

# Workshop on SMART Informatics for Sustainability

## IMPLEMENTATION OF IWRM IN MALAYSIA



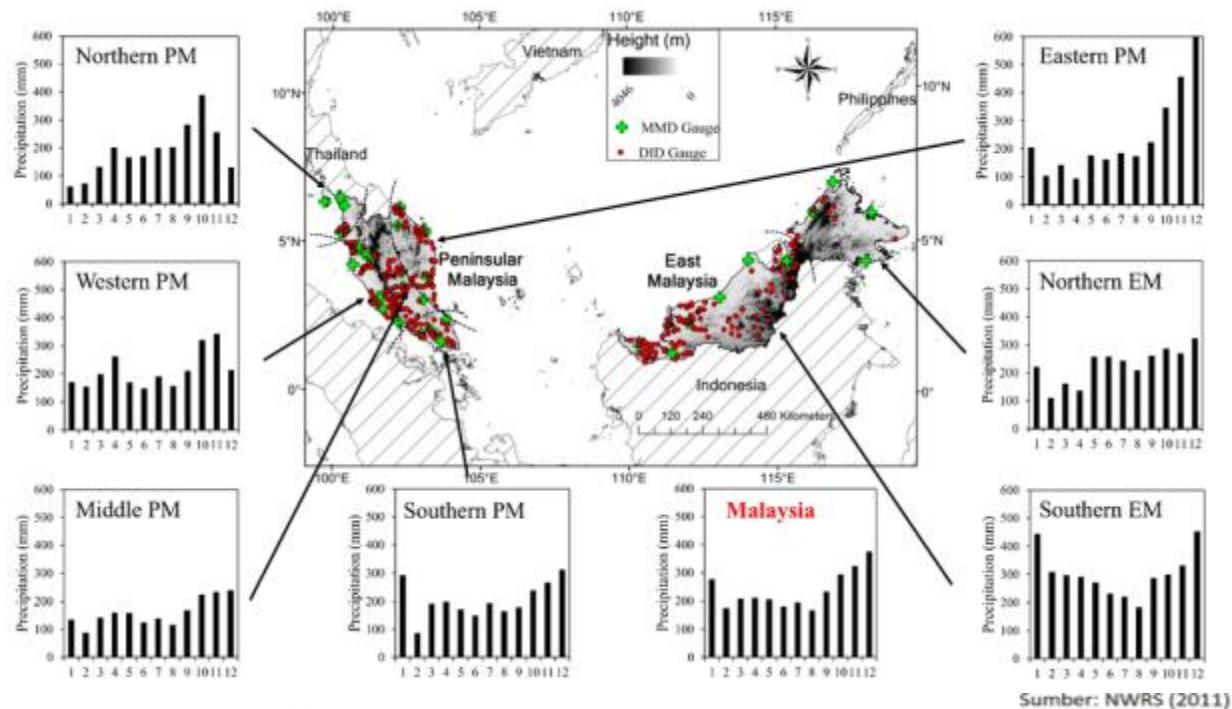
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# Presentation Outline

1. Introduction
2. Water Resources Scenario in Malaysia
3. Water Security Challenges & Issues
4. DID Responsibility in Flood Disaster
5. IWRM & WRM Instruments
6. Conclusion

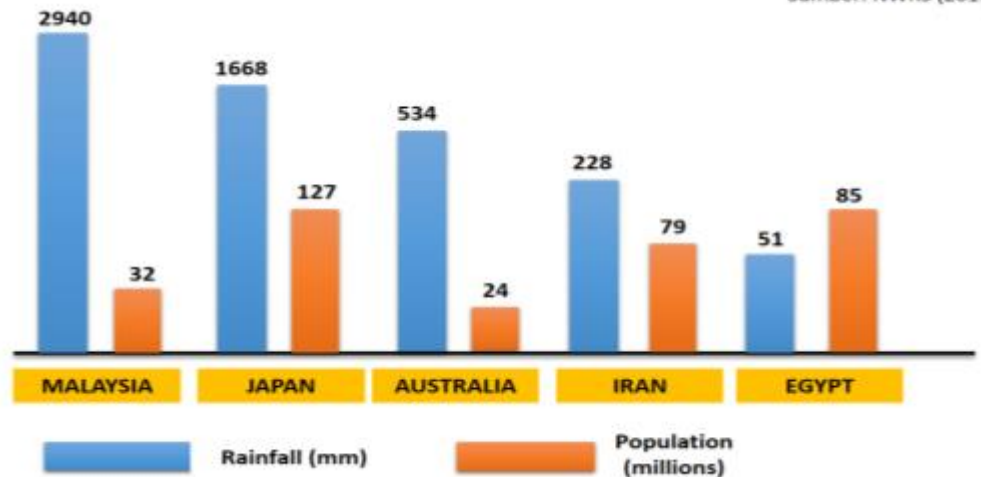
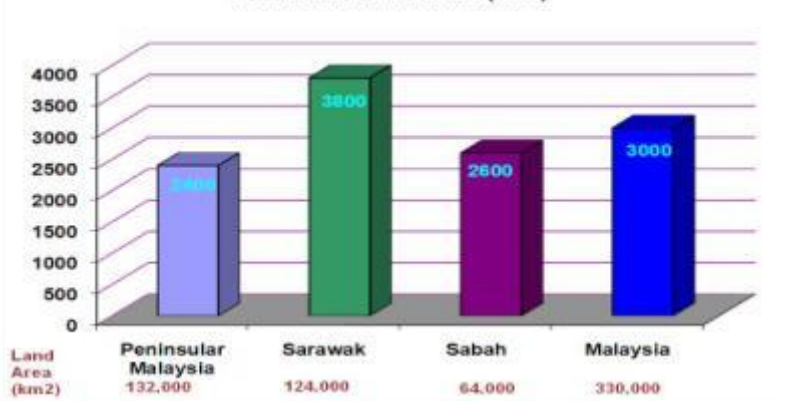
# Climate & Rainfall in Malaysia

