



# The 6th NARBO General Meeting

## Water resources development through IRBM consolidation approach

*Jakarta 23 February 2017*

**Md Khairi bin Selamat**

**Department of Irrigation and Drainage Malaysia**



# Content of presentation

- ✓ **Introduction**
- ✓ **National directive**
- ✓ **Guiding principle**
- ✓ **Way forward**
- ✓ **Conclusion**

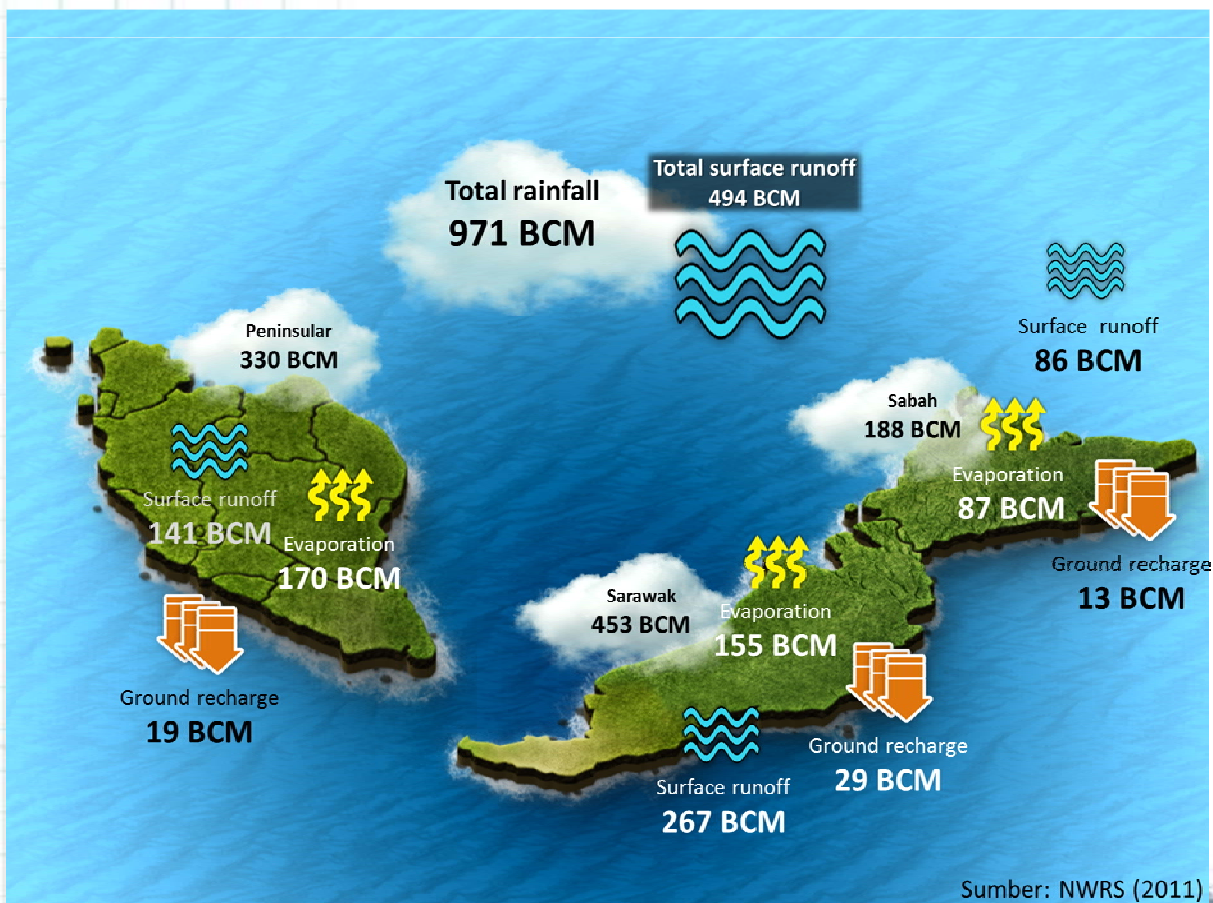


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# Introduction

## Water resources in Malaysia



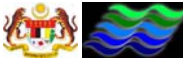
## Water cycle







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The Millennium Development Goals

# Eight Goals for 2015

- 1 Eradicate extreme hunger and poverty
- 2 Achieve universal primary education
- 3 Promote gender equality and empower women
- 4 Reduce child mortality
- 5 Improve maternal health
- 6 Combat HIV/AIDS, malaria and other diseases
- 7 Ensure environmental sustainability
- 8 Develop a global partnership for development



## SUSTAINABLE DEVELOPMENT KNOWLEDGE PLATFORM

HOME HIGH-LEVEL POLITICAL FORUM SDGS TOPICS PROCESSES & UN SYSTEM STAKEHOLDER ENGAGEMENT PARTNERSHIPS RESOURCES ABOUT

### Sustainable Development Goals



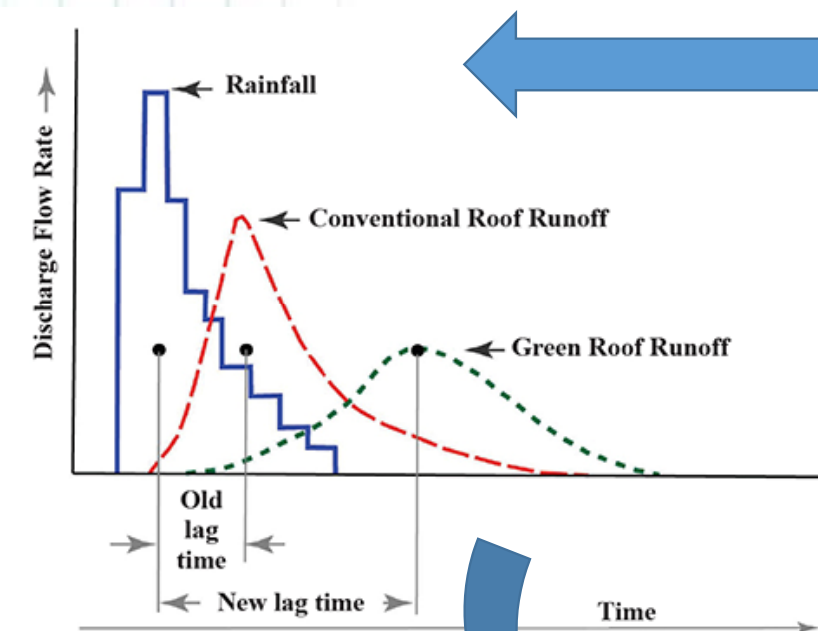
SDGs is  
WATER  
BASED







# Managing surface run off



## Average rainfall in kuala lumpur

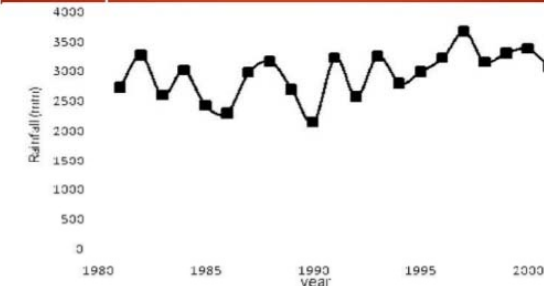
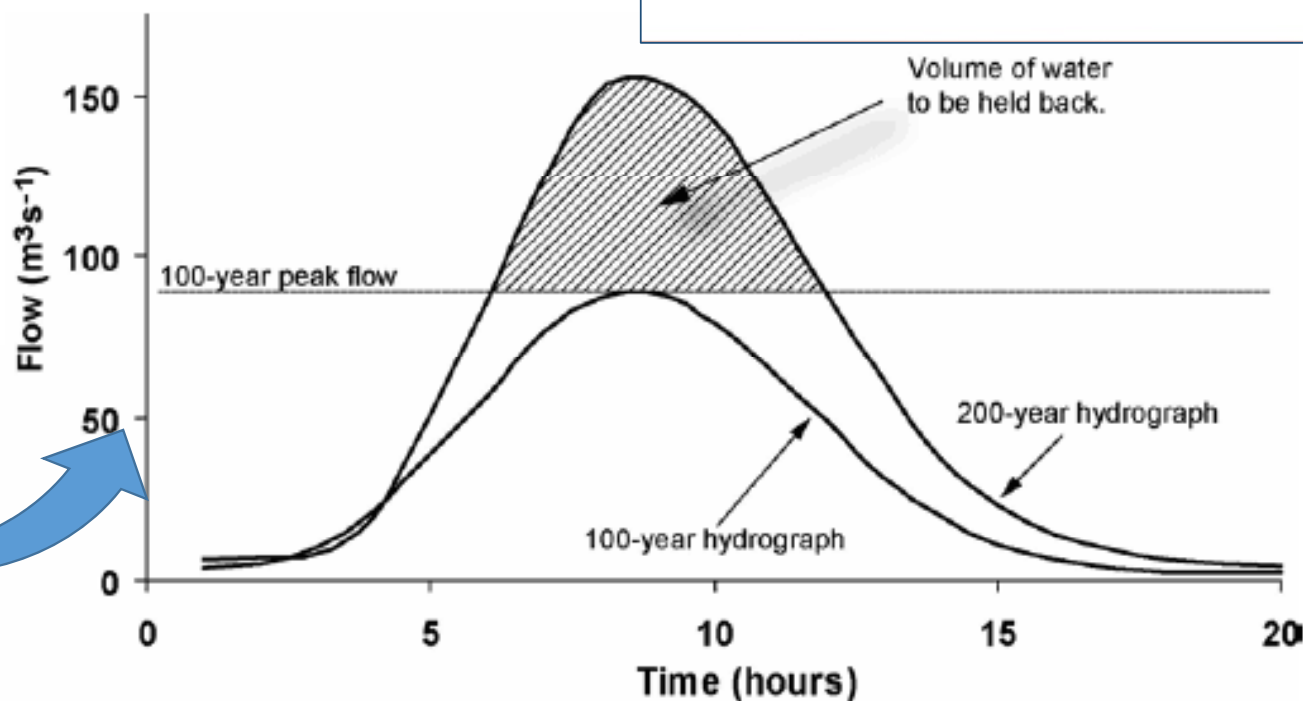


