# GEOSS-AWCI in Asia-Pacific

# Water Issues, Malaysian Scenario

*Tokyo 12 January 2017*

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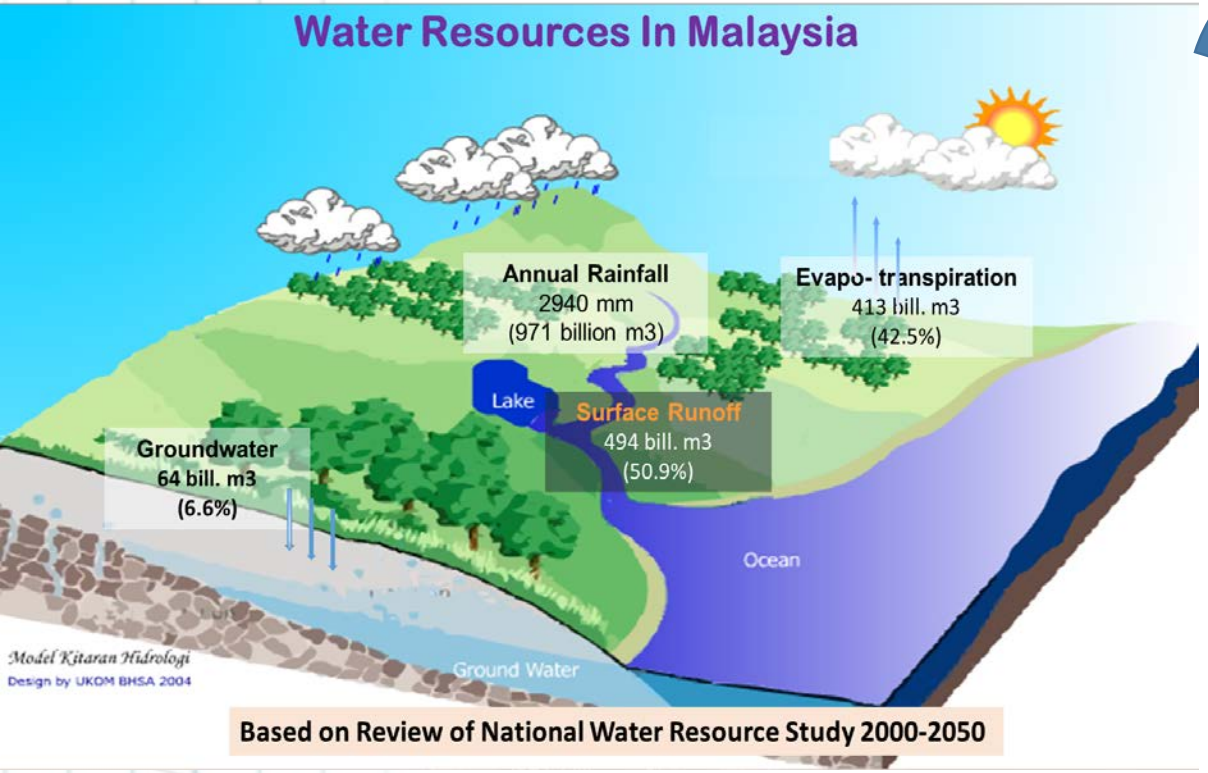
Department of Irrigation and Drainage Malaysia

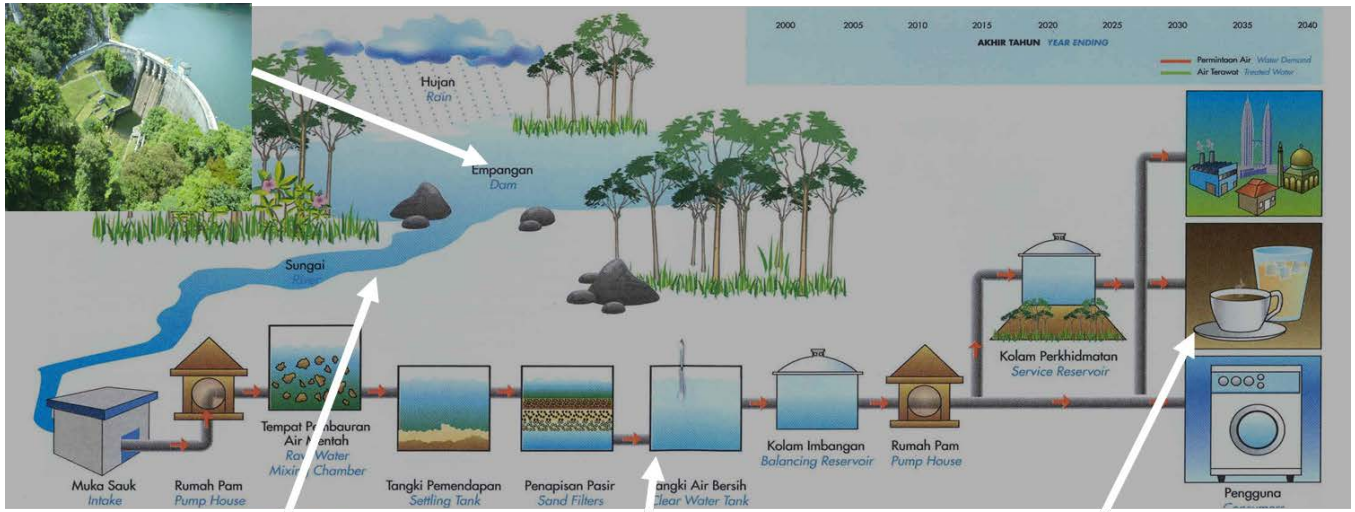
# Content of presentation

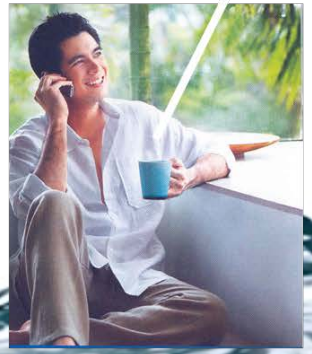
- Introduction
- Observation
- Data related issues
- Conclusion

# Introduction




Water cycle

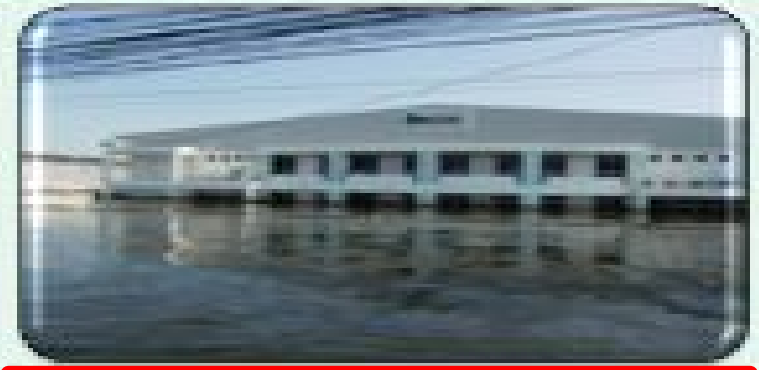


Discharge to septic tank / drain ?