- **Annual rainfall 3000mm**
- **Temperature 21° – 34° C**
- **Relative humidity 80%**
- **Open water evaporation 1600 -1800 mm**
- **Northeast Monsoon (Nov – Mac)**
- **Southwest Monsoon (Apr –May for Peninsular Malaysia)  
(May – July for East Malaysia)**



Sumber: NWRS (2011)

Mean Annual Rainfall (mm)

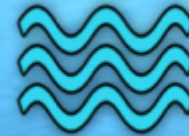




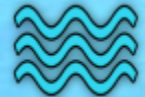
# Water Resources Scenario in Malaysia

Source : NWRS (2011)

**Rainfall Per Year**  
**971 BCM**



**Surface Runoff**  
**494 BCM**



**Surface Runoff**  
**86 BCM**

**Peninsular Malaysia**  
**330 BCM**



**Evaporation**  
**170 BCM**



**Surface Runoff**  
**141 BCM**



**Groundwater Recharge**  
**19 BCM**

**SARAWAK**  
**453 BCM**



**Evaporation**  
**155 BCM**



**Surface Runoff**  
**267 BCM**



**Groundwater Recharge**  
**29 BCM**

**SABAH**  
**188 BCM**



**Evaporation**  
**87 BCM**



**Groundwater Recharge**  
**13 BCM**

# Water Security Challenges & Issues

- Institutional & Legislation issues;
- Climate change : Flood and Drought;
- Water quality pollution;
- High rates of Non-revenue Water (NRW);
- Inefficient irrigation water use;
- High rate of water wastage and overuse;
- Land-use changes;
- Population is growing : 32 millions in 2015 and estimated in 50 millions (2050).

# Water Related Disasters in Malaysia

## Disaster Types

**Floods**

**Landslide**

**Drought/  
Forest Fire/  
Haze**





# FLOOD



# DROUGHT

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## 30 DAYS BEFORE 4 STATES DRY UP

Perlis, Kedah, Penang and Perak are facing the worst water shortage with projected drying of dams and rivers in a month.

Penang calls for stop to irrigation in Kedah to divert water to treatment plants serving four million people in the four states.

Water rationing has started in northern Perlis with 13,000 affected. The Timah Tasoh dam, the only one in the state, is drying up fast.

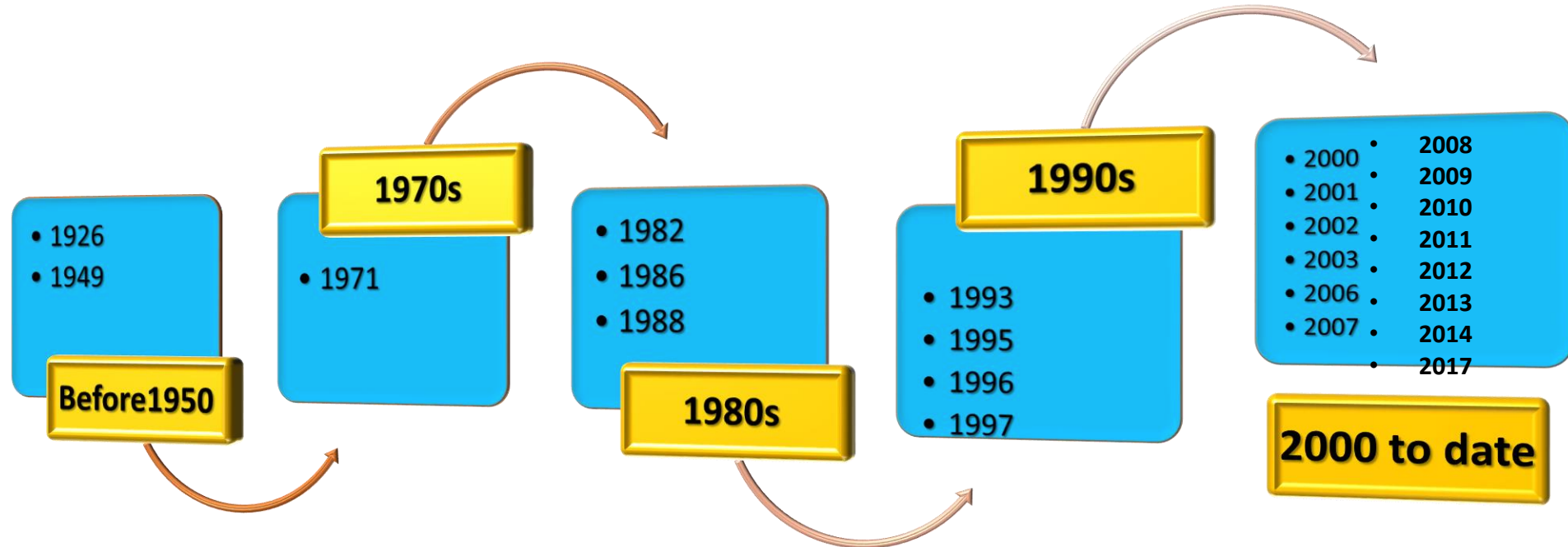
Natural Resources and Environment Ministry to present proposed national water framework to Cabinet by end of May to stave off shortage in future.

**MORE ON PAGES 364**

A photograph of a boat resting on the bed of a dry riverbed. The riverbed is composed of large, reddish-brown rocks. A rainbow is visible in the background, arching over the dry riverbed. The water is very low, and the surrounding landscape is dry and hilly.

A boat rests on the bed of the Air Itam Dam after the water level there fell to 50 per cent due to the current drought. — Picture by KE Ooi.