Fig. 5: Yearly average rainfall of Kuala Lumpur (1981-2001)







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# Too much or too little water – management issues







## Eliminating Water Security Challenges



**Too Little Water**



**Too Much Water**



**Too Dirty Water**

**Increasing water demand, flood disasters, and deterioration of water quality**

- ◆ **Population growth, Urbanization, Economic development**
- ◆ **Climate change, Recent extreme hydrological events**

**Lack of proper facilities, poor governance structure to stop negative spiral wrt water related disasters**

- ◆ **Increased hydrological runoff from development and climate change**
- ◆ **Existing water infrastructure inadequate to cope with increased flows**
- ◆ **Shortcomings in legislation and institutional setups**
- ◆ **Poor planning and policies wrt water related disasters**



## Role and responsibility - complex relationship and process

- Eliminate fragmentation and overlap of responsibilities
- Integrate action across issues
- Strong foundation and mandate



**GOVERNMENT**

**PUBLIC**



- Strong knowledge based
- Strong community awareness and participation

- Cost-sharing programs
- Voluntary actions; CSR



**PRIVATE**



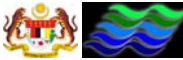
**NGO**

- Community advisory processes.
- Skills-based membership.
- Accountability





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# National directive

NEW STRAITS TIMES

NATION

## Master plan for river basins

### Monitoring land use for development

By Jaswinder Kaur  
news@nstp.com.my

About 40 people representing government agencies, non-governmental organisations, students and members of the media participated

"DID sees rivers as a heritage we should care for. Rivers provide 98 per cent of our drinking water while the remaining two per cent

KINABATANGAN, Mon

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**NWRC (29<sup>th</sup> July 2003) → River Basin Master Plans to be the Basis for Development within a River Basin to achieve the objectives; sufficient, clean, reduce flood risk and environment**

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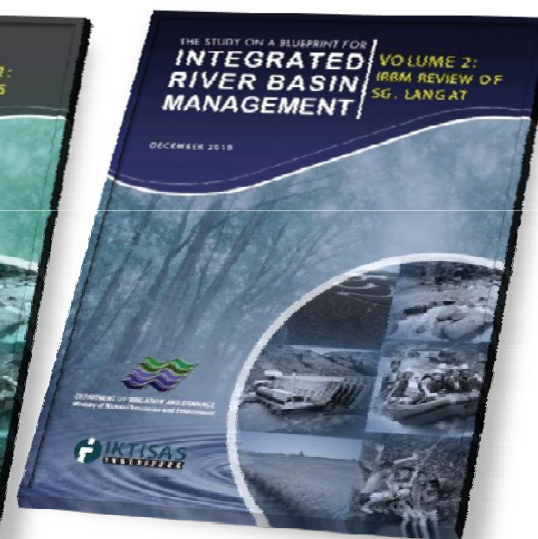
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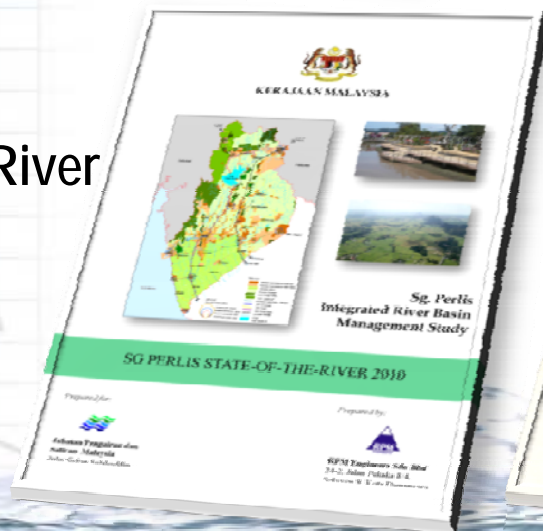


## IRBM Study



**IRBM Blueprint:**  
Langat River  
Muar River  
Kerian River  
Linggi River  
and more to come

State-of-the-River  
Report







## IRBM Study As Basis of Project

One State One  
River Program  
Sg.Penchala

Water Quality  
Improvement  
Sg.Penchala



River of Life (RoL)  
Sg.Klang

Flood Mitigation  
Sg. Klang

Flood Mitigation  
Sg.Damansara

Flood Hazard Map  
Sg.Setiu

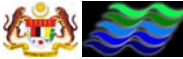
Flood Hazard Map  
Sg.Terengganu



One State One River  
Program  
Sg.Hiliran

Flood Mitigation, Urban  
Storm Water,  
Hydroelectric Dam

**New  
approach;  
Water  
resources  
project  
consolidation**



## Protection area

- Forest Act; Permanent forest reserve for water resources sustainability
- Water Resources Bill; protect, conserve, develop and manage wisely

> Sustainable future water resources demand

TheStar FRIDAY 5 November 2004

# 'Gazette water catchments'

## Do it as soon as possible, states ordered

BY MERGAWATI ZULFAKAR

**PUTRAJAYA:** The order is out to all state governments to gazette all water catchment areas as soon as possible.

And once done, a total of 880,000ha would be gazetted as water catchment areas to meet the future water needs of Malaysians.

Deputy Prime Minister Datuk Seri Najib Tun Razak said the authorities must use satellite photos and aerial surveillance to curb illegal logging in all forest reserves.

He said the country's water resources must be protected as demand for water was on the rise.

"Some state governments have already gazetted these areas and others are in the process of doing so."



**Najib: Says water resources must be protected because demand for water is rising**

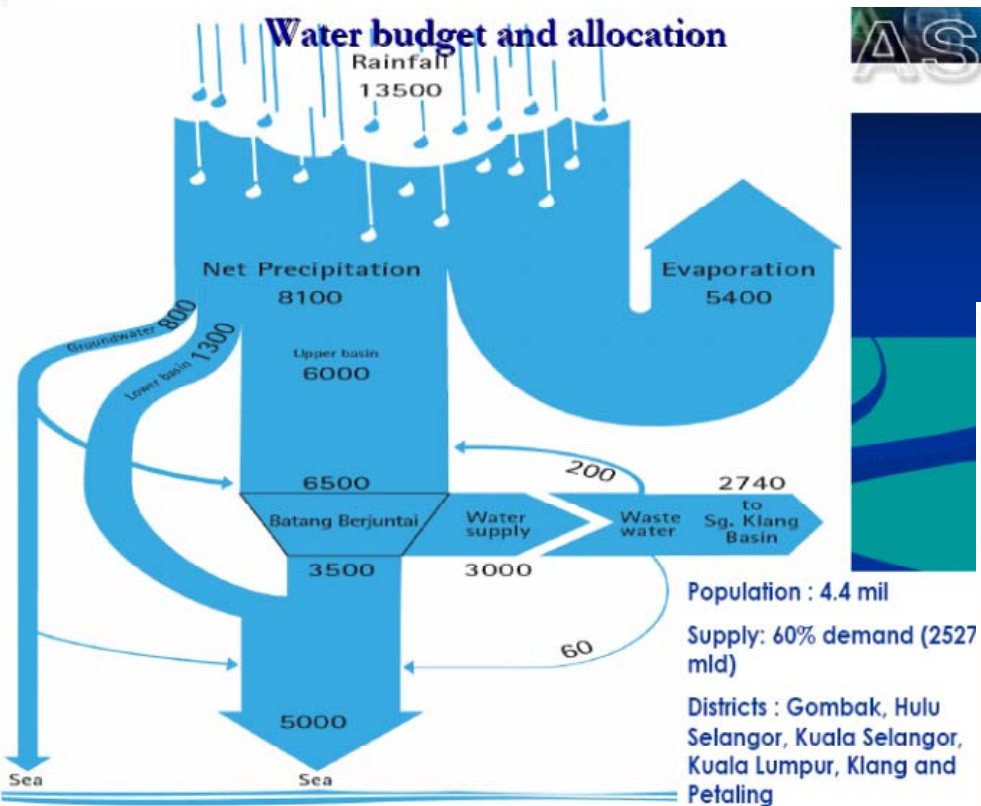
Forestry Council meeting here yesterday.

