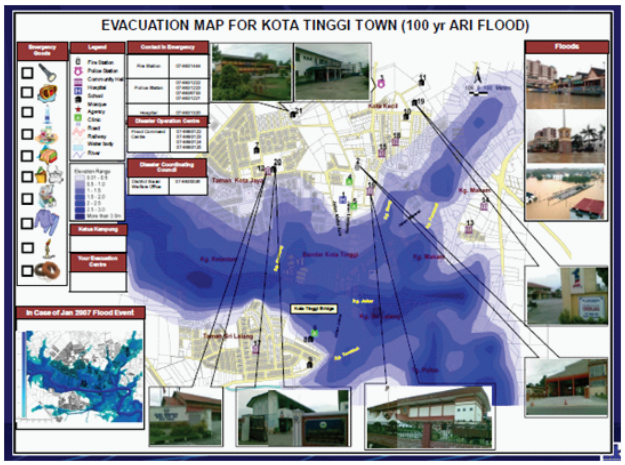
5.1 Before Flood

5.1.1 Preparation List

5.1.1.1 Initial Preparation

- Always pay attention to flooding information in your area such as weather reports, especially flood warnings. Visit the following websites: Malaysian Meteorological Department (www.met.gov.my, DID (publicinfobanjir.water.gov.my) and Works Department (bencanaalam.jkr.gov.my).
- Ensure the flood warning system and local flood preparedness information is disseminated in your area accurately and effectively.
- Inspect water channels such as drains or sewers. Ensure no barriers and it is tightly closed to prevent outflow.
- Identify and ensure evacuation centres and disaster relief centres in your area, create emergency evacuation plans and conduct training. Prepare emergency equipment.
- Ensure your whole family know the emergency actions when at home.
- Prepare a list of emergency contacts such as phone numbers of family, friends, police, ambulance, hospital, etc. for reference during flooding emergency.
- Identify evacuation routes and the nearest evacuation centres.





Source: DID Malaysia.

5.1.1.2 While Symptoms Detected

- During heavy rain or prolonged rain, pay attention and always listen to the announcements from the media about the possible flooding in your area.
- Fill a barrel, container, sink or bathtub with clean water. Water may get dirty or contaminated during flooding. Do not touch flood water and do not drink untreated flood water.
- Bring in furniture or appliances outside the house.
- Ensure important documents are kept in a safe place or bring along in a waterproof container.
- Ensure important documents are kept in a safe place or bring along in a waterproof container.

5.1.2 Prepare the "Grab Bag"

'Grab Bag' or Emergency Bag is an important kit for an early preparation of disasters such as flooding. The bag is useful while waiting for help at the evacuation centre. Example of items (checklist) needed in the emergency bag or kit are as follows:

KITS	CONTENT	UNIT	STATUS
DOCUMENT KIT	Birth certificate		
	Identification card		
	Passport		
	Home grant		
	Land grant		
	Car grant		
	Health records		
	Banking documents		
EMERGENCY & FIRST AID KIT	Panadol		
	Plaster		
	Chi Kit Teck Aun pill		
	Dressing pack		
	Personal medicine		
	Triangular sling cloth		
	*Other: other medications as needed		
HYGIENE KIT	Soap / Body wash		
	Toothpaste		
	Toothbrush		
	Shampoo		
	Hand wash (Dettol)		
PERSONAL KIT	Jewelleries		
	Cash		
	Sanitary pads		
	*Other personal needs		
OTHERS	Canned food stocks		
	Drinking water stocks		
	Torchlight		
	Blanket		
	Dressing clothes		
	Rain coat		
	Whistler		
	Candles and matches		
	Durable and water proof shoes		
	Rubber gloves		
	List of emergency numbers		