# Flood Events – Malaysia Scenario





# Kuala Lumpur Major Flood History

## Bangunan Sultan Abdul Samad / Dataran Merdeka



# Kuala Lumpur Major Flood History



Jalan Ipoh, Jalan Kuching & Jalan Munshi Abdullah

26 April 2001



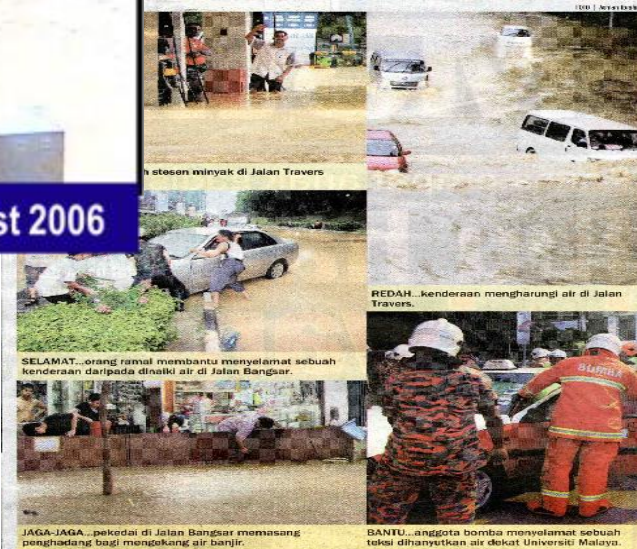
10 June 2003



# Kuala Lumpur Major Flood History



25 August 2006



## KL banjir lagi!

Stesen LRT Masjid Jamek terpaksa ditutup, lima kereta dihanyut air

>>> Oleh Muzlihidhy Hassan  
dan Intan Mas Ayu Shuhimi  
malaymail.com.my

**K**UALA LUMPUR: Hujan lebat, kemor dan banjir di ibu kota menyebabkan kawasan rendah berhampiran dengan Sungai Klang dilanda banjir kilat petang tadi.

Jalan Travers, Dalam kejadian jam 6 petang tadi, banjir kilat terat menyebabkan sesenkan teruk terbasak di Lebuhraya Persekutuan, Lebuhraya Sungai Besi, Jalan Lingkaras Tengah (Jalan MRR2), Jalan Dutra, Jalan Segambut, Jalan Kuching, Jalan Latar, Jalan

lin, Speed Putra, Lebuhraya Mahameru, Jalan Cheras-Bukit, Jalan Bangsar dan Jalan Pagar Besar di tenggelam air.

Sistem Transit: Aliran Ringan (LRT) Masjid Jamek turut terpaksa ditutup selama 45 minit berseada jam 7.30 malam apabila Sungai

(UM) di hanyutkan air. Jurusikap Bomba dan Pemadam kebakaran juga berkesempatan diijazahkan ke tempat kejadian bagi membantu menyelamatkan orang ramai.

Tinjauan Harian Metro juga mendapati keadaan banjir dalam kawasan terowong Sungai

3 June 2007

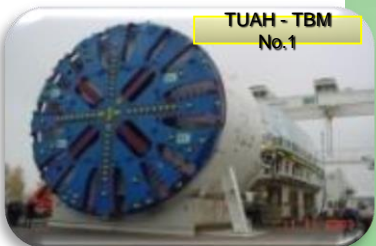
## Tiga cedera ditimpa dahan, 4 terkena cermin restoran KL tenggelam







## Tunnel System Overview



## 28 no. Hydrological Station



# SCC Monitoring System

## FDS SMART OPERATIONS MANAGEMENT

22-Mar-2008 5:06:50 PM

### CRITICAL SYSTEM STATUS

Catchment Sites: **ONLINE**

Operation Sites: **ONLINE**

VHF Repeater: **ONLINE**

### TMCS INTERFACE

Filling Status: **READY**

Dewatering Status: **READY**

### SCADA OPERATING MODES

Holding Pond: **MAN / AUTO**

Attenuation Pond: **MANUAL**

### OPERATING ALARMS

HP Auto Ready: **ALARM**

AP Auto Ready: **ALARM**

Gate Status: **ALARM**

L8 Pump Status: **ALARM**

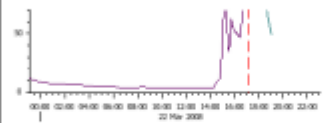
### FORECAST FLOW @ L4 GATES

15 mins **96.7 m³/s**

30 mins **96.8 m³/s**

60 mins **73.8 m³/s**

**STORM CATEGORY II**



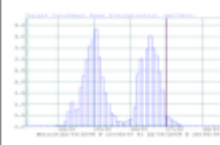
### TUNNEL OPERATING MODE



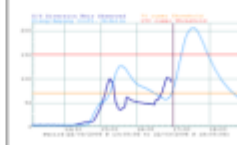
### CRITICAL SITE LEVEL / FLOW

	Level	Flow
U/S L4 Gates:	<b>36.86 mLSO</b>	<b>204.41 m³/s</b>
D/S L4 Gates:	<b>34.92 mLSO</b>	
D/S Diversion:	<b>35.26 mLSO</b>	<b>81.89 m³/s</b>
Holding Pond:	<b>34.58 mLSO</b>	
Upstream NJB:	<b>15.50 mLSO</b>	
Downstream SJB:	<b>10.63 mLSO</b>	
L8 Tunnel Outfall:	<b>4.86 mLSO</b>	
Attenuation Pond:	<b>21.50 mLSO</b>	
Tun Perak:	<b>28.53 mLSO</b>	<b>177.47 m³/s</b>
U/S Sg. Kerayong:	<b>23.43 mLSO</b>	<b>92.61 m³/s</b>