Malaysia had been recognised as one among the 12 countries in the world with rich biodiversity where there were 12,500 species of flower plants, 300 species of mammals, 750 species of birds, 350 species of reptiles, 165 species of amphibians, 300 species of freshwater fish and millions of invertebrates.

Najib also said the council was getting the cooperation of the Malaysian Centre for Remote Sensing to supply satellite and aerial photographs to state governments to check on illegal logging activities.

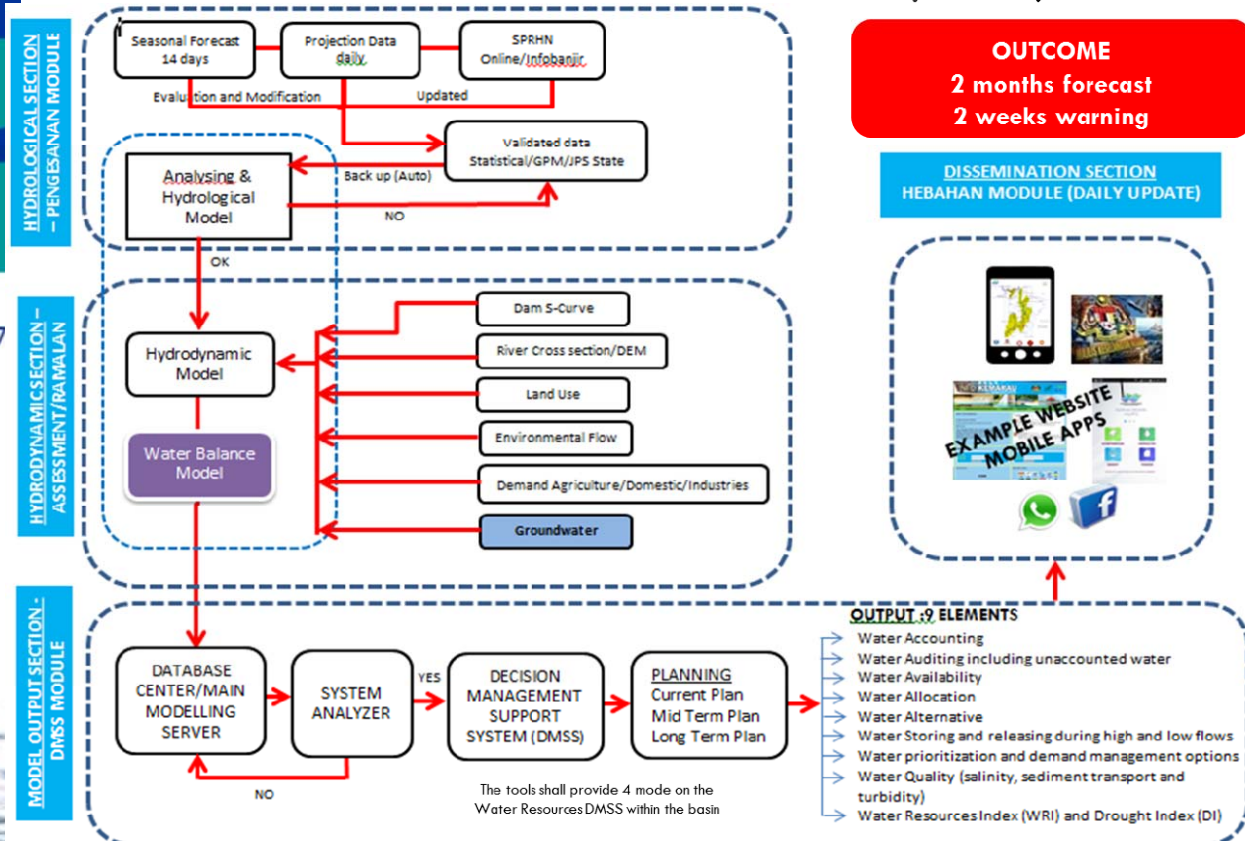
"This will make it easier to detect illegal logging activities and enforcement could be beefed up to eventually curbed it totally."





## Management system

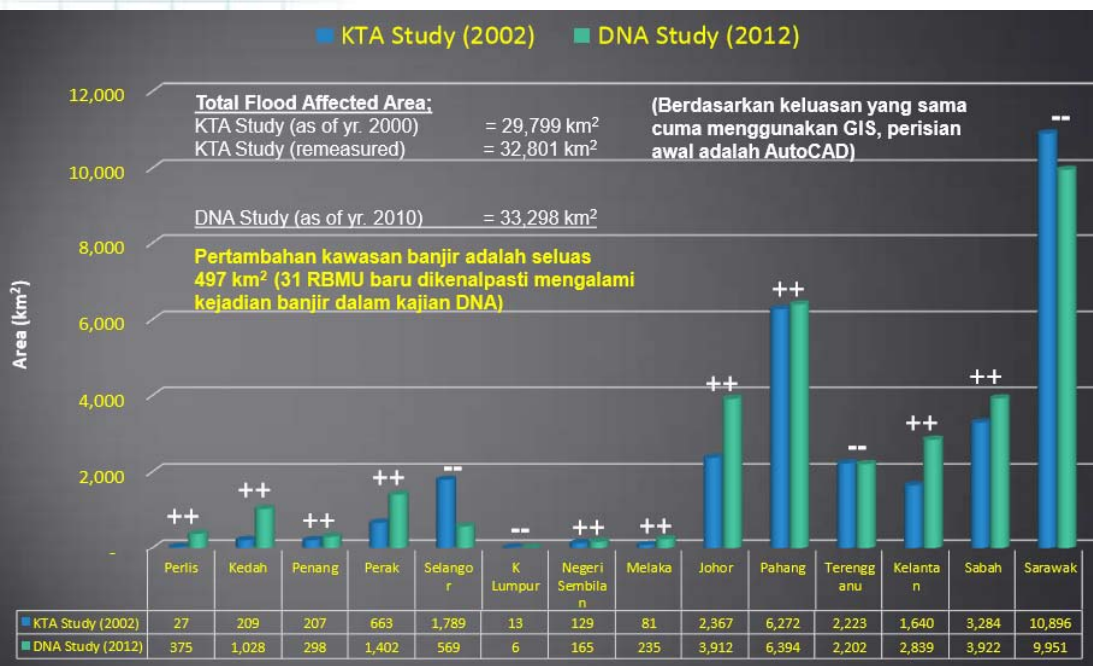
### NATIONAL WATER BALANCE MANAGEMENT SYSTEM (NAWABS)



No of basin : 33 / 198 river basins  
Cost : RM335 million  
Timeframe : 3 phases