5.2 During A Flood

5.2.1 Inside The House

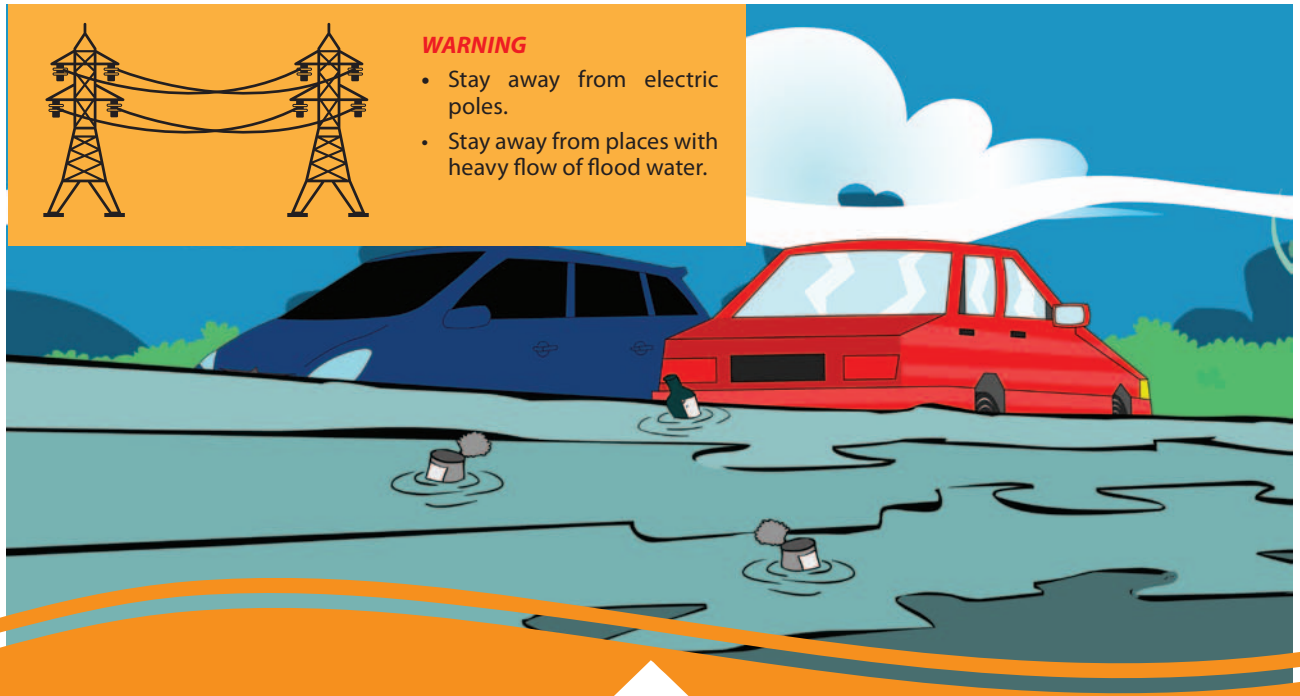
- Be alert with announcements on the media.
- Be prepared with the emergency equipment, personal items, medicine, photos, pets and more.
- Place valuables, poisons and chemicals above expected flood levels and protect electrical appliances.
- Evacuate immediately upon instructed. Turn off/remove all electrical plugs, fuse boxes, gas valves and main water pipe.

5.2.2 Outside The House

- Move to a high and safe place.
- Avoid going through flooded areas as strong currents may drown you.
- Do not go to the flooded areas either by boat or on foot. Do not touch wires and cables cuts.
- Stay alert of your children, do not let them play in the drains, rivers or mines. Do not drink flood water.
- Inform family members, neighbours or friends of your current location and situation.

5.2.3 Inside The Vehicle

- Stay alert of your children, do not let them play in the drains, rivers or mines.
- If your vehicle stops, lock and leave behind your vehicle. Move to a safe place.



WARNING

- Stay away from electric poles.
- Stay away from places with heavy flow of flood water.

5.2.4 During Relocation

- Evacuate immediately upon instructed.
- Evacuation processes are easier and safer before flood level increases or during the day.
- Follow instructions and the determined routes as shortcuts may be blocked.

TENAGA NASIONAL

5.2.5 Electrical Management Safety Guide

Electrical appliances

- Be careful of using electrical appliances when the water level is rising inside the house.
- Switch off the main switch if instructed to evacuate.
- Do not touch electrical appliances or switches with wet hands.
- Before re-using the electrical appliances submerged in the floodwater, ensure inspections has been done by a registered conductor under the Energy Commission.