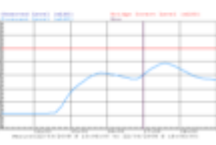
### AVERAGE RAINFALL



### D/S DIVERSION FLOW

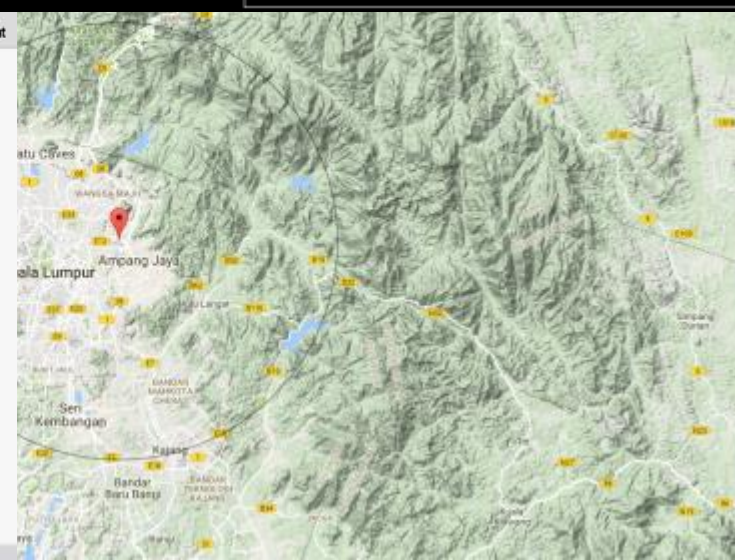
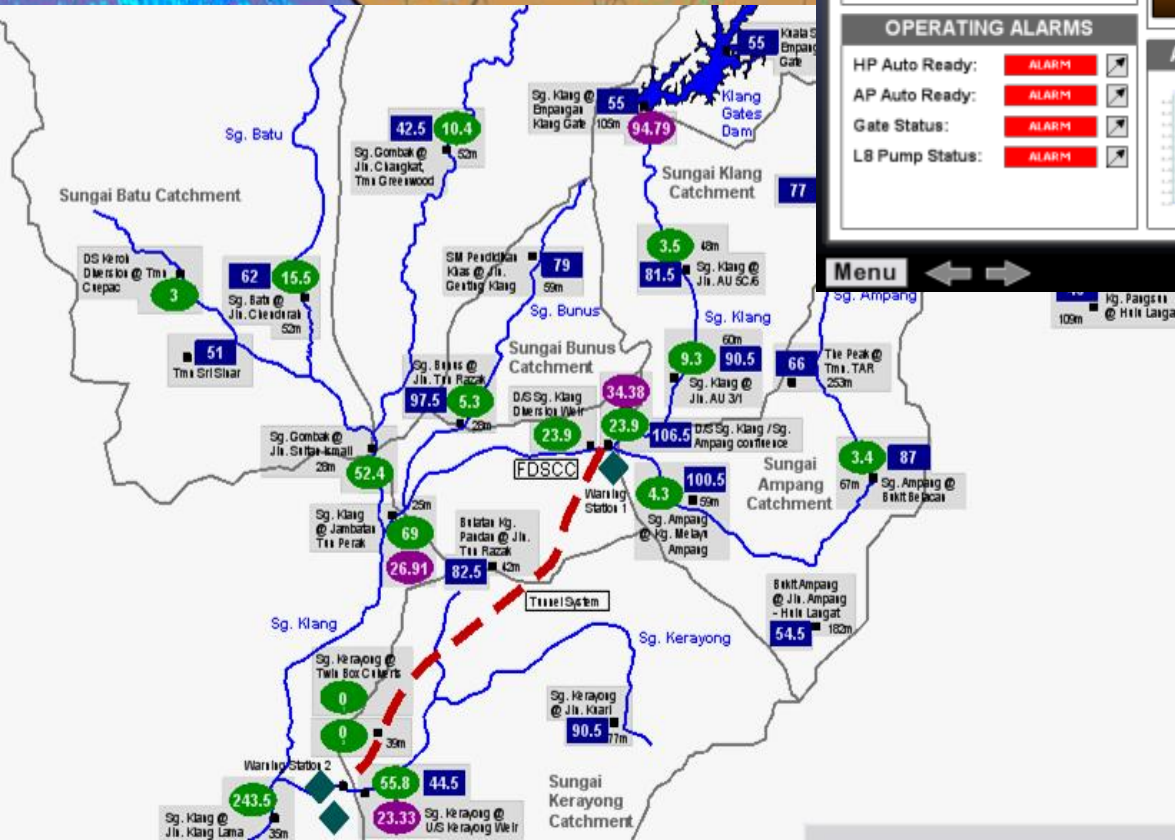


### TUN PERAK LEVEL



Menu

Current Category: **III** Forecast Category: **III** Tunnel Mode: **III**





# Drought

No.	Year	Location	Note
1.	1991	Melaka, Johor	Water Crisis in Melaka (Durian Tunggal Dam)
2.	1998	Kuala Lumpur, Selangor, Pulau Pinang, Melaka, Kedah, <b>Kelantan</b> , Sabah & Sarawak	El-Nino Phenomena
3.	2005	Negeri Sembilan	Water Crisis Negeri Sembilan
4.	2010	Sabah, Johor, <b>Kedah</b> , Perlis	El-Nino Phenomena
5.	2014	Selangor, Kuala Lumpur, Johor, <b>Kelantan</b> , Perak	Dry and Drought Weather
6.	2016	Perlis, <b>Kedah</b> , Pulau Pinang, Johor, Perak, <b>Kelantan</b>	El-Nino Phenomena



*Sumber Sinar Harian: 14 Mei 2016, Tinjauan dari udara menunjukkan keadaan air Sungai Kelantan yang surut berikutan kemarau berpanjangan*

*Sumber Utusan Online: 8 April 2015, Lambakan pasir yang menunjukkan hanya sebahagian kebun sesuai ditanam jagung ekoran kemarau di Machang, Kelantan.*