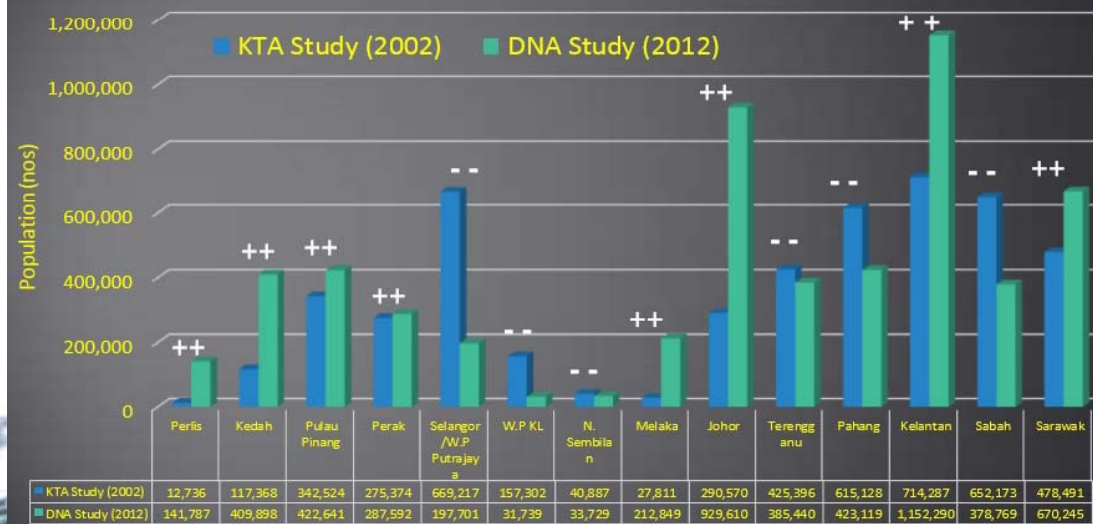
# Flood risks – flooded area and effect to population



Flood forecasting and warning (40 river basins, RM550mill, 2015 – 2022)

## Population Within the Total Flood Affected Area (As of Year 2000 and 2010)

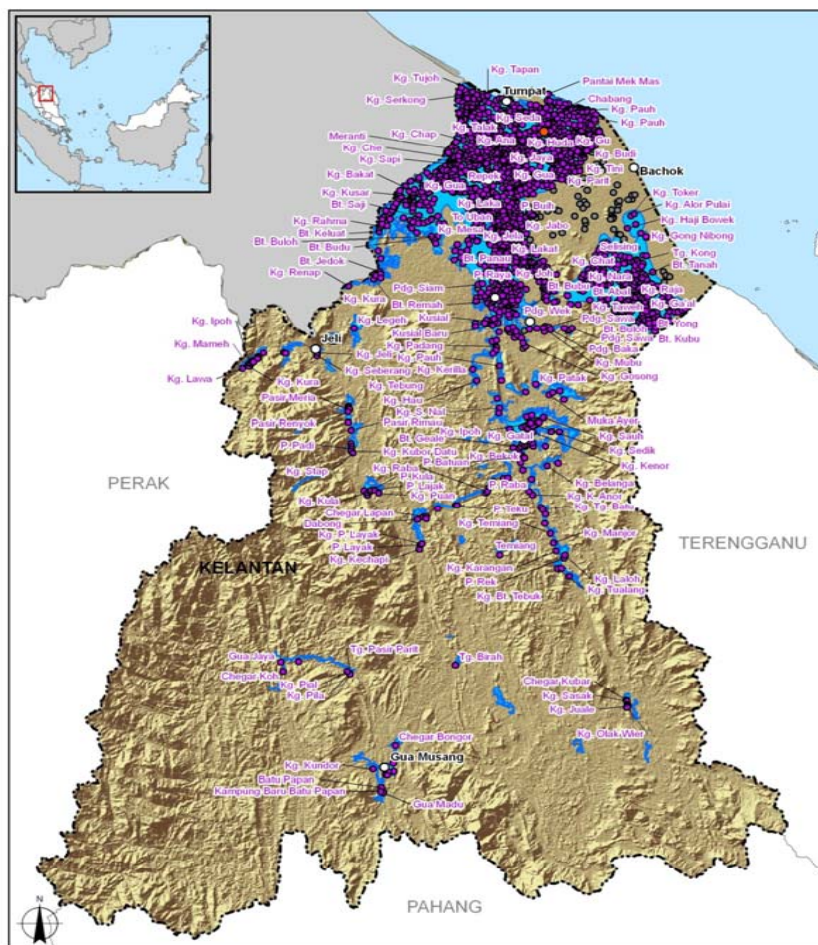
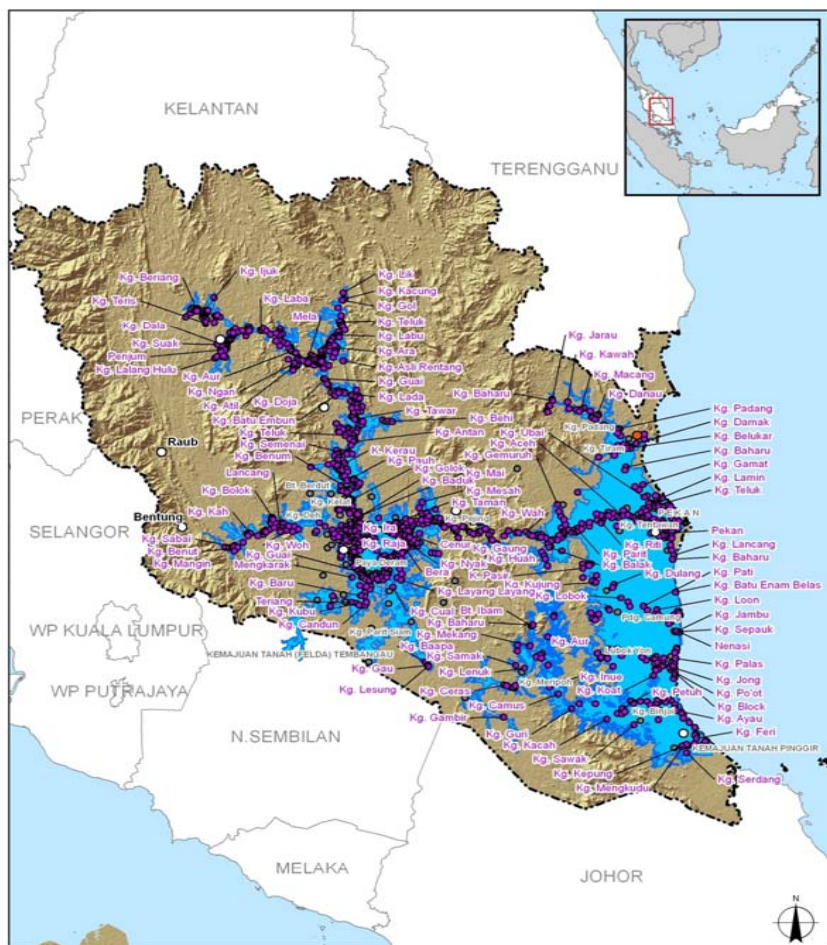
**Total Population in Flood Affected Area;**  
KTA Study (as of yr. 2000) = 4,819,264 (22%) over 22,202,622 million people  
DNA Study (as of yr. 2010) = 5,677,409 (21%) over 27,565,821 million people







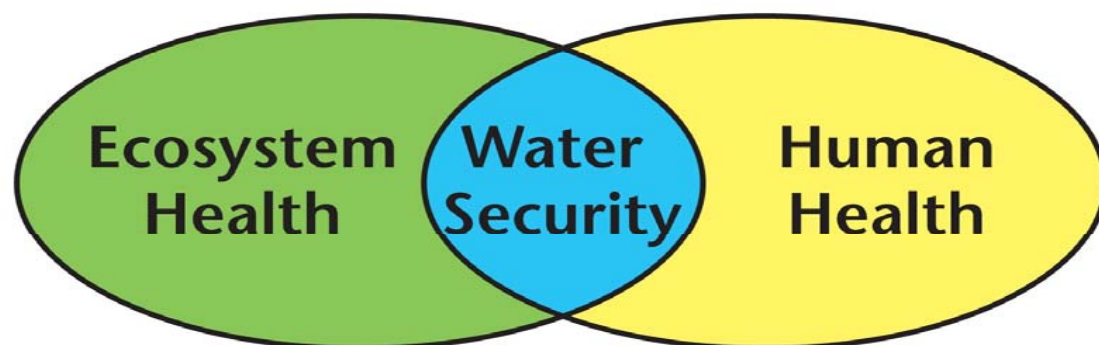
# Flooded area – extreme event



- Develop management plan;
- Access the present scenario and plan for the future (25 plan, 2016 – 2020)