# 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

NEW STRAITS TIMES

NATI

# Master plan for river basins

## Monitoring land use for development

**By Jaswinder Kaur**
*news@nstp.com.my*

KINABATANGAN, Mon. — The Drainage and Irrigation Department will formulate a master plan on land
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monitor
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He said
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was part
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Keizrul
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Mannan
Sungai
in Sukau

About 40 people representing government agencies, non-governmental organisations, students and members of the media participated in the expedition which was organised by DID under the "I am Our

"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 is from underground water," Keiz-
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come, eco-
tion," he
ted Depu-
uk Lajim
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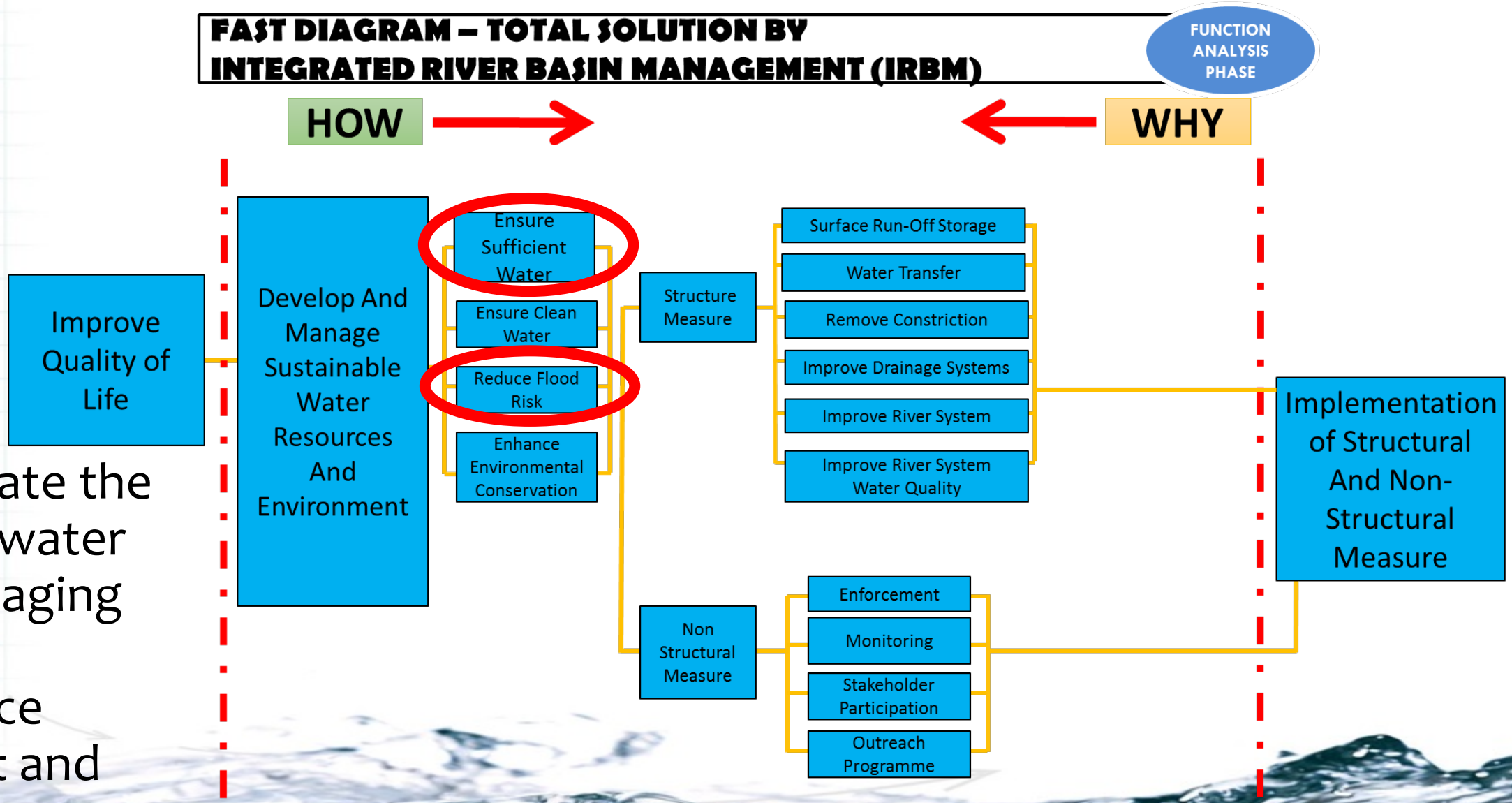
e said.

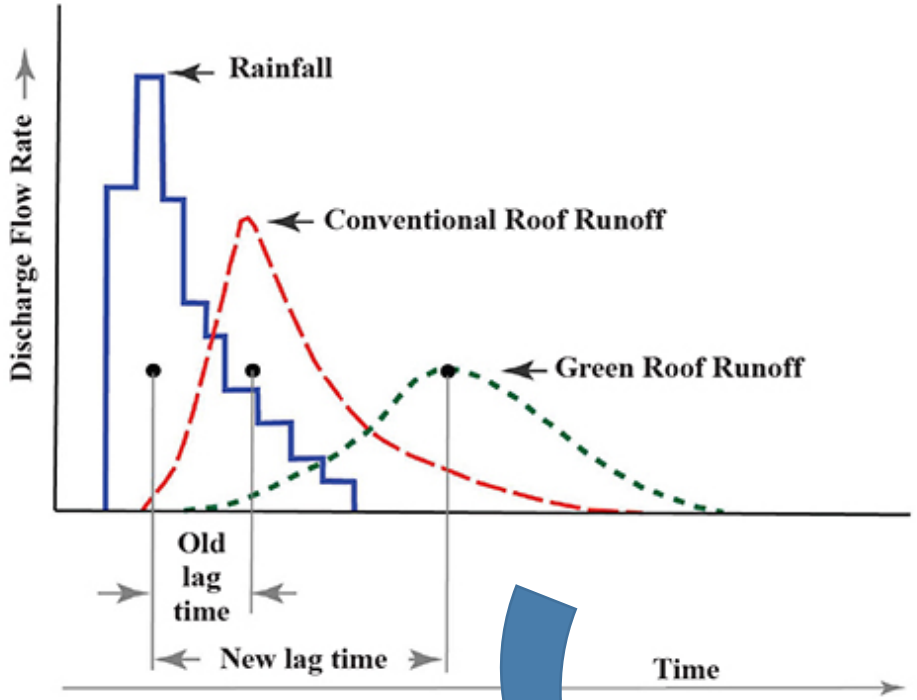
NWRC (29th July 2003) → River Basin Master Plans to be the Basis for Development within a River Basin to achieve the objectives; sufficient, clean, reduce flood risk and environment