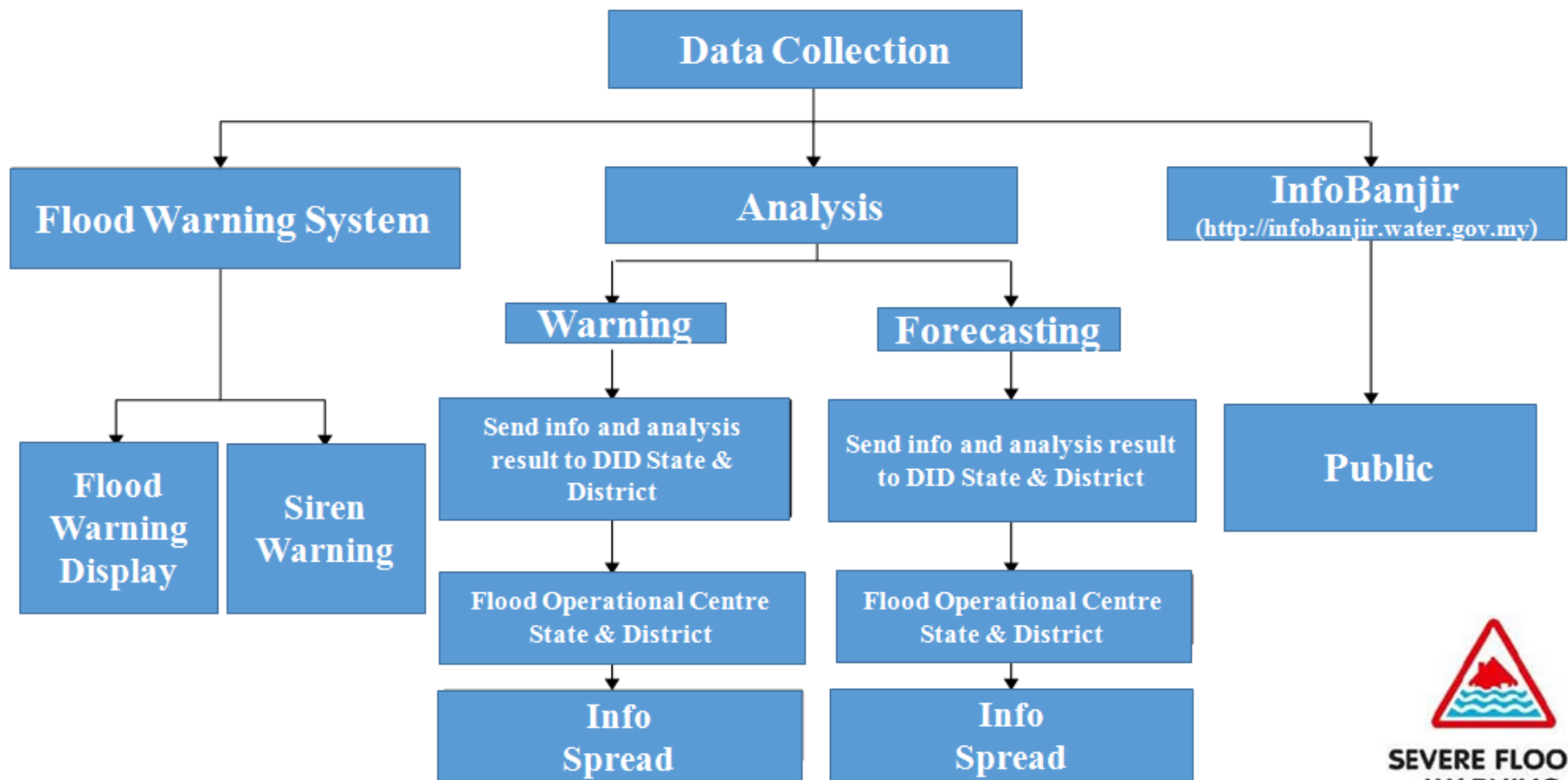
## SCENARIO WATER SCARCITY

# National DM Focal Point

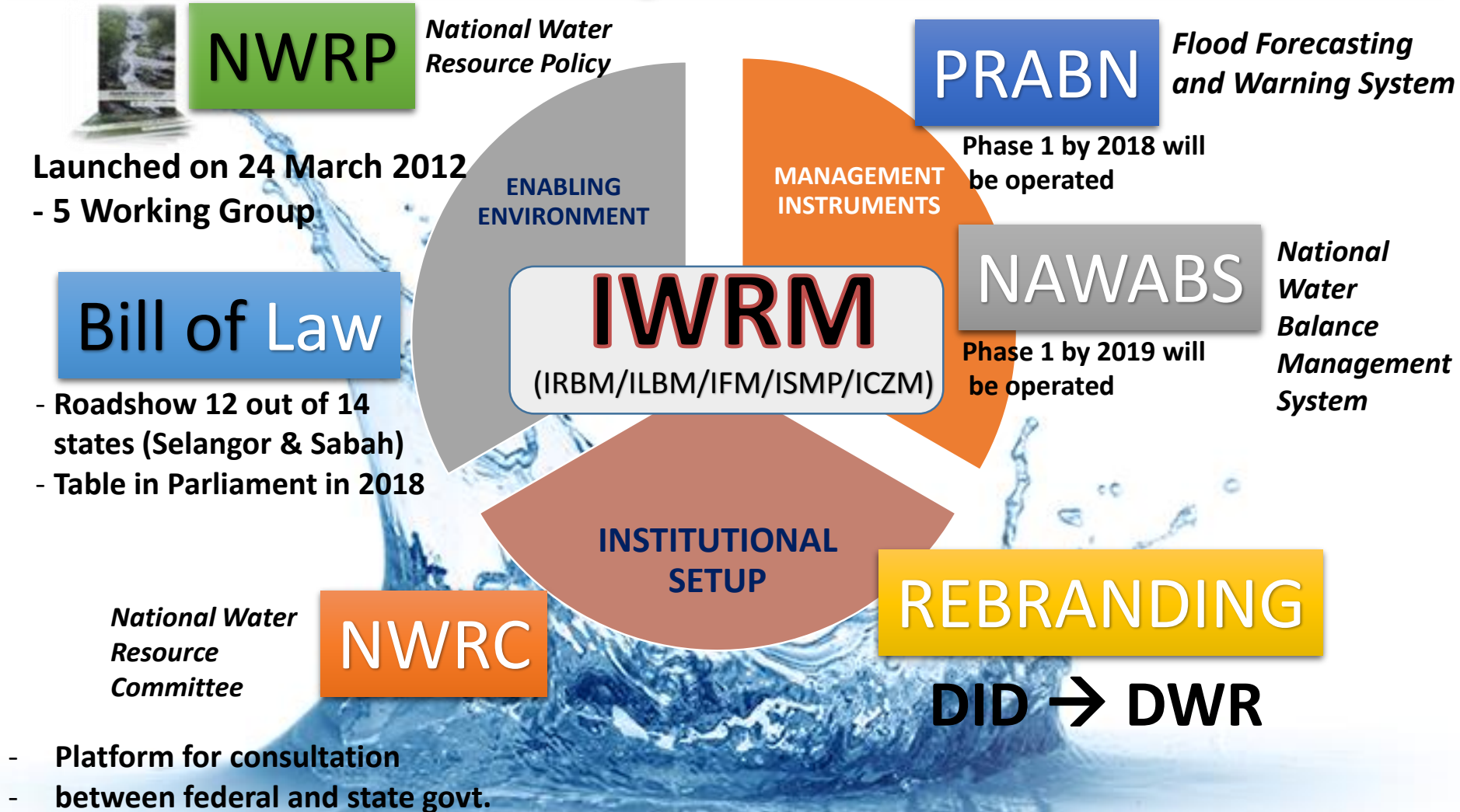




# DID Responsibility in Flood Disaster



# Action Taken by Government to Overcome the Challenges on IWRM



# National Water Balance Management