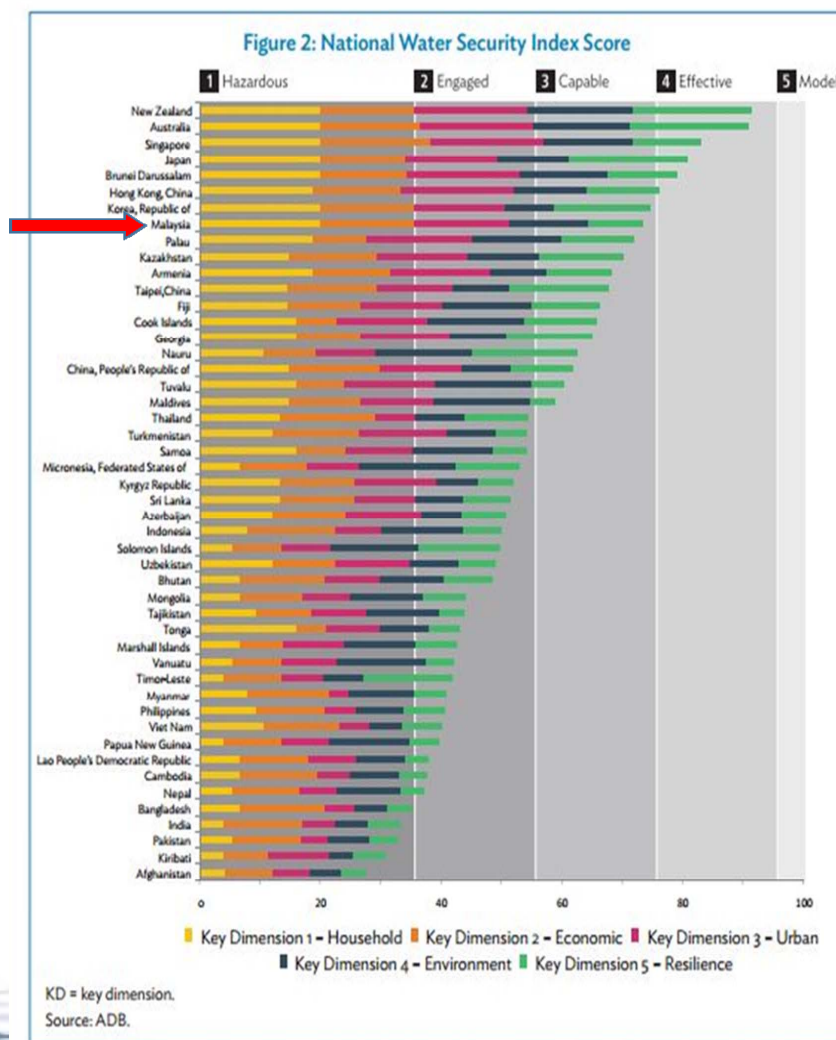


## Defining Water Security



Water Security :

« sustainable access on a watershed basis to adequate quantities of water, of acceptable quality, to ensure human and ecosystem health. »





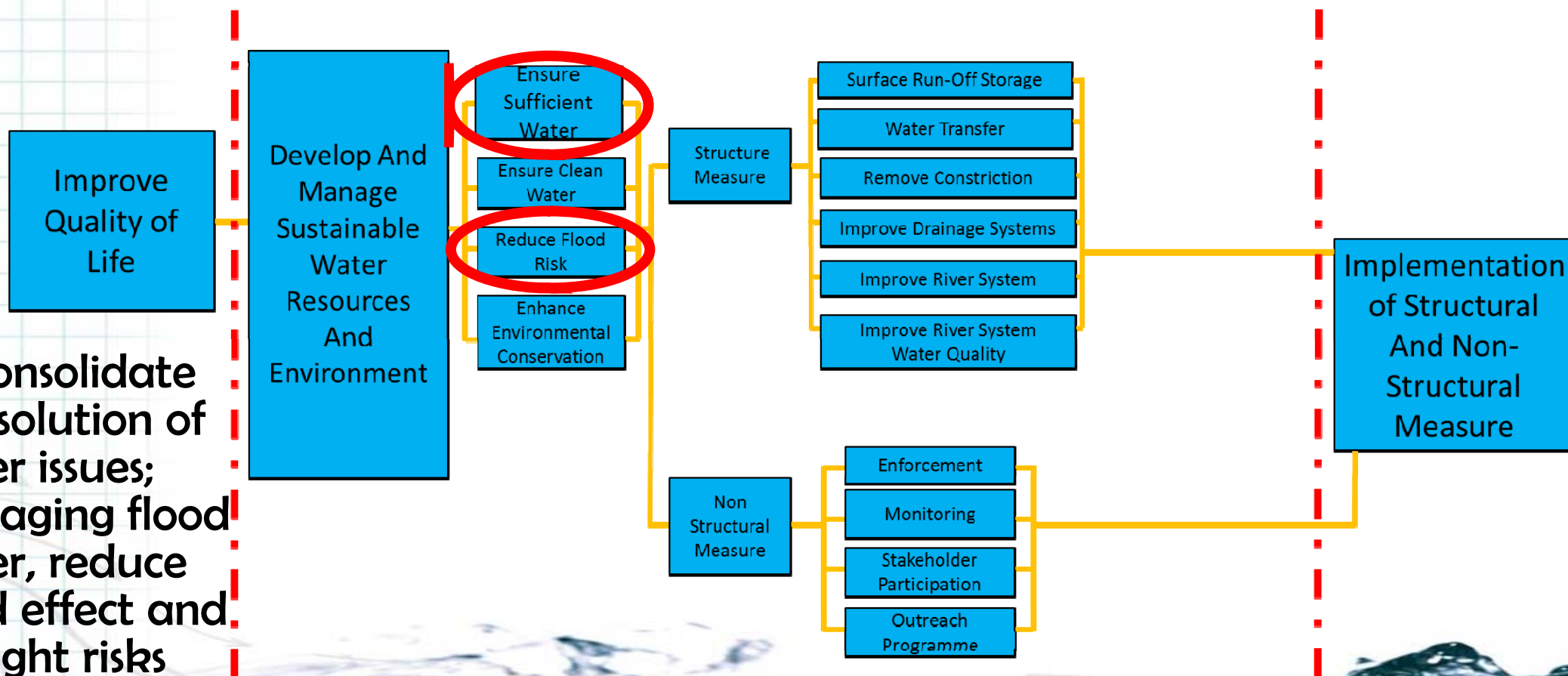


## FAST DIAGRAM – TOTAL SOLUTION BY INTEGRATED RIVER BASIN MANAGEMENT (IRBM)

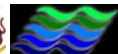
FUNCTION  
ANALYSIS  
PHASE

HOW

WHY

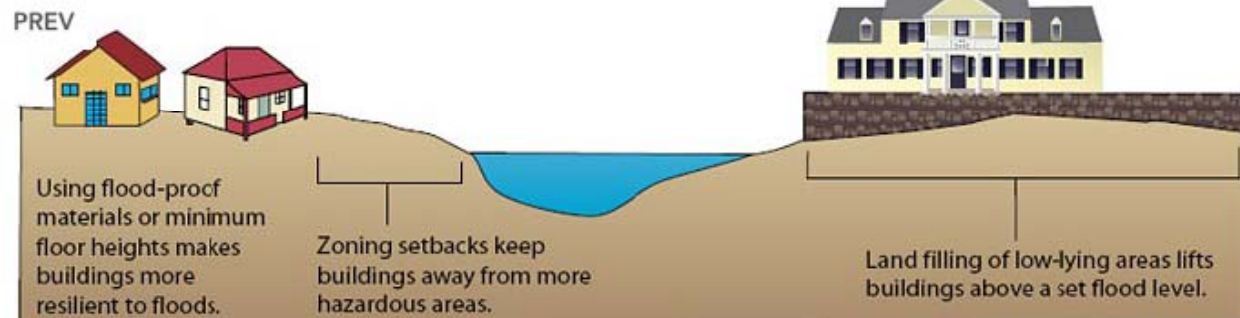


To consolidate the solution of water issues; managing flood water, reduce flood effect and drought risks

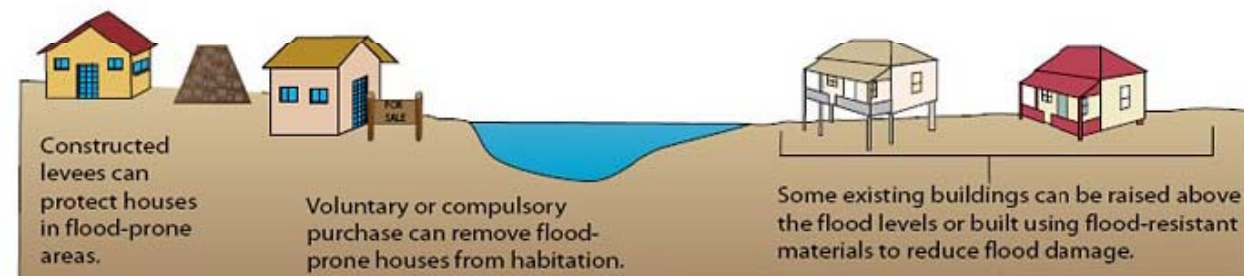


# Development approach

## New development areas



## Existing development areas







# Climate change effect

## Temperature:

- Increase in mean surface temperature: 0.6°C to 1.2°C , 1969-2009 (MMD)