TNB installation

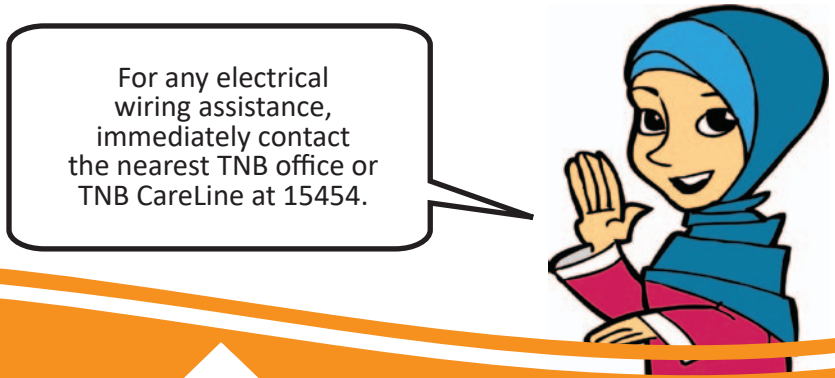
- Always monitor your children and do not let them near a fallen electric pole or electric wire cuts. Do not repair the damage yourself.
- If you find any electrical wire cuts or fallen electric poles, immediately contact the nearest TNB office or TNB CareLine at 15454.
- Stay away from areas where water levels rise and reach the low and high voltage wires to prevent electric shock. Report the situation to the nearest TNB office.

Do not approach electric wires

- During heavy rain or flooding, wires and electric poles will be at risks of such as fallen trees hitting the wires. When such situation happens, please do the followings:
  - Do not approach an electric wire cuts on the ground as the wires may still have electric current;
  - Do not attempt to remove electric wire cuts by hands or devices that can conduct electrical current; and
  - Do not approach areas with puddles and wire cuts as electric current may still flows.

TNB action

TNB constantly monitors the situation from time to time. If the water level reaches a dangerous level, TNB will temporarily shut off the electricity supply to substations, installations and electric wires in the affected areas to ensure the safety of the public. Electricity supply will be reconnected after the flood water recedes and the situation returns safe. The public can contact the nearest TNB office or TNB CareLine at 15454 immediately if they see the above situation is happening so that immediate actions can be taken.



5.2.6 Guide to Emergency Aid (CPR)

CPR RESPIRATORY AID

myMetro

FIRST AID MEASURES

Chest compression (30 times)

1. **POSITION YOUR HANDS.** Make sure the victim is lying on a solid surface. Kneel at the victim's side and place the heel of one of your hands in the center of the chest.
2. **INTERLOCK FINGERS.** Keep your arms straight, put your hands at the top of the other and interlock your fingers.
3. **CHEST COMPRESSION.** Get up and lean slightly forward with your shoulders perpendicular to the victim's chest and press down approximately 4 to 5 cm. Release the pressure (hands still on the victim's chest) and let the victim's chest rises. Repeat 30 times at a rate of 100 times per minute.

Open the airway

4. **OPEN THE AIRWAY.** Move slightly towards the victim's head. Tilt the head and lift his chin to reopen the airway. Leave the victim's mouth slightly open.

Rescue breathing

5. **GIVE RESCUE BREATHS.** Pinch the victim's nose to shut the nostrils and hold the victim's chin with your other hand. Inhale, place your mouth on the victim's mouth and exhale until you see the victim's chest rises.
6. **OBSERVE THE VICTIM'S CHEST FALL.** Move your mouth away from the victim's mouth and watch the victim's chest fall. Repeat this rescue breaths (i.e. 5 -6) 2 times.
7. **REPEAT CHEST COMPRESSIONS AND RESCUE BREATHING.** Place your hands on victim's chest again and repeat chest compressions. Conduct 30 times chest compressions followed by 2 times rescue breaths. Repeat this cycle until help arrives.

Source: My Metro dan Kecemasan.info

5.3 Post Flood

5.3.1 Early stage

- Listen to the media announcements or wait for instructions. Do not return home against instruction or before the situation is completely safe.
- Help your neighbours or people with disabilities (elderly, children or disabled). Inspect your home, look for signs of cracks or deposits as it may not be safe.
- Avoid going to flooded and destroyed areas. The roads may be unstable and could collapse.
- Do not enter a house that is still flooded as there may be unknown dangers.