System (NAWABS)



**NAWABS**  
DID Malaysia

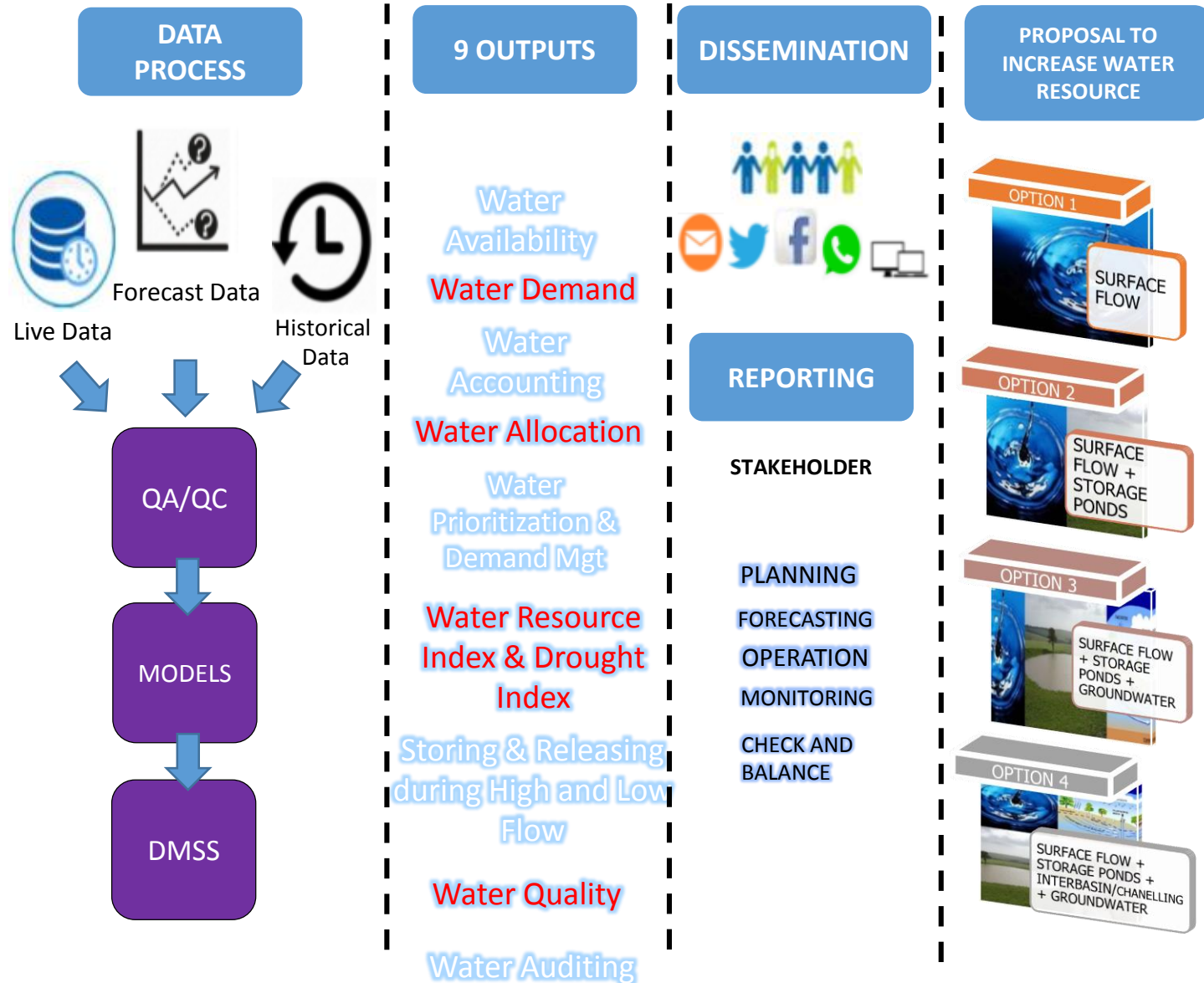
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**The WATER BANK of Malaysia**

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# National Water Balance Management System (NAWABS)