# Observation




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

# Managing surface run off



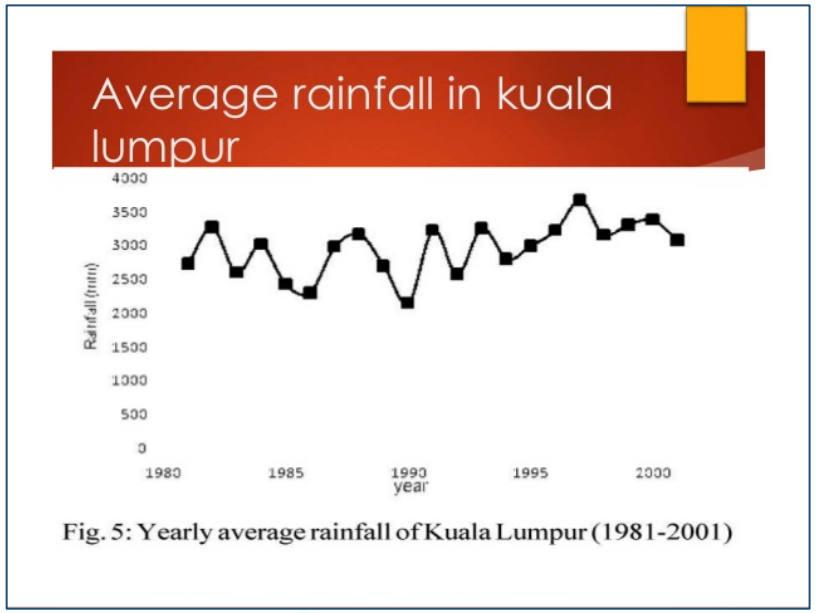
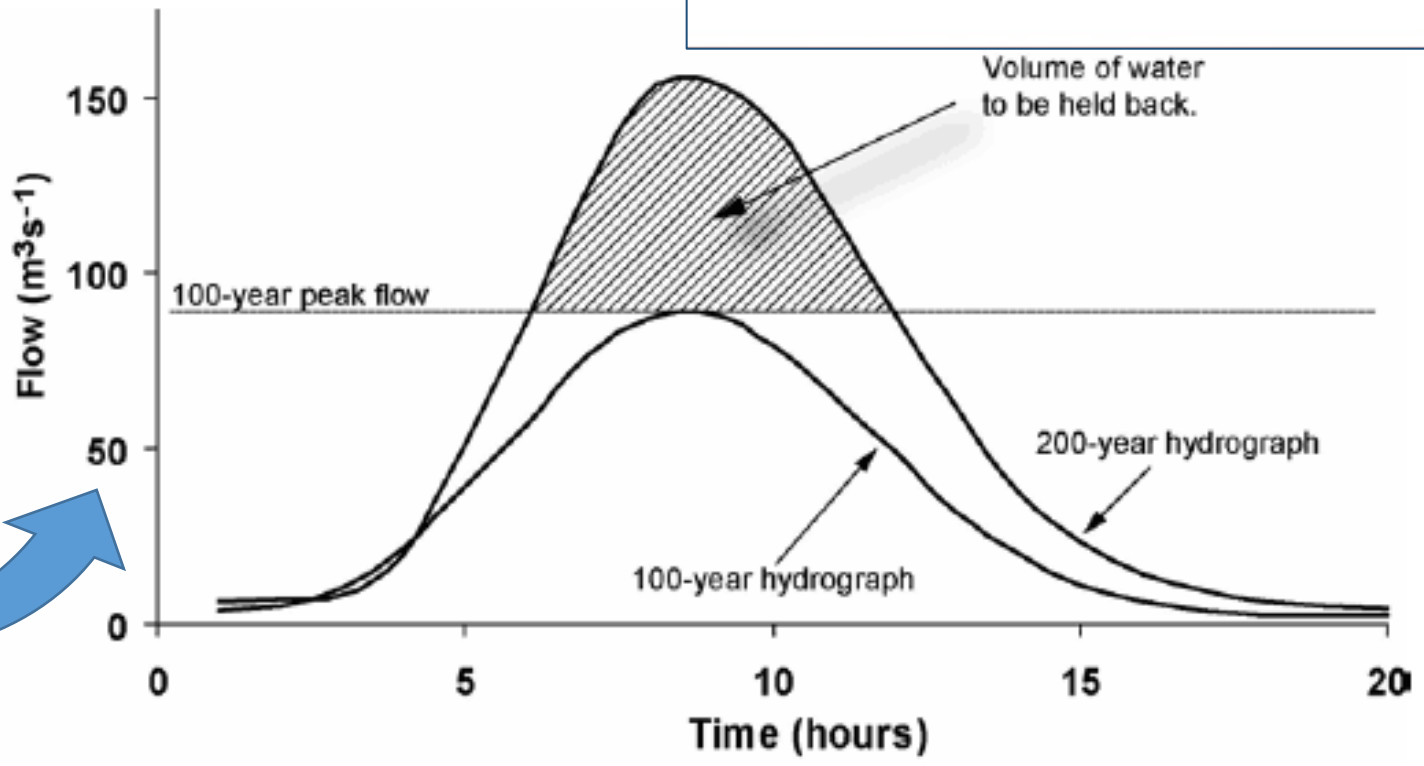
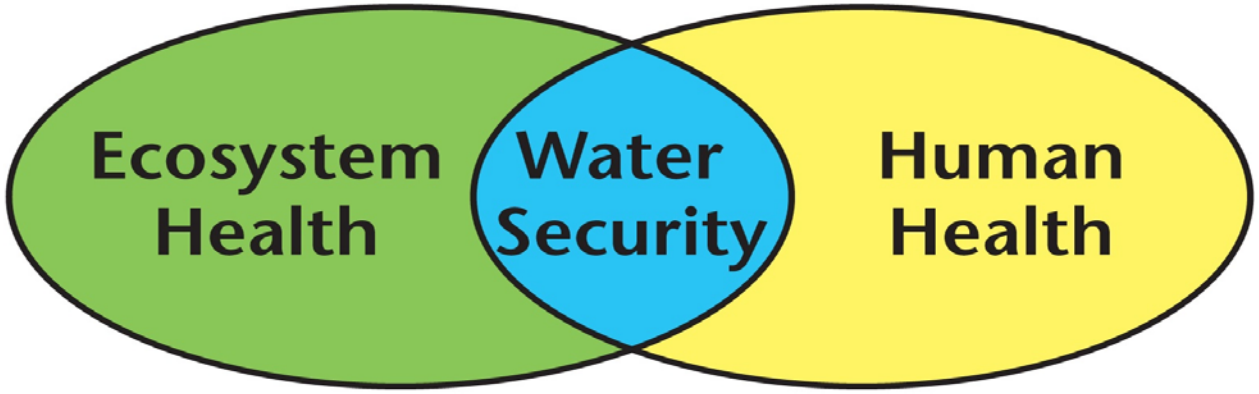