## Rainfall

- Increased rainfall intensity -> 1-hour rainfall intensity (2000-2007) increase by 17% compared to 1970s values (NAHRIM)
- “Above average” rainfall cause flood losses RM 1.5 billion
  - ✓ In 2007: Massive floods in some part of Johor
  - ✓ In 2014: Massive floods in Pahang and Kelantan

## Sea Level Rise

- 4.6 cm to 11.9 cm, satellite altimetry data (1993-2010)





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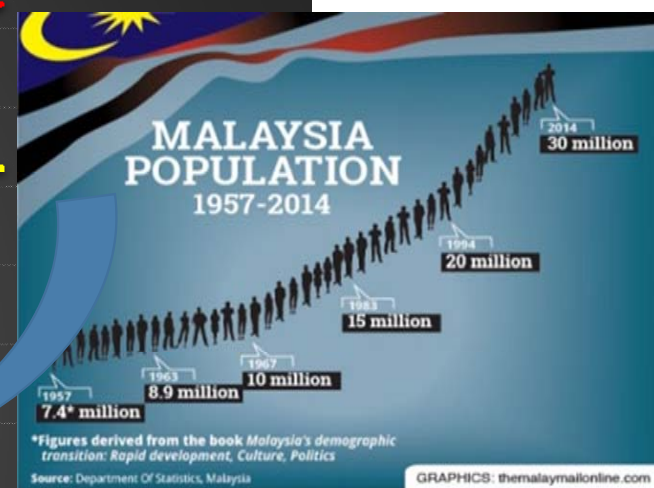
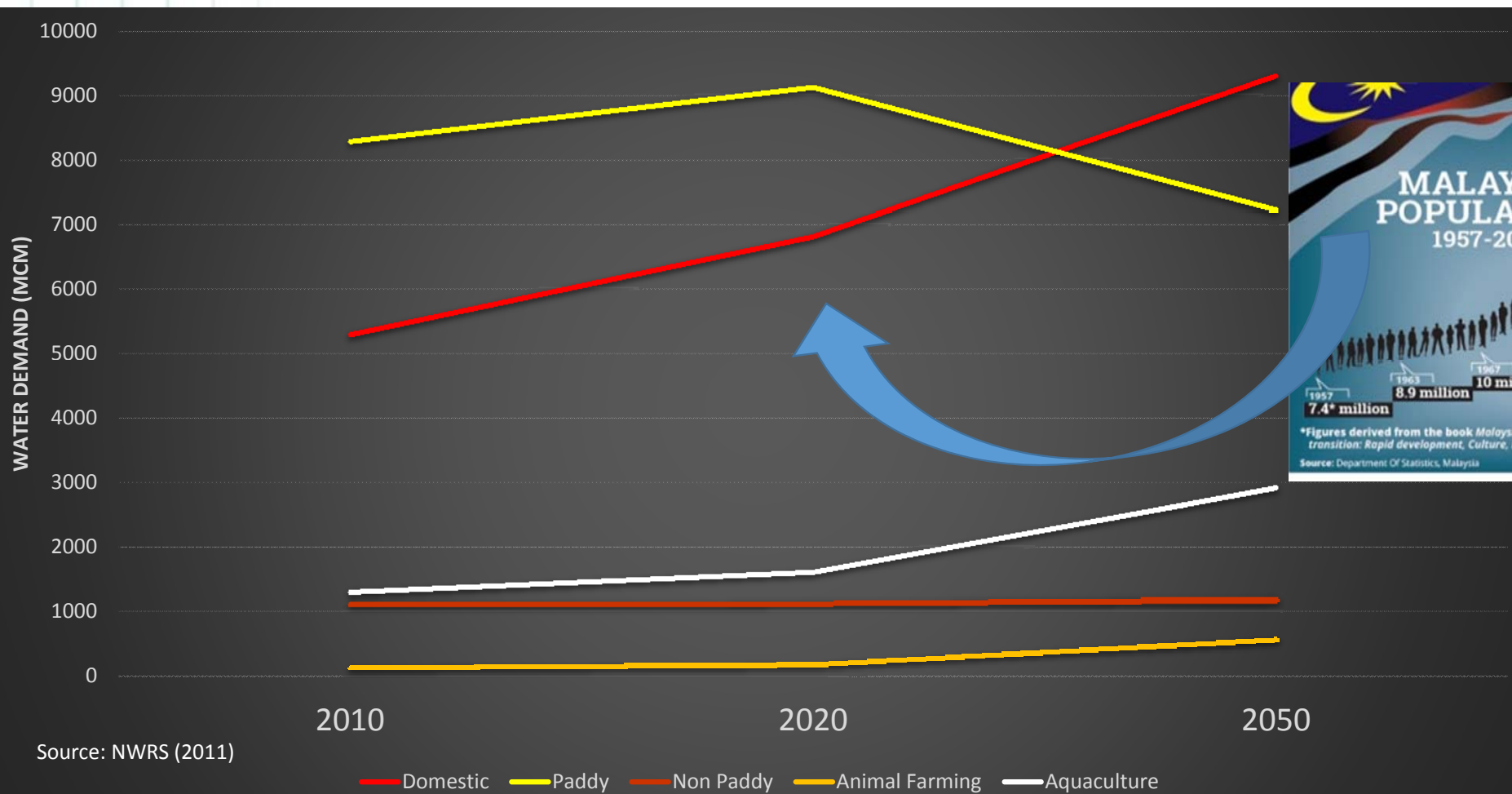


## Water Demand in Malaysia

2010  
14,783 MCM

2020  
17,206 MCM

2050  
18,228 MCM







# Guiding principle

- National Water Resources Policy, thrust;
  - Water for people
  - Water for food and rural development
  - Water for economic development
- Key Area, focus area;
  - Water resources security
  - Water resources sustainability
  - Partnership
  - Capacity building and awareness
- Ministerial Function Act
  - Manage and develop water resources

**DASAR SUMBER AIR NEGARA**  
**NATIONAL WATER RESOURCES POLICY**



Kementerian Sumber Asli dan Alam Sekitar Malaysia  
Ministry of Natural Resources and Environment Malaysia



**BY CHEN YIN CHEN**  
PHOTO BY LEE KAP KUAN

1. **What is the main mission of DID Malaysia?**  
Zulkifli Hasan: The main mission of DID Malaysia is to ensure water security for the future generations. We are responsible for managing the water resources and ensuring that there is enough water for everyone, everywhere, all the time.

2. **What are the challenges you face in your role?**  
Zulkifli Hasan: One of the main challenges is climate change. It is causing more frequent and severe weather events, which can lead to droughts and floods. We need to be prepared for these challenges and have a plan in place to deal with them.

3. **How do you ensure water security for the future?**  
Zulkifli Hasan: We need to take a long-term view of water security. This means investing in infrastructure, such as dams and water treatment plants, and ensuring that we have enough water to meet the needs of future generations.

4. **What is the role of the government in ensuring water security?**  
Zulkifli Hasan: The government has a key role to play in ensuring water security. We need to have policies in place that encourage sustainable water use and investment in water infrastructure.

5. **What are the benefits of water security?**  
Zulkifli Hasan: Water security is essential for a healthy and sustainable society. It ensures that we have enough water to drink, grow food, and keep our environment healthy.