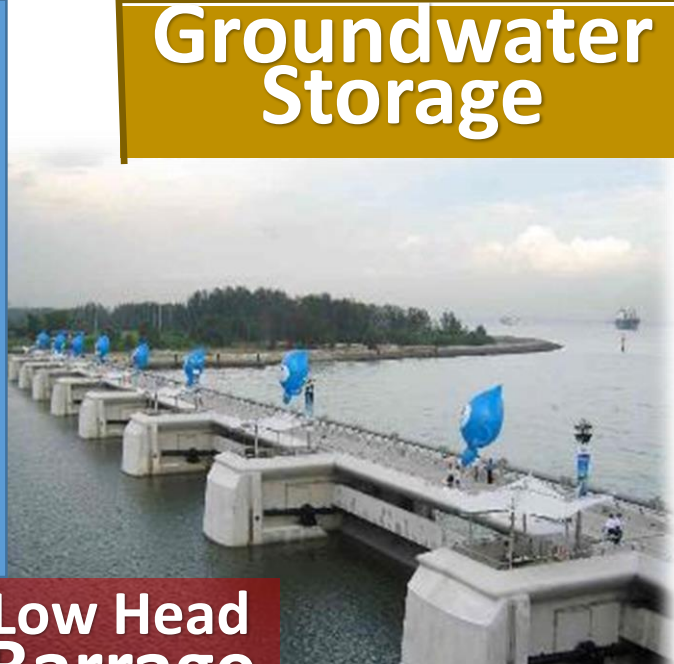
SOLUTION

INFRASTRUCTURE

ALTERNATIVE FOR WATER RESOURCES



Rainfall  
Harvesting

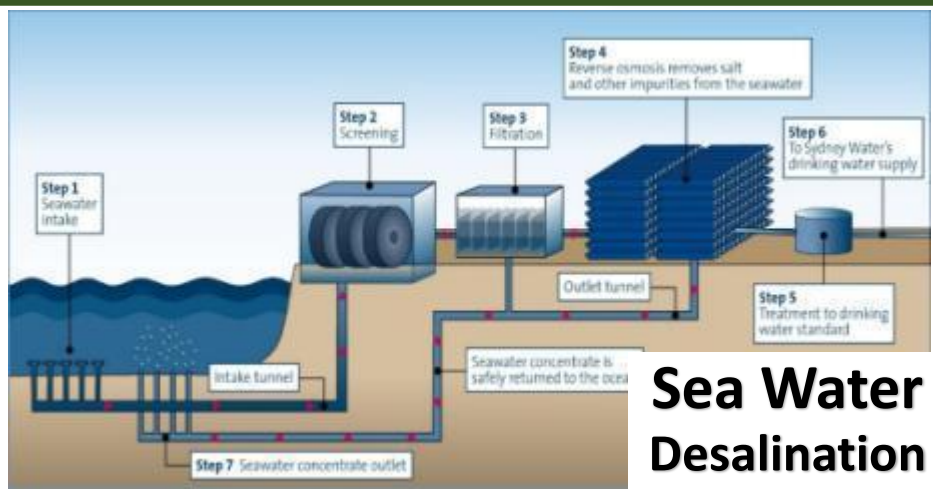


Low Head  
Barrage

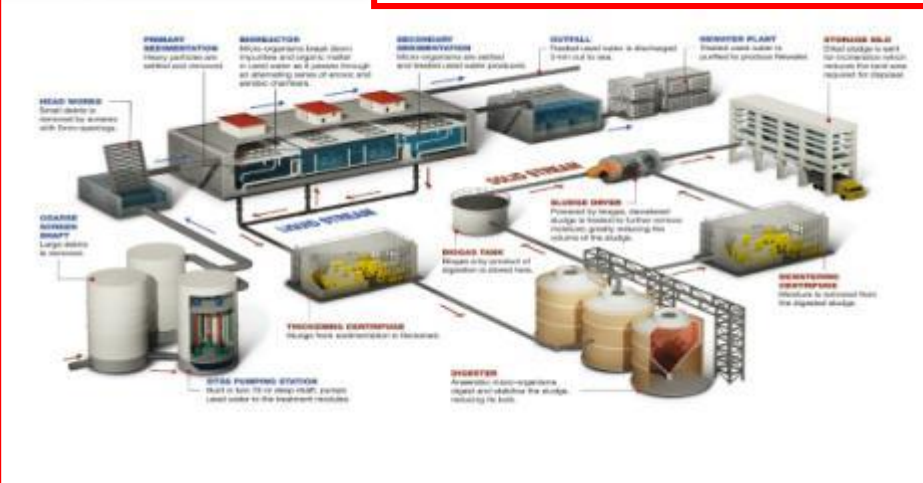
Groundwater  
Storage



Re-Cycle Water

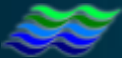


Sea Water  
Desalination





# NAWABS OUTCOME

HOW  
 **NAWABS**  
WILL HELP  
YOU??