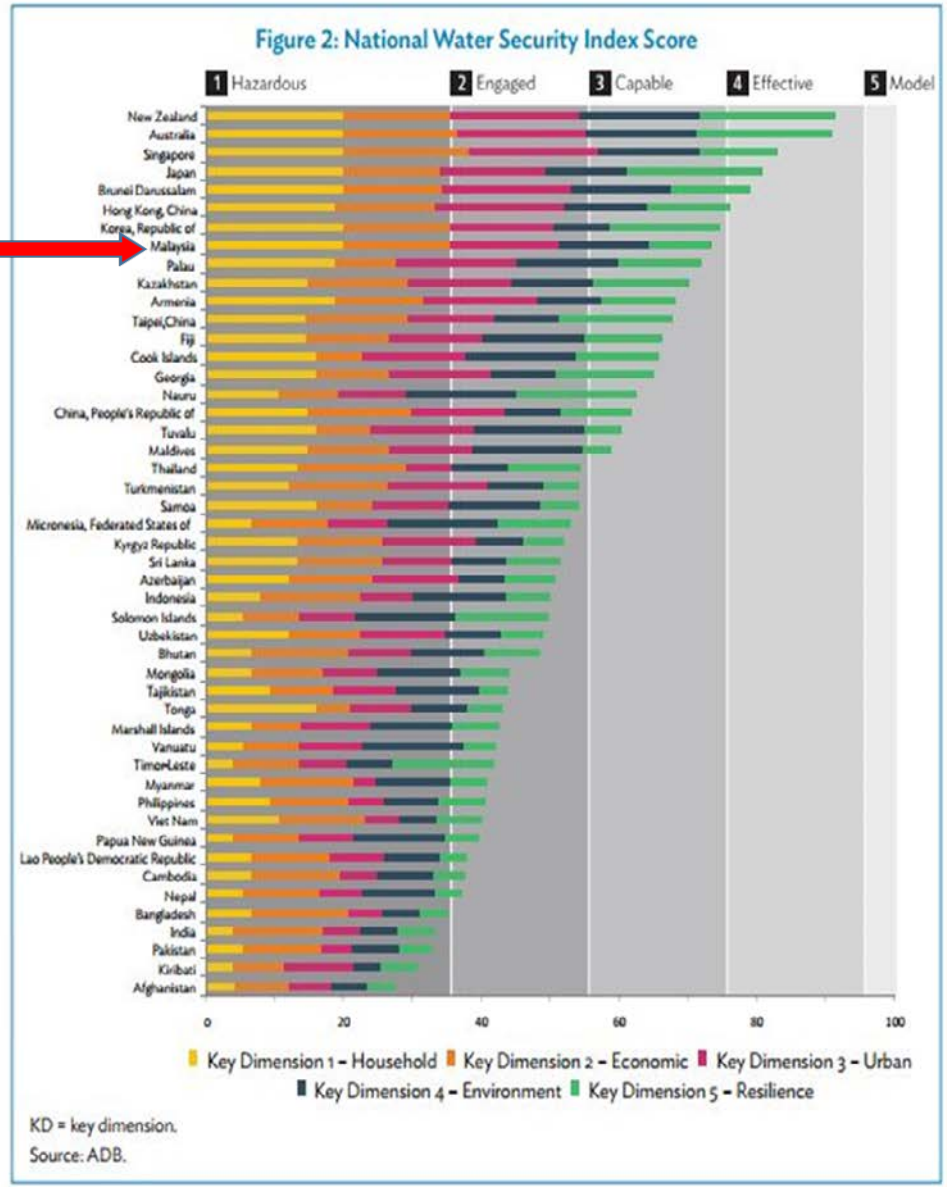

Fig. 5: Yearly average rainfall of Kuala Lumpur (1981-2001)



