

FHM IN MALAYSIA

Presented By:

SITI KHADIJAH ABD. RASHID
WAN AZINUDDIN W. IBRAHIM
WAMZAH MOHD

**Department of Drainage and Irrigation
Malaysia**

Email address: sitikhadijah@water.gov.my
wamzah@water.gov.my
wan_azi@water.gov.my

INTRODUCTION

The region-focused training course on Flood Hazard Mapping was conducted on 28 October 2007 until 1 December 2007 by International Centre for Water Hazard and Risk Management (ICHARM) together with the Japan International Cooperation Agency (JICA) and JICE. The total of 30 participants which included 10 master student from 13 countries (Malaysia, Indonesia, Japan, China, Cambodia, Laos, Thailand, Filipina, India, Sri Langka, Bangladesh, Vietnam and Nepal) were attended this course.

This course also provided participants with a better understanding not only of general knowledge on flood hazard mapping in Japan and the world, but also professional knowledge and techniques which are indispensable for the development of flood hazard map (FHM). These techniques included flow routing, topographical maps, GIS and Inundation analysis. In addition, participants of the course would also learn about the information to be included in the FHM and how to disseminate and utilize FHM through town watching (field survey and interviewing).

1. OBJECTIF OF THE PLANNED PROJECT

- FHM is to reduce or prevent lost of human life is coincide with one of the component of the floodplain management plan, measures for minimising the impact of flooding.
- To produce flood hazard map for flood preparedness and emergency response.
- To inform the public and relevant authorities about the flood risk and how to deal it.
- To propose an integrated flood management (IFM) that can be used for another areas in Malaysia.
- To promote sustainable flood risk management measures.
- To let the public recognize the risk of floods as well as ensure smooth and quick evacuation from floods.

Flood Hazard Map In Malaysia

As a non-structural measures, Flood Hazard Map is very useful to be implemented in Malaysia. With regards of the FHM objectives, to prevent loss of people's lives and helps smooth refugee from home to evacuation shelter as well as to notifying the residents of

potential flood damage and enhancing their awareness of the importance of flood disaster preparedness could be achieved. Summary of flood condition in Malaysia is as in **Table 1**.

Table 1: Summary of Flood Condition in Malaysia

	Peninsular Malaysia	Sabah	Sarawak	Malaysia
Total Area (km ²)	131,574	73,712	124,449	329,735
Flood Affected Area (km ²)	15,620	3,285	10,895	29,800
% of Flood Affected Area	11.9%	4.5%	8.8%	9%
Total Population (nos)	17,670,100	2,519,900	2,012,600	22,202,600
Population living in Flood Affected Areas (nos.)	3,688,600	652,175	478,490	4,819,265
% of Population Living in Flood Affected Area	21%	26%	24%	22%
Annual Average Damage (RM million)	616.5	141.0	157.5	915
AAD per sq. km. of Flood Affected Area (RM)	39,470	42,920	14,460	30,700

Source : *Final Report on Updating of Condition of Flooding in Malaysia, October 2003 by Department of Irrigation and Drainage Malaysia*

Lost of life, damages to properties and activities disruption were among types of damages due to flood experienced. Property damages caused by flood are shown in Table 1 above may included the damages of houses, infrastructures, vehicle, machines, crops etc.

THE ALLOCATION OF ROLES IN MAKING FLOOD HAZARD MAPS IN MALAYSIA

No.	Organizations	Roles
1.	National Disasters and Relief Committee	Planning, coordinating and supervising relief operations during flood. Support the flood disaster preparedness activities among the committee members.
2.	Ministry of Finance	Prepare Malaysia's budgets for five yearly developments.
3.	Ministry of Natural Resources and Environment	<ul style="list-style-type: none"> - Support and provide development allocation for flood mitigation projects at the federal level. - Dissemination of Flood Hazard Map
4.	State Government	<ul style="list-style-type: none"> - Support and provide development allocation for flood mitigation projects at the state level.