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Water security for future generations

## Waterman on a mission

### Flood-fighting mission is also making water security his priority

- Director General DID Malaysia

# To ensure



- Supported by legal provision;
  - Water resources usage
  - Planning
  - Protection of water resources area
  - Water hazard control
  - Activity control
  - Licensing
  - Enforcement
  - Offences and penalties
  - Repeal and savings





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**Total Demand vs Availability of Water Resources NWRS 2011**



State	Area Sq km	Total water demand (mm)					Effective rainfall (mm) 14%	Excess / Shortage (mm) – Uncontrolled flow				
		2010	2020	2030	2040 40%	2050 46%		2010	2020	2030	2040	2050
Perlis	821	372.3	364.2	348.0	345.5	342.3	71	(302)	(294)	(277)	(277)	(272)
Kedah	9,500	307.6	313.2	299.1	302.4	302.8	113	(195)	(201)	(187)	(190)	(190)
Pulau Pinang	1,048	729.4	791.3	797.5	834.4	853.2	120	(609)	(671)	(677)	(714)	(733)
Perak	21,035	92.7	91.6	85.5	85.6	86.1	140	47	48	54	54	53
Selangor	8,396	266.6	296.6	306.0	328.7	348.0	114	(153)	(183)	(192)	(215)	(234)
Negeri Sembilan	6,686	51.0	54.1	53.6	54.7	56.0	74	23	19	20	19	18
Melaka	1,664	193.9	220.1	225.9	246.0	263.4	86	(108)	(135)	(140)	(161)	(178)
Johor	19,210	37.2	45.8	53.8	60.6	67.7	171	134	125	117	110	103
Pahang	36,137	20.1	26.2	24.8	25.2	26.5	165	145	139	140	140	138
Terengganu	13,035	67.8	74.8	74.4	76.7	78.7	254	186	179	179	177	175
Kelantan	15,099	108.1	107.2	105.0	106.0	106.2	176	67	68	70	70	69
Pen Malaysia	132,631	96.5	103.1	102.2	105.9	109.2	159	62	56	57	53	50
Sabah	73,631	12.4	18.4	18.9	19.6	20.0	177	165	159	158	157	157
FT Labuan	91	197.7	264.3	285.0	304.0	318.0	323	125	58	37	19	4
Sarawak	124,450	8.4	17.3	17.0	17.5	18.0	221	212	203	203	203	202
East Malaysia	198,172	10.0	17.9	17.9	18.4	18.9	269	258	251	251	250	250
Total Malaysia	330803	44.7	52.0	51.7	53.5	55.1	225.0	180.3	173.0	173.3	171.5	169.9



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# Way forward

**Optimizing existing infrastructures  
- Water storage facility**



Batu Dam

Dual purpose dam; flood  
detention and water resources  
for domestic water supply



Klang Gate Dam





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# Flood retention pond



Sri Muda Retention Pond



Batu Retention Pond



MC8-MC9 Pond

Surface runoff collection and storage to reduce flood risks; water resources development to meet future demand

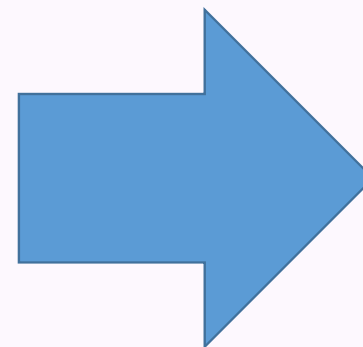




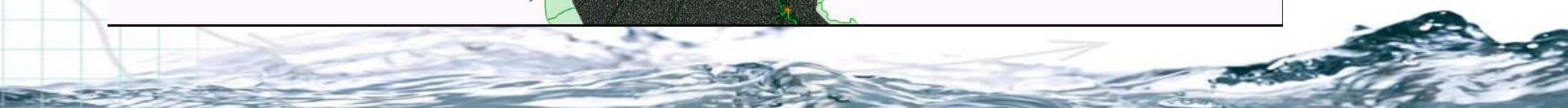
# River modelling

1/02/2015 00:00:00

Sungai  
Terengganu  
Dam



**Basin  
Modelling**







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# Downstream water resources storage

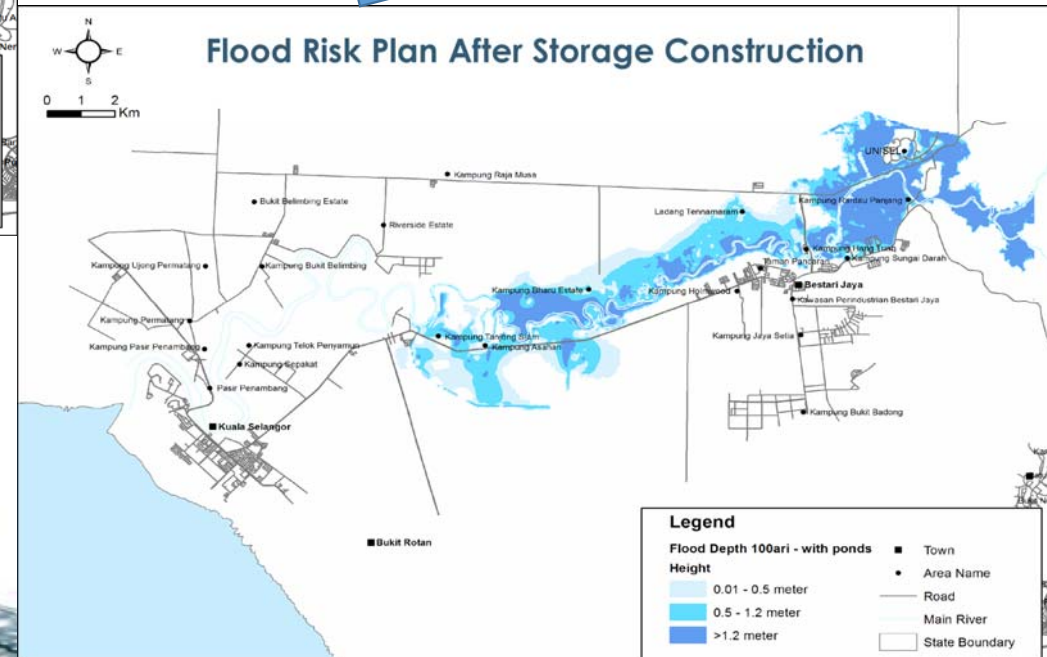
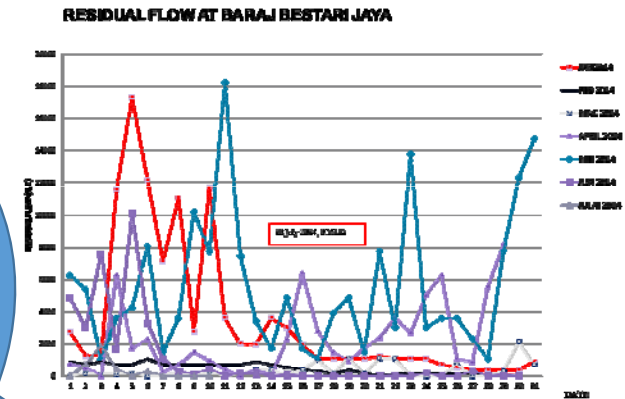
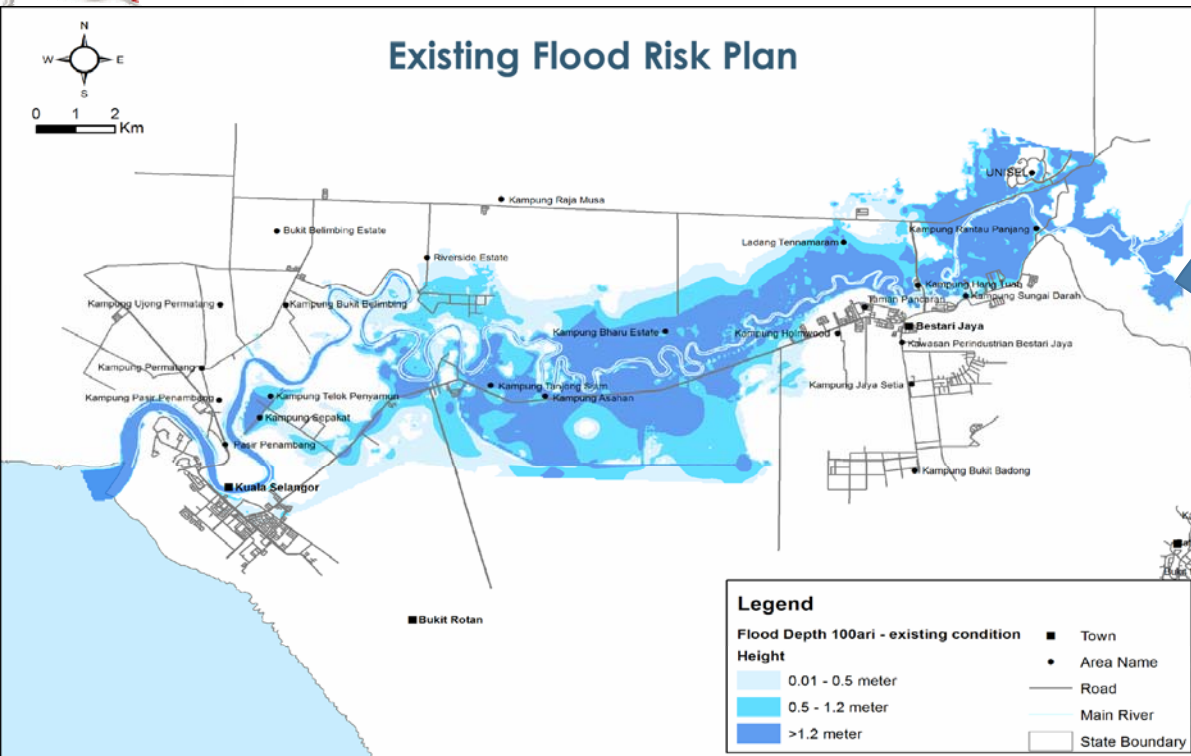