# *Defining Water Security*

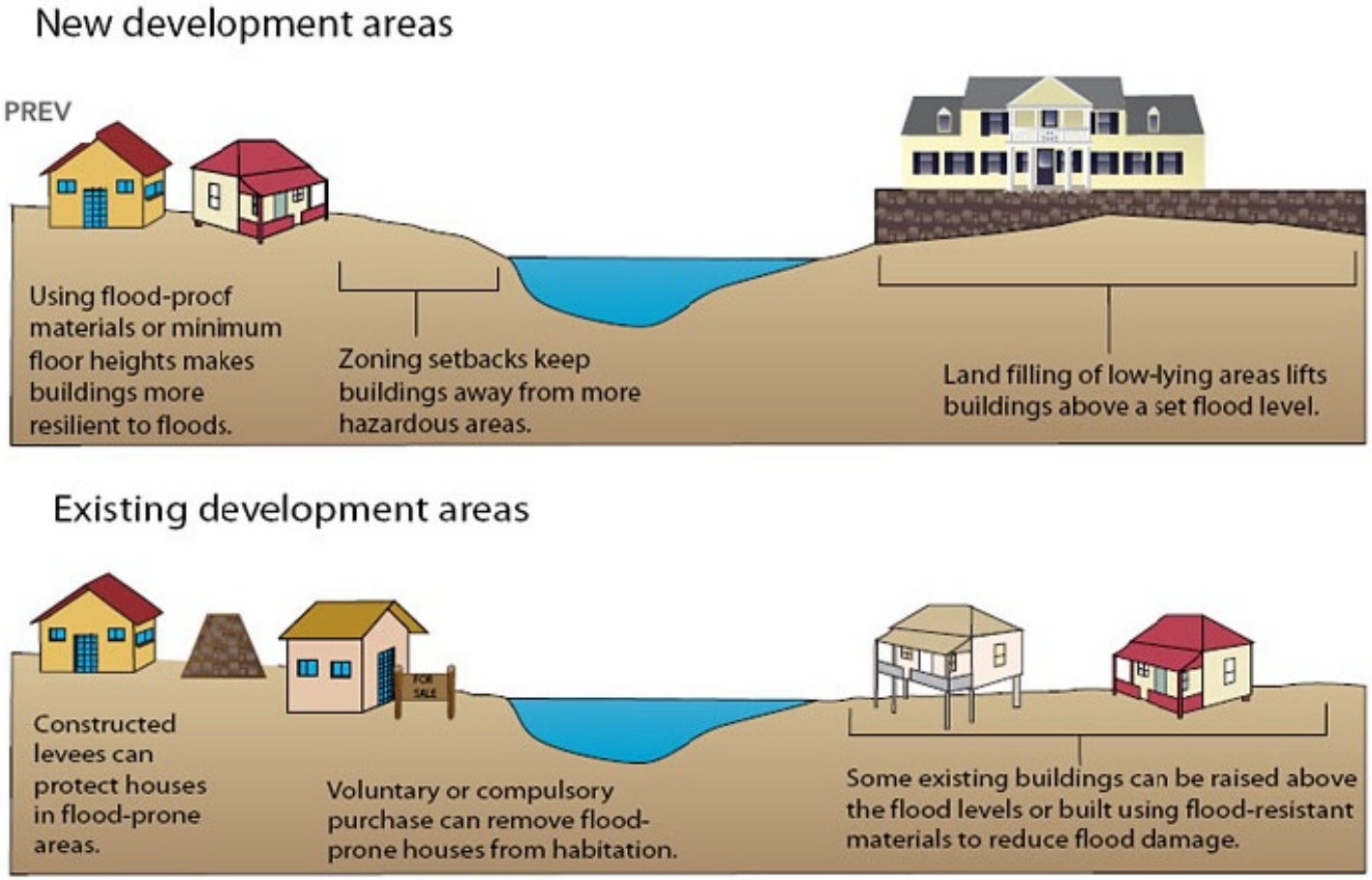



Water Security :
« sustainable access on a watershed basis to adequate quantities of water, of acceptable quality, to ensure human and ecosystem health. »



# Too much or too little water – management issues

# Development on floodplain zone!!!




# Climate change effect

## Temperature:

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

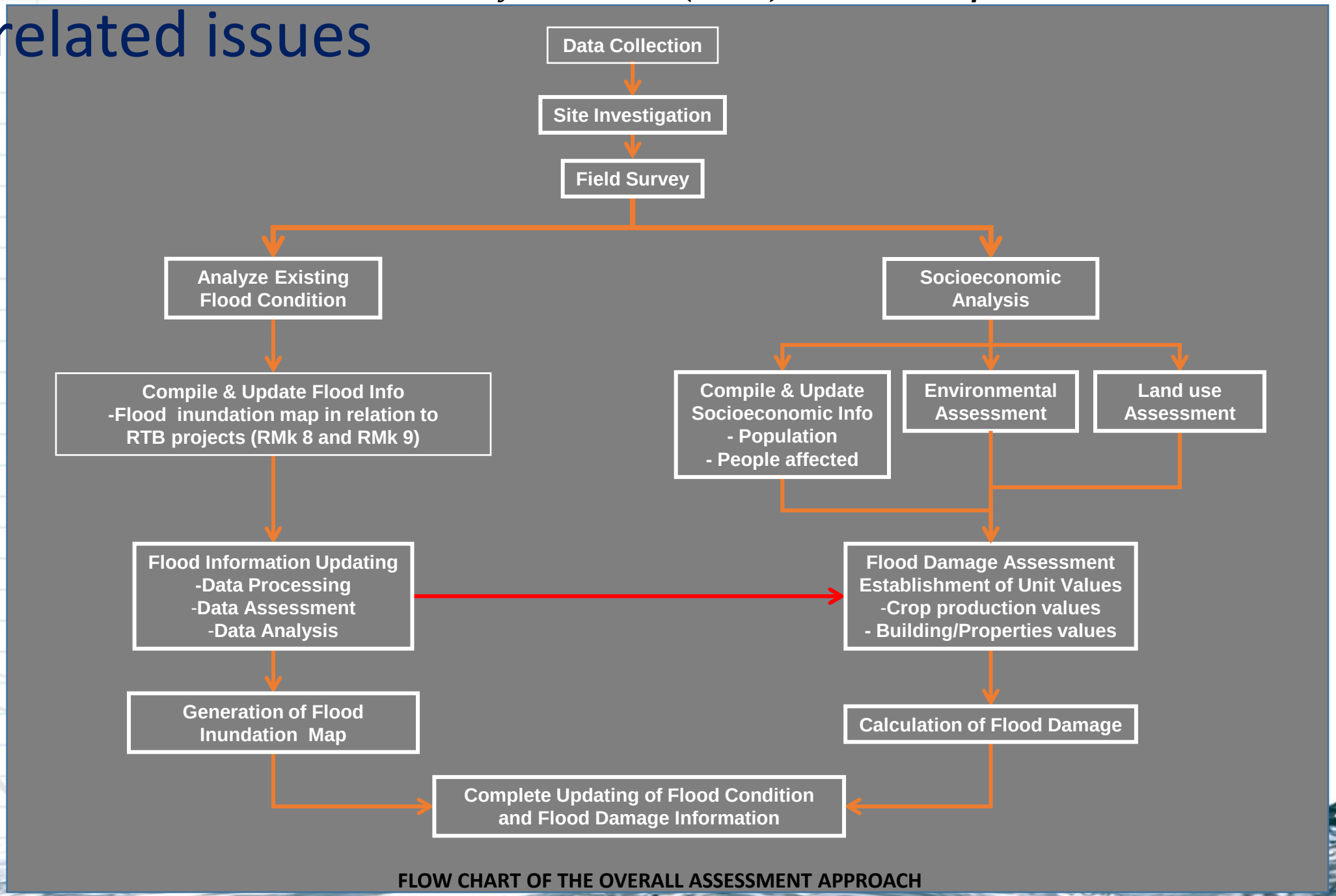
## Rainfall

- 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 Batu Pahat, Johor Baru, Kluang, Kota Tinggi, Mersing, Muar, and Segamat ->Typhoon Utor
  - ✓ In 2014: Massive floods in Kuantan, Pahang and Kelantan