		<ul style="list-style-type: none"> - Dissemination of Flood Hazard Map - Provide information on evacuation routes in their region.
5.	Department of Irrigation and Drainage	<ul style="list-style-type: none"> - Providing flood forecasting and warning service to the public. - Main organizations for planning, prepare and disseminate Flood Hazard Map.
6.	Department of Survey and Mapping	Providing the digital topographic map, DEM of the drainage basin.
7.	Meteorological Services of Malaysia, State Department of Information	Providing weather forecast information due to flood forecasting and warning activities.
8.	Malaysian Center For Remote Sensing (MACRES)	Providing the satellite images due to flood forecasting and warning activities.
9.	Department of Public Defence, State Fire and Rescue Department, Army and Police.	Rescue works
10.	Department of Welfare	Providing the evacuation shelter information.

2 TARGET AREA ON PRODUCING FHM

- **Target area 1 : Kampung Baru, Kuala Lumpur**



Fig. 1 – The Location of Kuala Lumpur

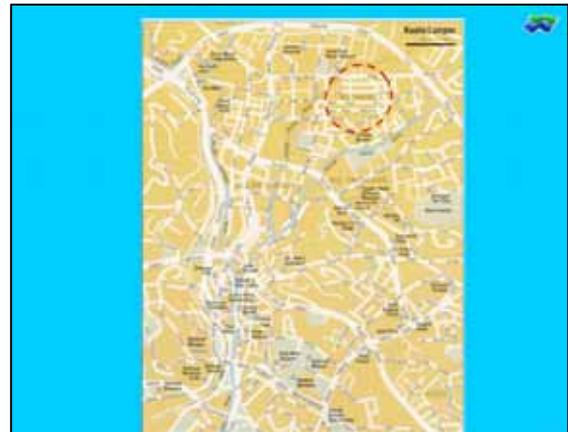


Fig. 2 - The Location of Kampung Baru, Kuala Lumpur

Kampung Baru is only a village located on the floodplain of the Klang River, centre the town of Kuala Lumpur. It has total slightly more than thousand peoples and mostly working around the Kuala Lumpur and Selangor. The selection of Kg Baru as a pilot project is because it is crucial area within the Kuala Lumpur perimeter and has a significant impact to the local people. The location of Kg. Baru shown in Figure 2. Because of rapid development, flash

flood always occurred and most of the resident do not have enough time to response and take a correct action. With the flood hazard maps, hopefully it will help the local resident to take a right direction and safer route to the evacuation shelter as well as to prevent losses of life and damages.

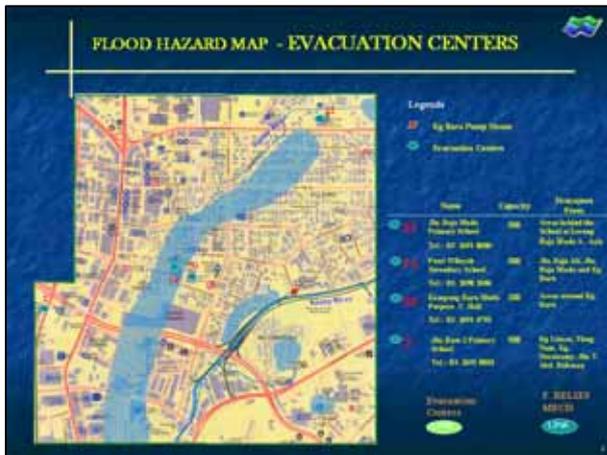


Figure 3 - The Location of Evacuation Shelter in Kampung Baru, Kuala Lumpur



Figure 4 – Suggested evacuation route to evacuation shelter in Kampung Baru, Kuala Lumpur

- **Target Area 2: TTDI Jaya, Sg. Damansara Catchment**

Sg. Damansara Catchment is located west of Kuala Lumpur and has an area of about 148 sq. km². Figure 1 and Figure 2 shows the proposed project location of the catchment and the associated main rivers respectively. Development within the catchment has been on going over the years. The development has been gradual with areas in the fringes of Kuala Lumpur such as Damansara, Taman Tun Ismail being developed about 30 to 40 years ago. Subang Jaya was developed due to its transportation links via the Federal Highway. Subsequently Shah Alam was developed as the capital of Selangor replacing Kuala Lumpur as the latter became part of Federal Territory. Sg. Damansara catchment is now estimated to have a population of about 226,000 in the year 2000. The area contains important industries and areas of commercial and economic significance to the state. The lengths and corresponding sub-catchment areas are shown in **Table 2**.