5.3.2 Safety precautions when entering a building

- Wear shoes.
- Check for damages on the walls, floors, doors and windows.
- Beware of dangerous or venomous animals and insects.
- Use sticks to remove any obstructions inside the house.
- Watch out for any damaged ceilings and wall plasters.

5.3.3 Inspection of the surrounding area

- Check any broken or leaked gas pipes.
- Check electrical wires and appliances submerged in the flood water.
- Check for any flammable materials that may flow in during flooding (kerosene, gasoline, diesel, etc.).
- Dispose food items submerged or exposed to flood water, including canned foods.
- Check damages on septic tank to avoid biological hazards. Report any public facilities damages to the authorities.

5.3.4 Recovery Work

Small scale

- Each member of a household to play their respective roles.
- Clean up your own house.
- Be careful when cleaning the house.
- Equip yourself with the basic knowledge of actions to be taken after flooding.

Big scale

- Simultaneous clean-up of post-flooded scenes.
- Involve the local community and related agencies.
- Important agencies: Health Ministry, Malaysian Civil Defence Department, RELA, KEMAS, NGOs and other potential agencies.
- Time consuming reparation works.
- High recovery costs.

5.4 Checklist

Personal Checklist: What Should I do NOW?

- Prepare the Grab Bag ☐
- Identify the best place to store sandbags ☐
- Identify people who can help / that I can help ☐
- Identify belongings to bring along if you have to evacuate ☐
- Identify the best way to prevent flood water from entering the house ☐
- Inspection of flood evacuation plan ☐
- Be alert to flood warning codes ☐

ACTIONS	NOTES
Inside the house	
Ensure your family members are safe	
Inform / contact neighbours, police, family members and nearby relatives	
Switch off electricity and turn off gas and water.	
Place electrical appliances, drawers and furniture on tables	
Block toilets to prevent backflow of wastewater (if possible)	
Save drinking water	
Relocate your pet to a safe place	
Place sandbags around doors, windows and opening spaces	
Move the chemicals	
Check your necessities	
Check your Grab Bag and add necessities if you have time	
Garden and outside of the house	
Move vehicles to a less flood-risk area	
Relocate heavy and loose objects to a safer place	
Business / office area	
Move important documents, computers and important files	
Signal the staffs and ask for their help	
Farmers move animals and livestock to safe places	
Others*	

** add actions according to own needs*

5.5 Agencies Involved During Flooding

5.5.1 Agency role chart

SCENE CONTROL POST
(DISASTER OPERATIONS COMMANDER)
(DEPUTY DISASTER OPERATIONS COMMANDER)

SEARCH AND RESCUE SERVICE

- Search and rescue victims.

Special Malaysia Disaster Assistance and Rescue Team (SMART)
Royal Malaysia Police (PDRM)
Malaysian Armed Forces (ATM)
Malaysia Civil Defence Force (JPAM)
Fire and Rescue Department of Malaysia (JBPM)
Ministry of Health of Malaysia (KKM)
Other permitted agencies

WELFARE

- Evacuation of victims
- Food preparation for victims/officers
- Prepare/manage relocation areas
- First Aid and counselling services

Department of Social Welfare (JKM)
Ministry of Health of Malaysia (KKM)
Malaysia Civil Defence Force (JPAM)
Malaysian Red Crescent (BSMM)
People's Volunteer Corps (RELA)
Ministry of Tourism, Arts and Culture
Other permitted agencies

HEALTH AND MEDICAL SERVICES

- Handling emergency treatments
- Handling forensic services
- Handling general health

Ministry of Health of Malaysia (KKM)
Malaysian Armed Forces (ATM)
Malaysian Red Crescent (BSMM)
Malaysia Civil Defence Force (JPAM)
Other permitted agencies

SUPPORT SERVICES

- Helping in logistic, communications and other kinds of helps to ensure effective disaster control and mitigation.