## Sea Level Rise

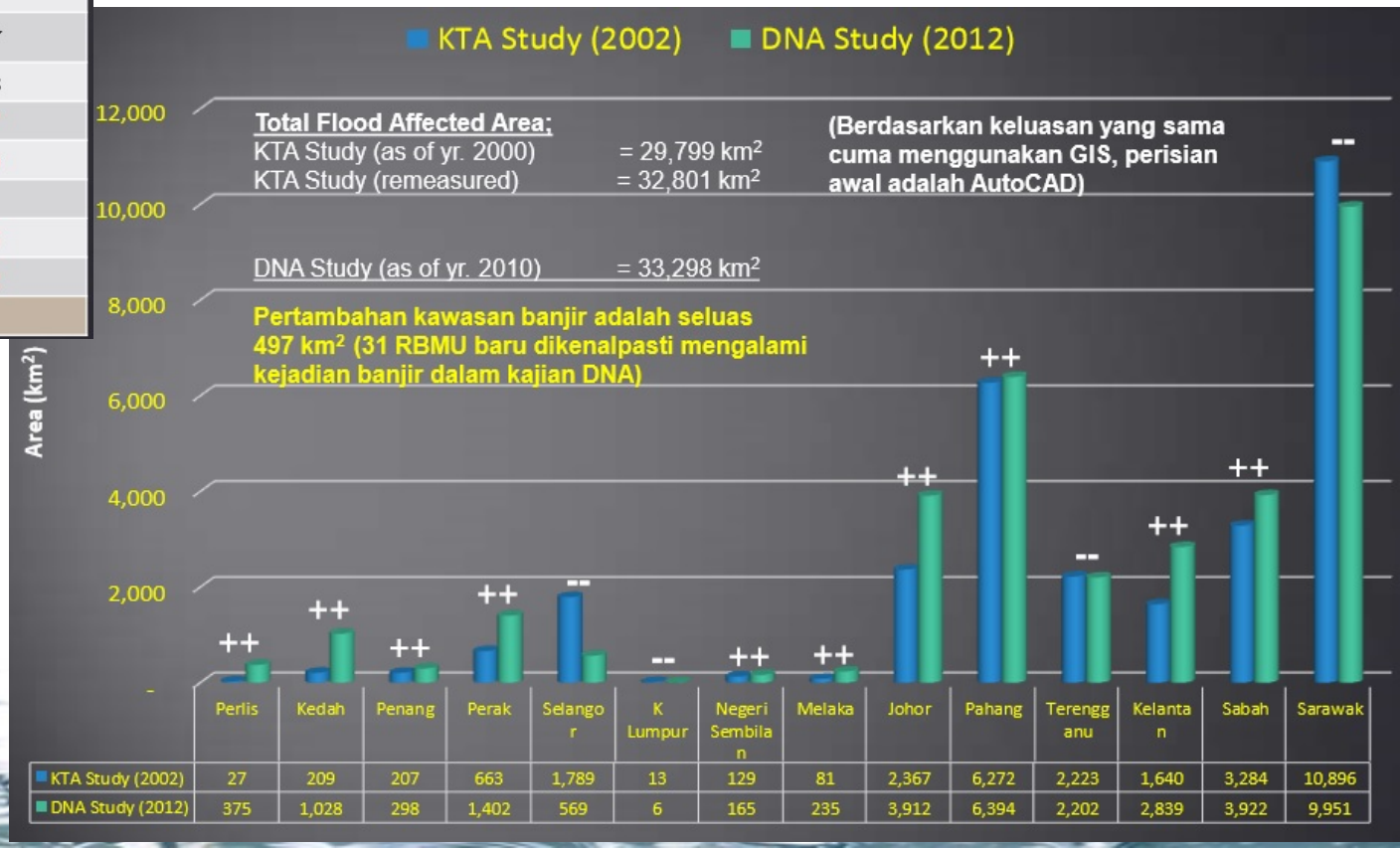
- 4.6 cm to 11.9 cm, satellite altimetry data (1993-2010)

# Data related issues

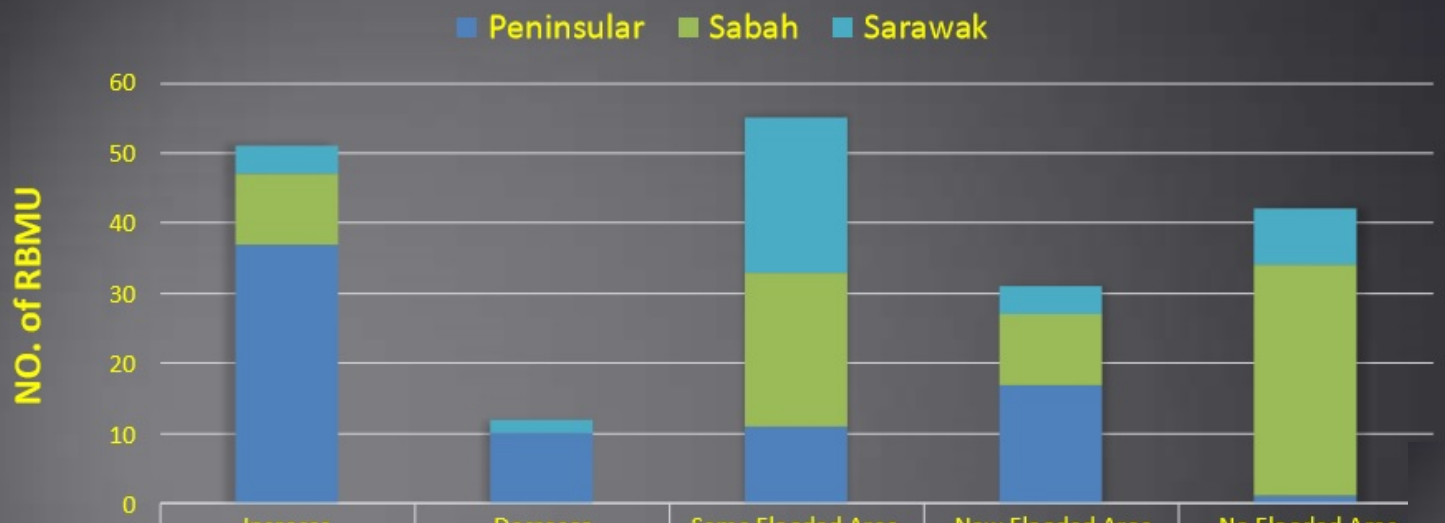



FLOW CHART OF THE OVERALL ASSESSMENT APPROACH

| NO. | STATE | ANNUAL AVERAGE DAMAGE, AAD (RM Million) | | | |
|---|---|---|---|---|---|
| | | KTA 2002 Study (berdasarkan kadar pada 2002) | KTA 2002 Study (inflation rate 24.6% dari 2002 sehingga 2012) | DNA 2012 Study (berdasarkan kadar pada 2012) | Perbezaan antara KTA 2012 dan DNA 2012 (%) |
| 1 | Perlis | 2.75 | 3.43 | 48.342 | 1309.39 |
| 2 | Kedah | 30.20 | 37.63 | 126.795 | 236.95 |
| 3 | Pulau Pinang | 44.52 | 55.47 | 34.233 | -38.29 |
| 4 | Perak | 22.64 | 28.21 | 58.929 | 108.89 |
| 5 | Selangor | 75.76 | 94.40 | 55.870 | -40.82 |
| 6 | Wilayah Persekutuan | 99.33 | 123.76 | 33.363 | -73.04 |
| 7 | Negeri Sembilan | 3.96 | 4.94 | 14.237 | 188.19 |
| 8 | Melaka | 2.29 | 2.85 | 15.096 | 429.67 |
| 9 | Johor | 64.00 | 79.75 | 333.541 | 318.23 |
| 10 | Pahang | 76.15 | 94.88 | 37.317 | -60.67 |
| 11 | Terengganu | 101.58 | 126.57 | 83.283 | -34.20 |
| 12 | Kelantan | 93.32 | 116.28 | 146.733 | 26.19 |
| 13 | Sabah | 140.96 | 175.64 | 82.819 | -52.85 |
| 14 | Sarawak | 157.66 | 196.44 | 80.501 | -59.02 |
| | | 915.12 | 1,140.25 | 1,151.057 | 0.95 |