Table 2: Details of Sg. Damansara River System and its Major Tributaries

Name of the River/Tributary	Length (km)	Catchment Area (sq.km ²)
Sg. Damansara	16.20	41.99
Sg. Kayu Ara	13.00	32.45
Sg. Air Kuning	9.20	19.69
Sg. Rumpit	8.50	17.68

Sg. Pelampas	9.00	21.17
Sg. Payong	4.50	7.03
Sg. Pelumut	5.50	7.99
TOTAL	65.90	148.00



Figure 1 : Location Plan of TTDI Jaya, Sg. Damansara Catchment

Target Area 3 : Kelantan State

Target Area : Kelantan State

Malaysia consist 14 states includes the Kelantan State
 Kelantan State - East Coast of Peninsular Malaysia
 - Consists 10 districts

Why Kelantan State ?

Kelantan State – Land area : 15, 101 km²
 - widespread flooding area, flooding occurred annually during the North East Monsoon

Flood impact to the Kelantan State (1983 – 2004)

Year	Total of Evacueess	Total of Death People	Total amount of damages (in Ringgit Malaysia)	Total amount of damages (in USD)
2004	10,476	12	14,317,800.00	3,767,842
2003	2,228	2	5,554,400.00	1,461,684
2002	no record	no record	1,420,000.00	373,684
2001	5,800	0	8,462,700.00	2,227,026
2000	506	0	4,940,620.00	1,300,163
1999	no record	1	1,924,440.00	506,432
1998	136	0	1,628,455.00	428,541
1997	no record	no record	922,020.00	242,637
1996	no evacuation	0	735,795.00	193,630
1995	1,172	4	1,485,095.00	390,814
1994	441	2	2,413,922.30	635,243
1993	13,587	0	1,512,816.50	398,110
1992	743	0	329,256.05	86,646
1991	no record	2	1,427,872.45	375,756
1990	4,581	4	1,036,100.00	272,658
1989	no record	no record	-	-
1988	41,059	0	-	-
1987	402	0	3,338,589.00	878,576
1986	7,968	0	6,092,454.25	1,603,277
1985	no record	no record	-	-
1984	7,177	9	1,998,268.00	525,860
1983	33,815	0		-

3. PROJECT SCHEDULE

Year	Action Plan
<p>2007</p>	<ul style="list-style-type: none"> - Deliver a presentation of FHM to my division - Formed the committee members of FHM - Suggest to the department to send the right officer to attend the FHM course - Gain and enhance my knowledge in anticipated inundation area mapping, Topographic Map and GIS. - Having some meeting and understanding of FHM between the related organizations - Get an opinion and idea from the local residents' perspective of FHM - Carry out pilot project using existing FHM in terms of flood modelling, flood stimulation (review and enhance the exist FHM)
<p>2008</p>	<ul style="list-style-type: none"> - Promote the idea of FHM to the local government. - Prepare Manual of FHM, guideline for making and utilizing FHM and Manual for anticipated inundation area map. - Check the viability with update topographical map and Digital Elevation Map at Department of Survey and Mapping. - Model construction (consists Topographic Modelling, Flood Modelling and Flood Stimulation) for TTDI Jaya, Selangor. - Educating people and enhancing their awareness due to flood disaster preparedness - Start planning and doing some ground works of FHM for urban and rural area. Target area : Sg. Damansara Catchment.
<p>2009</p>	<ul style="list-style-type: none"> - Carry out survey to study effectiveness – for three of the target area. - Model construction (consists Topographic Modelling, Flood Modelling and Flood Stimulation)
<p>2010</p>	<ul style="list-style-type: none"> - To disseminate the completed FHM to the target group - Educating people and enhancing their awareness due to flood disaster preparedness - To conduct survey via questionnaire to the target groups with the view to improve the usefulness of the FHM