District Office
Municipal / District Council
Tenaga Nasional Berhad
Telekom Malaysia Berhad
Malaysian Armed Forces (ATM)
Royal Malaysia Police (PDRM)
Malaysian Public Works Department (JKR)
Other permitted agencies

SECURITY

- Scene control
- Conduct investigation
- Effective communications

Royal Malaysia Police (PDRM)
People's Volunteer Corps (RELA)

MEDIA

- Newspaper coverage
- Electronic media coverage
- Media control

Department of Information
Department of Broadcasting

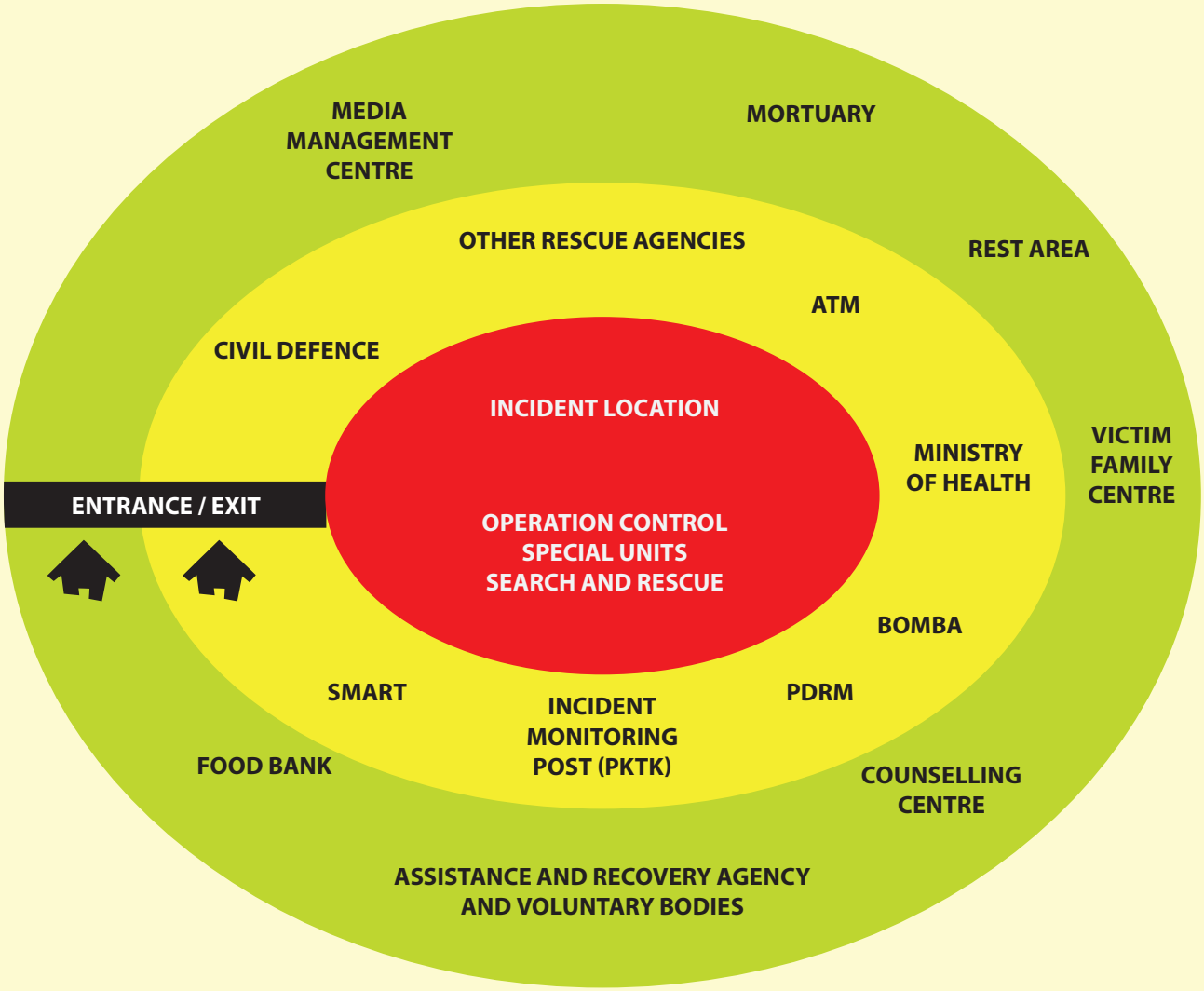
TECHNICAL AND EXPERT AGENCIES

- Provide technical services and expertise in disaster control.
- Provide consultations to the rescue agencies in disaster relief response.