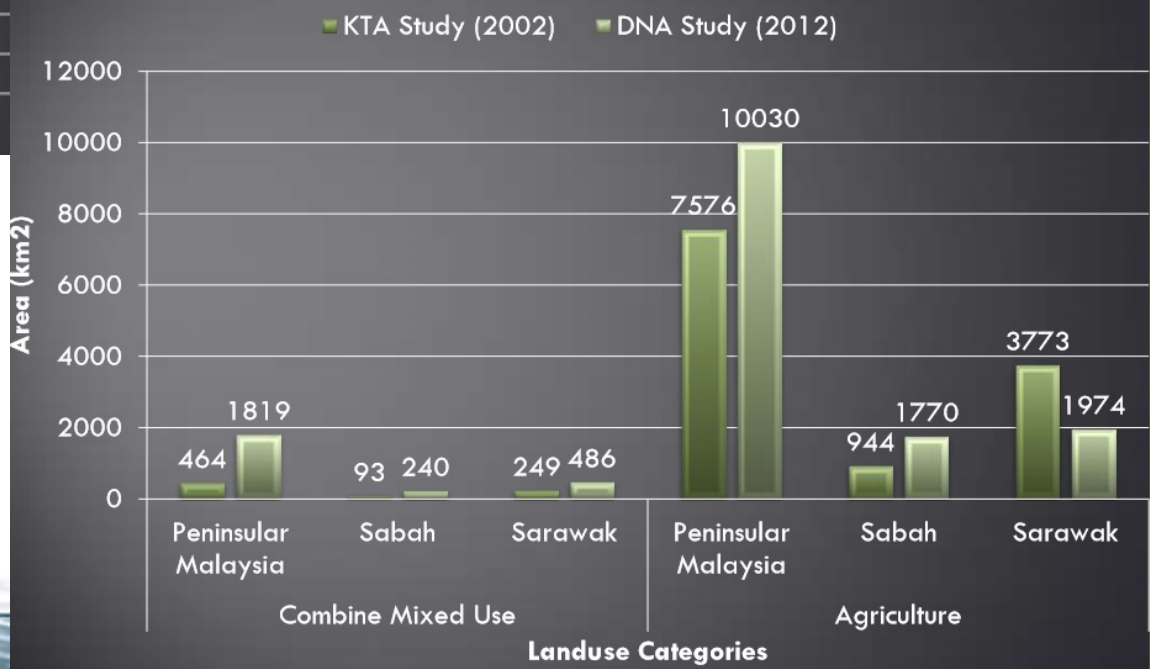


## Comparison of Flood Condition Between Total Reported Flooded Area as of 2000 and 2010 by RBMU




| | Increase | Decrease | Same Flooded Area | New Flooded Area | No Flooded Area |
|---|---|---|---|---|---|
| Sarawak | 4 | 2 | 22 | 4 | 8 |
| Sabah | 10 | 0 | 22 | 10 | 33 |
| Peninsular | 37 | 10 | 11 | 17 | 1 |
| Jumlah (RBMU) | 51 | 12 | 55 | 31 | 42 |

## Comparison Of Flood Affected Areas By Landuse

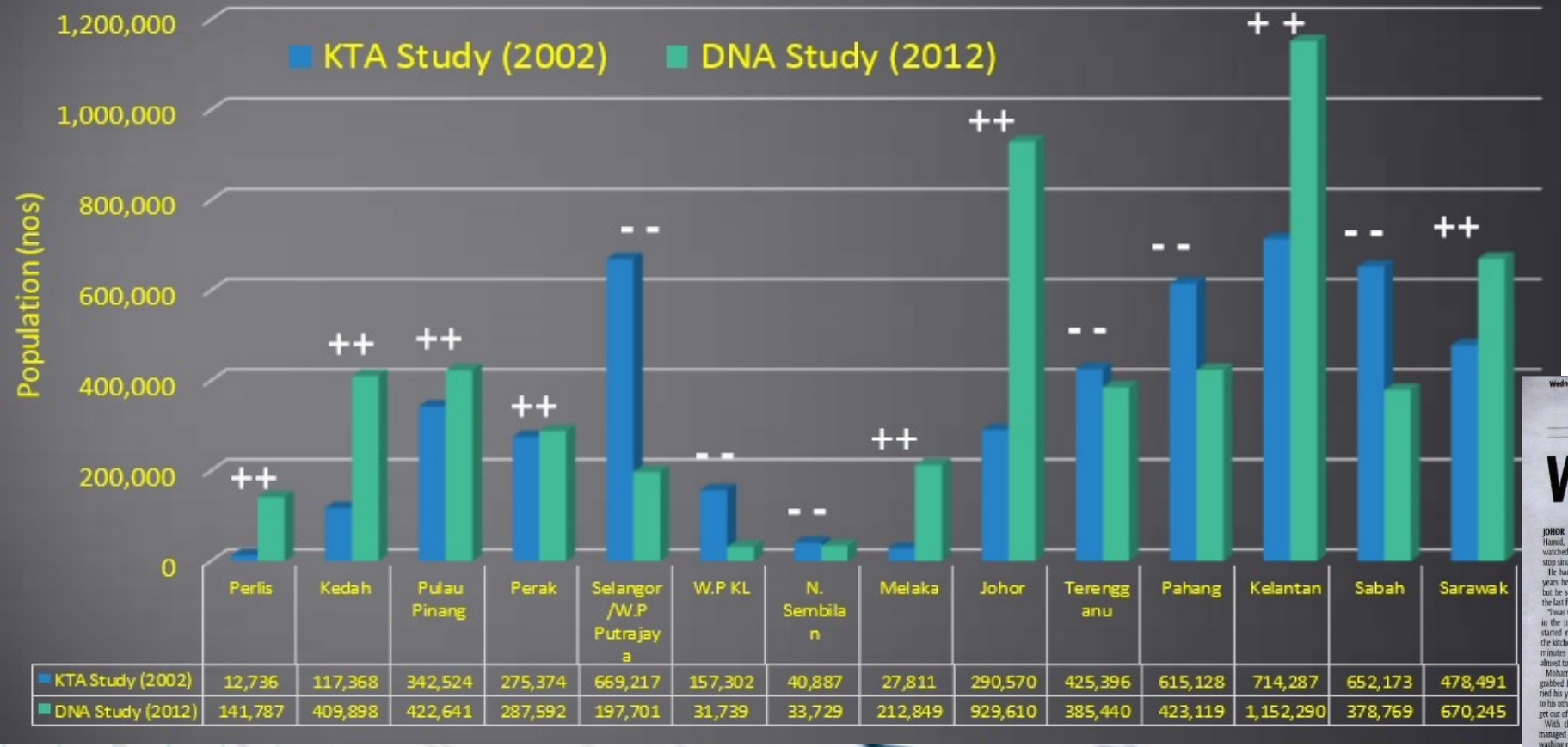


# Population Within the Total Flood Affected Area (As of Year 2000 and 2010)

**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




| | Perlis | Kedah | Pulau Pinang | Perak | Selangor /W.P Putrajaya | W.P KL | N. Sembilan | Melaka | Johor | Terengganu | Pahang | Kelantan | Sabah | Sarawak |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KTA Study (2002) | 12,736 | 117,368 | 342,524 | 275,374 | 669,217 | 157,302 | 40,887 | 27,811 | 290,570 | 425,396 | 615,128 | 714,287 | 652,173 | 478,491 |
| DNA Study (2012) | 141,787 | 409,898 | 422,641 | 287,592 | 197,701 | 31,739 | 33,729 | 212,849 | 929,610 | 385,440 | 423,119 | 1,152,290 | 378,769 | 670,245 |