Consensus  
oriented



**Centralised  
Decision Making  
System for Water  
State Manager**



**Improved  
Preparedness**



**Forecast: 2 months in advance  
Warning: 2 weeks in advance**

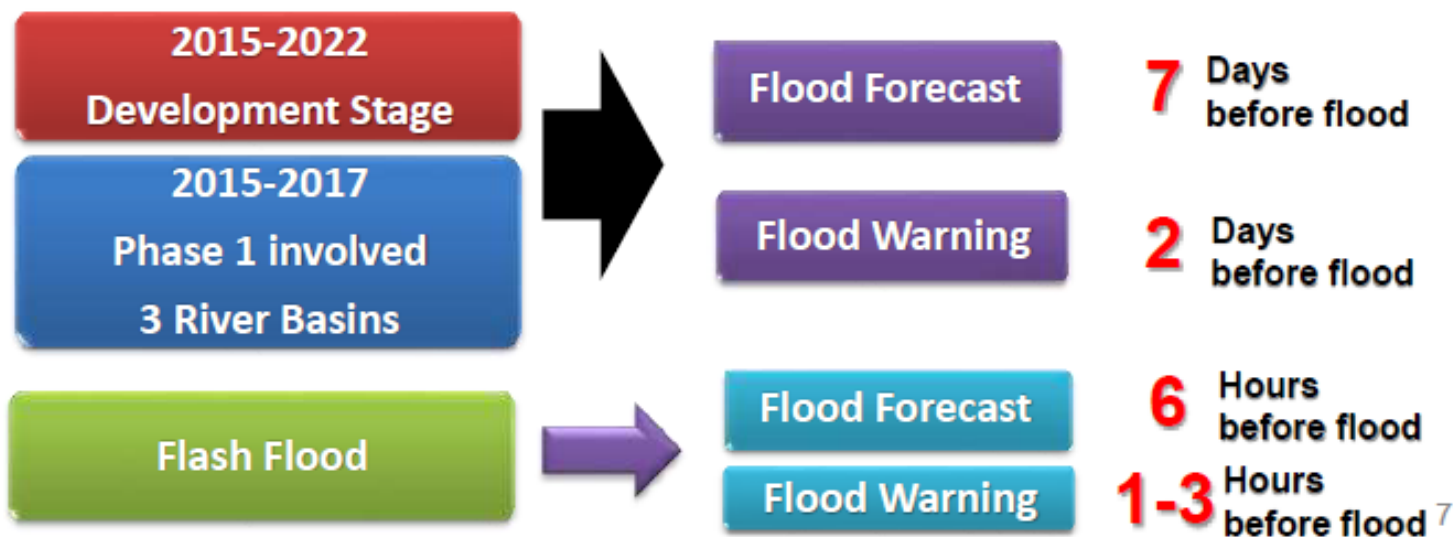
# National Flood Forecasting and Warning Program (PRAB)

## Current System



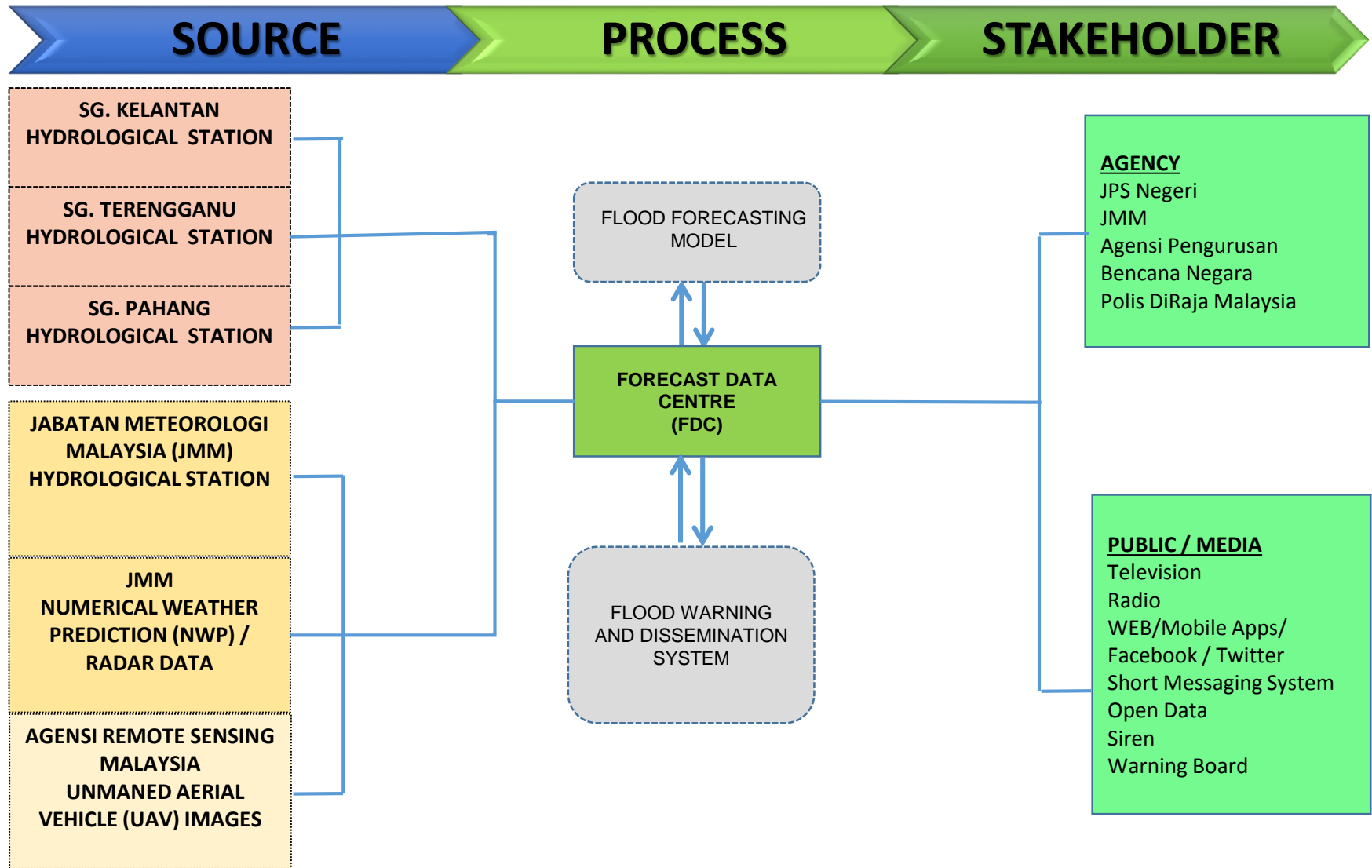
## PRAB

**40** River Basins



# DATA TRANSMISSION SYSTEM

PRAB Phase 1







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News Who's Who

**PRABN To Be In Operation By 2018, Can Forecast Floods 2 Days In Advance - Wan Junaidi**



Thank  
You



## 21<sup>st</sup> CENTURY MALAYSIA WATER VISION



“Malaysia will conserve and manage its water resources to ensure adequate and safe water for all by 2050”