**Transform**



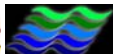


## Utilisation of excess surface water

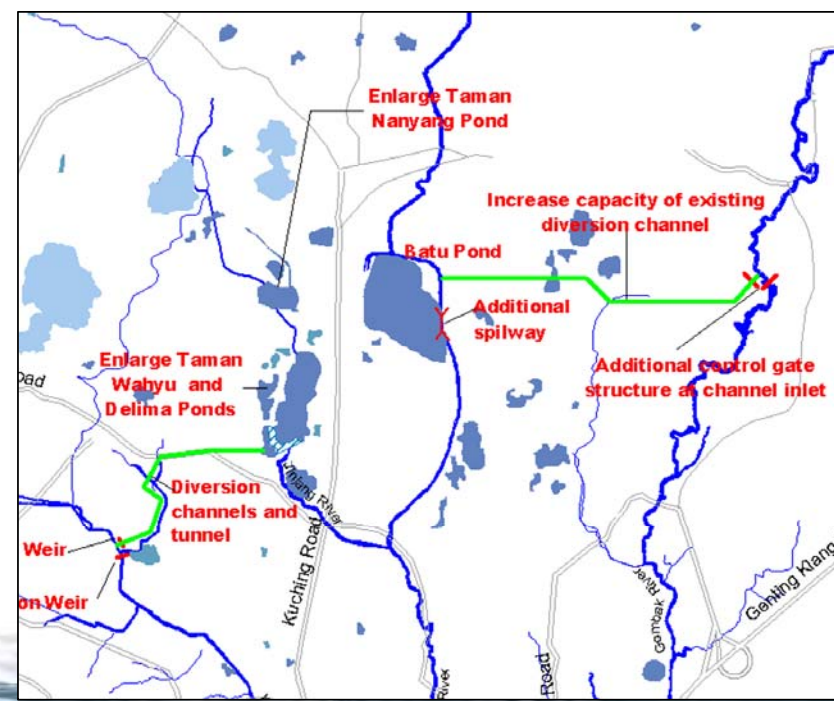
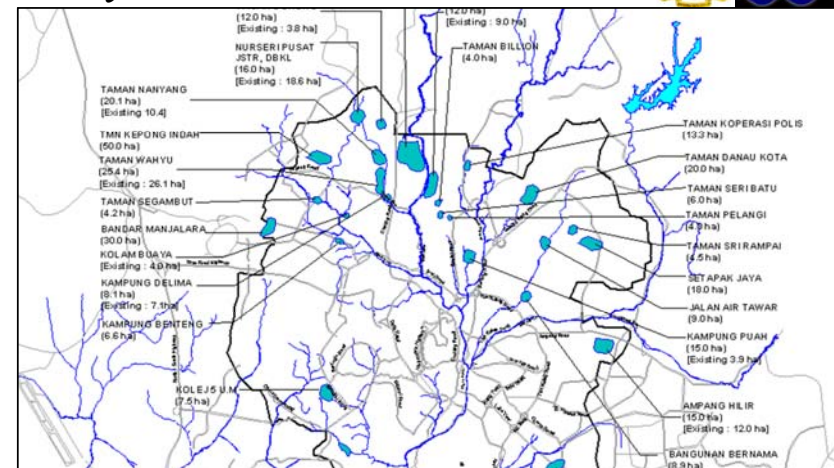
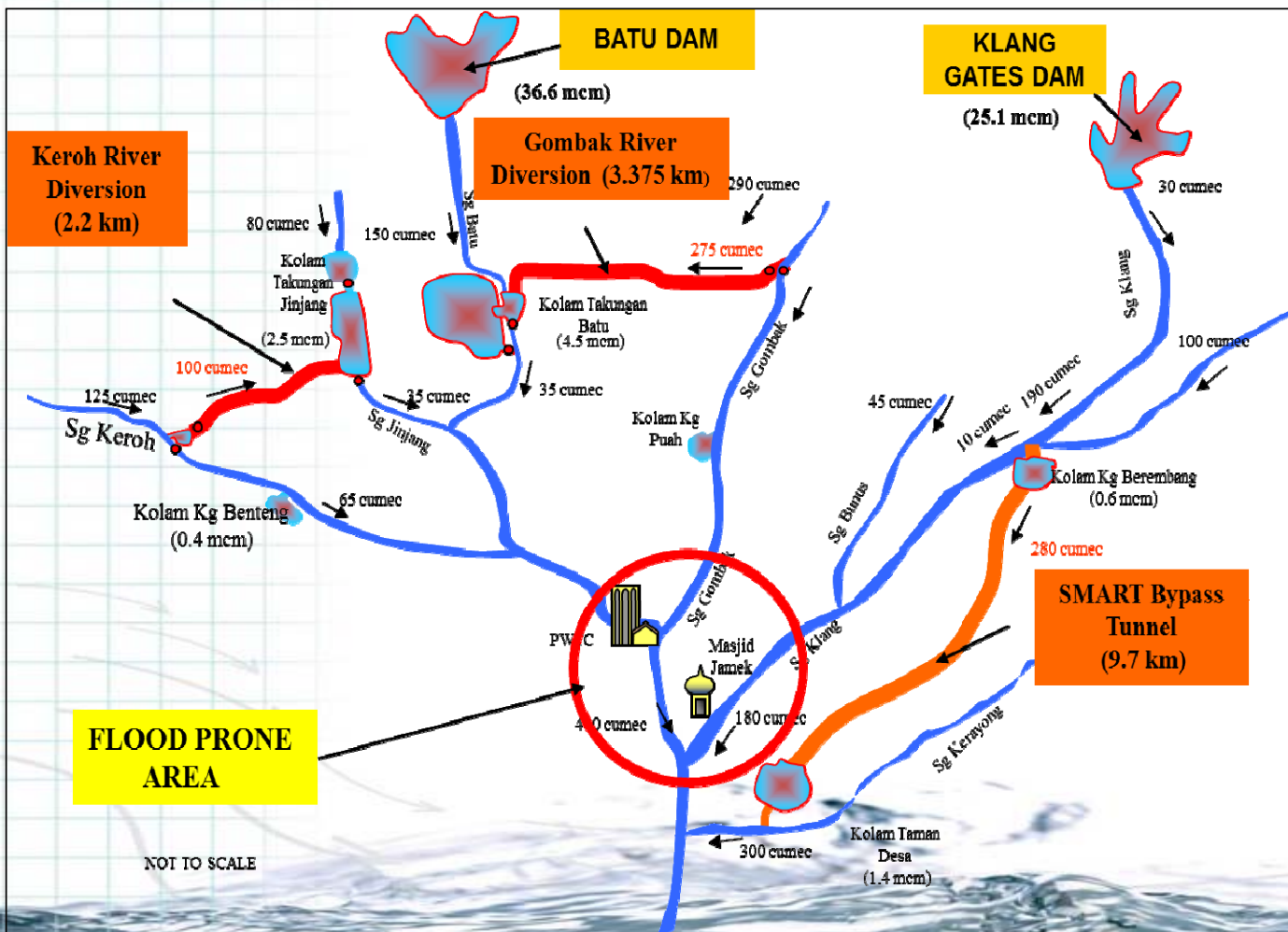


- Reduction in flood prone area
- Reduce flood risk to local community
- Increase water resources availability
- Ready to be used





## Green climate initiative





# Conclusion

- Water resources as national agenda; planning, development and investment
- Water security and build climate resilience
- In managing water resources, require data integrity (sustainable, reliable and sufficient)
- Data collection, data management, data sharing and application system
- Utilisation of flood water
- Optimising the existing infrastructure

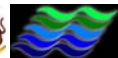






- **Solving for the future; implementation and operation (RBMP)**
  - ✓ New approaches, integrate water related project
  - ✓ More innovative solution including science based
- **Basin management is extremely complex; conflict resolution**
- **Management of basins in growing development**
- **Providing sufficient budget to execute the action plan**





Thank You  
Terima Kasih

2 11:16 AM