Expert agencies of a specific disaster

Source: National Flood Integrated Preparedness Programme — Community Roles, DID Malaysia

5.5.2 Disaster management at the scene by zone



Source: National Flood Integrated Preparedness Programme — Community Roles, DID Malaysia

RED ZONE: Work areas of special units, teams of rescue agencies with specific expertise. Such division is subject to type and form of disaster.

YELLOW ZONE: PKTK placement areas and rescue agency posts.

GREEN ZONE: The placement area of the media management centre, the victims' family, counselling, food supply storage, rest, mortuary, aid & recovery agencies and voluntary bodies.

GUARD POST

NOTE: Movement from one zone to another is not permitted except with the permission of the Disaster Operations Commander.

5.5.3 Emergency Agencies Contacts

National Disaster Command Centre (NDCC)
Special Malaysia Disaster Assistance
and Rescue Team (SMART)
03 8064 2400
portalbencana.mkn.gov.my

Information Department Malaysia
03 8911 3440
www.penerangan.gov.my

Community Development
Department (KEMAS)
03 8891 2000
www.kemas.gov.my

Malaysian Public Works Department (JKR)
03 2691 9011
www.jkr.gov.my

Department of Social Welfare (JKM)
03 8000 8000
www.jkm.gov.my

Ministry of Health of Malaysia (KKM)
03 8000 8000
www.moh.gov.my

People's Volunteer Corps (RELA)
03 8870 3760 / 3770
www.rela.gov.my

Malaysian Red Crescent (BSMM)
03 2141 8227
www.redcrescent.org.my

Royal Malaysia Police (PDRM)
03 2266 2222
www.rmp.gov.my

Fire and Rescue Department of Malaysia (JBPM)
03 8892 7600
www.bomba.gov.my

Malaysian Armed Forces (ATM)
03 2692 1333
03 2071 5746
www.mafhq.mil.my

Malaysia Civil Defence Force (JPAM)
03 2687 1300
www.civildefence.gov.my

	Police	Firefighter	Hospital	PBSM	JPAM	JKM
Kelantan	+609-7455622	+609-7444444	+609-7452000	+609-7435504	+609-7658130	+609-7482117
Terengganu	+609-6354722	+609-6224444	+609-8513333	+609-6314461	+609-6672991	+609-6222444
Johor	+607-2212999	+607-2243444	+607-2231666	+607-2371544	+607-2349705	+607-2232606
Perak	+605-2451222	+605-5474444	+605-2533333	+605-5466159	+605-2416562	+605-5225506
Pahang	+609-5902222	+609-5705999	+609-2955333	+609-5165243	+609-5161991	+609-4771349
Kedah	+604-7741222	+604-734444	+604-7406233	+604-7209980	+604- 7323801	+604-7334684
Selangor	+603-5514522	+603-7846444	+603-61454333	+603-33246920	+603-89453001	+603-55192876
Melaka	+606-2854222	+606-2513100	+606 - 2822344	+606-2817376	+606-2324035	+606-2319171
Sabah	+608-8450222	+608-8422873	+608-8245249	+6088-242648	+6088-232532	+608-8255133
Sarawak	+608-2245522	+608-8365994	+608-2611123	+6082-240610	+6082-252940	+608-2413055
K.Lumpur	+603-2146052	+603-2148444	+603-26155555	+603-21649209	+603-26949625	+603-83231000
Negeri Sembilan	+606-7682222	+606-6011900	+606-6626333	+606-7639097	+606-7672379	+606-7659555
Pulau pinang	+604-2221522	+604-5047222	+604-2225333	+604-8275678	+604-3237409	+604-2505259
Perlis	+604-9082222	+604-9778827	+604-9738000	+604-9779477	+604-9762510	+604-9702156

The Role of Community in Integrated FLOOD Management

FLOOD RANGER

Initiated by

Global Water Partnership

MyWP Malaysian Water Partnership

Global Environment Centre

Jabatan Pengairan dan Saliran Malaysia

Supported by

NADMA Agensi Pengurusan Bencana Negara

UPM Universiti Putra Malaysia