4. CONCRETE IMPLEMENTATION ITEM OF THE SCHEDULE

a. Promote the idea of FHM to the local government

- i. Give presentation about FHM such as the experience and professional knowledge and techniques which are indispensable in producing of FHM.
- ii. Having some meeting and understanding of FHM between the related organizations.
- iii. Get an opinion and idea from the local residents' perspective of FHM.
- iv. Prepare Manual of FHM, guideline for making and utilizing FHM and Manual for anticipated inundation area map.
- v. Carry out pilot project using existing FHM in terms of flood modelling, flood stimulation (review and enhance the exist FHM).

b. Carry out survey to study effectiveness

- i. To conduct the town watching to have the views from various perspective such as from residents who are experiencing the hazard and from the public sector who are responsible to produce FHM.
- ii. To identify problems such as displays clearly the inundation depth, dangerous spot, location of shelter, evacuation route, access point to flood information, flood forecasting and sources of weather information.
- iii. Model construction (consists Topographic Modelling, Flood Modelling and Flood Stimulation)
- iv. To conduct survey via questionnaire to the target groups with the view to improve the usefulness of the FHM.

c. Disseminate the completed FHM to the target group

- i. Munciple government should disclose and distribute FHM as soon as possible and keep the residents informed of the maps.
- ii. Educating people and enhancing their awareness due to flood disaster preparedness.
- iii. Give talk on FHM and organized drilled session because some of the residents cannot understand about FHM.

5. EXPECTED BENEFITS OF FHM

- to reduce loss of people (incremental of death people) to reduce the property damage due to flood occurrence.
- helps smooth refugee from home to evacuation shelter .
- Enhancing awareness of the local resident due to the importance of flood disaster preparedness as well as notifying the residents of potential flood damage – show the evacuation route, evacuation shelter, forecasted inundation area and inundation depth by dissemination of the FHM Schools

are the best place to disseminate the FHM as well as to give a better understanding to the childrens and teenagers due to impact of flood disaster. (enhance their awareness of flood disaster).

- Integration of flood modeling, topographical modeling and flood stimulation of the Sg. Damansara Catchment will helped DID Malaysia to enhance the exist of flood forecasting and flood warning system.
- Give an early warning information due to flood to local resident before their area/home inundated.
- Give a technical support to the Director of State Security Department for issuing the evacuation order / recommendation order.
- Suggest the alternatives evacuation route if the exist road inundated.

6. APPROXIMATE COST ESTIMATE (USD)

Item	Task	Cost Estimate (USD)
1.	Investigation of anticipated inundation area	150,000
2.	Hydrological data, Topographical map, DEM, Aerial photo/ Satellite Image	200,000
3.	Software of Hydraulic modelling & GIS and Consultancy from private sector	100,000
4.	Dissemination process	50,000
	Total Cost Estimate	500,000

7. SUGGESTION AND OPINION FOR FHM TRAINING COURSE

- a. Duration of 'Town Watching' should be extending at least for a few days.
- b. Insufficient time to understand the exercise on Topographical Maps and GIS for the new learners.
- c. Insufficient time to carry out more analysis e.g. rainfall runoff analysis.
- d. Due to our action plans and allocation of roles in making flood hazard maps in Malaysia, officer from Flood Mitigation Division Department of Irrigation and Drainage Malaysia should have an opportunity to attend the FHM course for continuity of progressing and developing Flood Hazard Map in Malaysia.

8. PROBLEM IN MAKING FHM IN MALAYSIA

- i. Insufficient data e.g. updated topographical map and DEM

- ii. Data reliability – rainfall, water level and discharge
- iii. Inadequate expertise e.g. Hydraulic modelling and GIS
- iv. Social and economic impact such as sales and price of land and properties will be affected by showing the forecasted inundation depth in the FHM, clarity and understanding public and private sector of FHM needed.

Special Thanks!

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Sayonara and mata-ayi masho!