Wednesday 20 December 2006

N14 Nation

THE STAR

## Worst flood experience yet

JOHOR BARU: Mohammad Abdul Hamid, 63, was feeling edgy as he watched the rain pouring down non-stop since Sunday.

He had seen many floods in the 26 years he had lived in Kampung Laut but he sensed that the incessant rain the last few days was a bad omen.

"I was watching television in the hall in the morning and suddenly water started rushing into the house from the kitchen," he said, adding that in 10 minutes the waters had reached almost to his waist.

Mohammad, a retiree, said he grabbed his personal documents, carried his youngest child and called out to his other three children and wife to get out of the house.

With the help of neighbours, he managed to move a television set and washing machine to higher ground.

From there they watched the water around their double-storey house rapidly rise. Within three hours, the waters had reached the roof.

Rescuers from the Fire and Rescue Department later arrived to take them to the relief centre at SRJK Pu Sze.

"There have been some severe floods in the past but never one as bad as this," Mohammad [illegible]

"My loss is abo[illegible] thought of shiftin[illegible] retired and have financial constraints."

N. Appanaitu, 54, said the flood this time was more severe.

"My family and I went outstation the day before and when we got back we saw our house in flood waters.

"I lost about RM20,000 worth of items, including our computer and electrical appliances," said Appanaitu.

At Kampung Mahmoodiah, restaurateur Ahmad Ismail, 25, struggled to keep the water from entering his house but to no avail.

"We were all prepared for this rainy season but we never expected the rain to fall continuously for days," he said, adding that his house started flooding at 2.30am yesterday.

Odd job worker Masri Safwan, 34, said he was shocked when he saw a car floating away in the floodwaters while the vehicle owner was having a meal at a nearby stall.

His friend, Abdul Rahman Abu Bakar, 43, blamed the poorly kept drainage for the floods.

"I cannot understand why because we have complained many times and the media have highlighted it countless times," he said.

[illegible] seeks refuge on the roof yesterday.

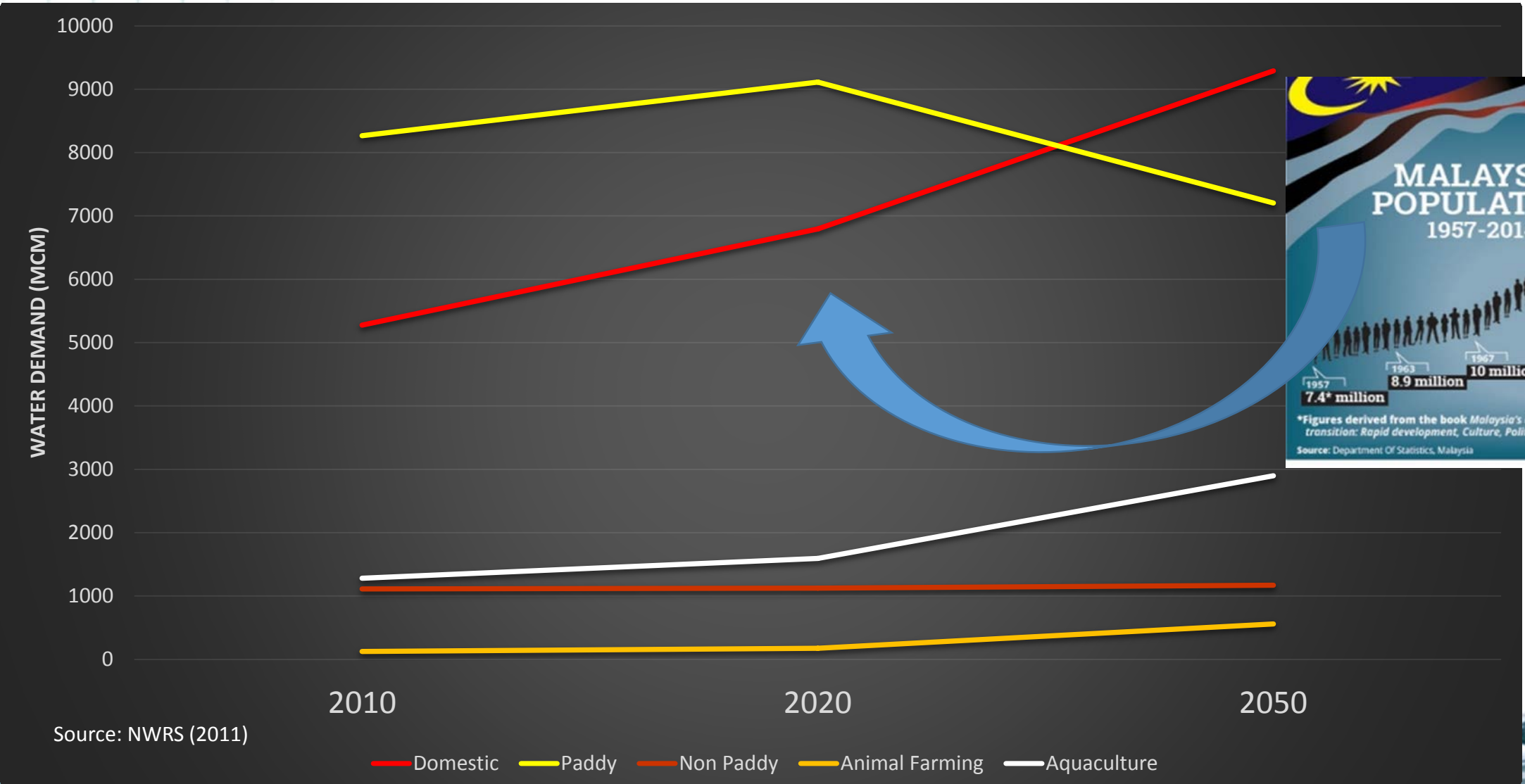
**Floods getting more intense and frequent**

# Water Demand in Malaysia

**2010**
**14,783 MCM**

**2020**
**17,206 MCM**

**2050**
**18,228 MCM**





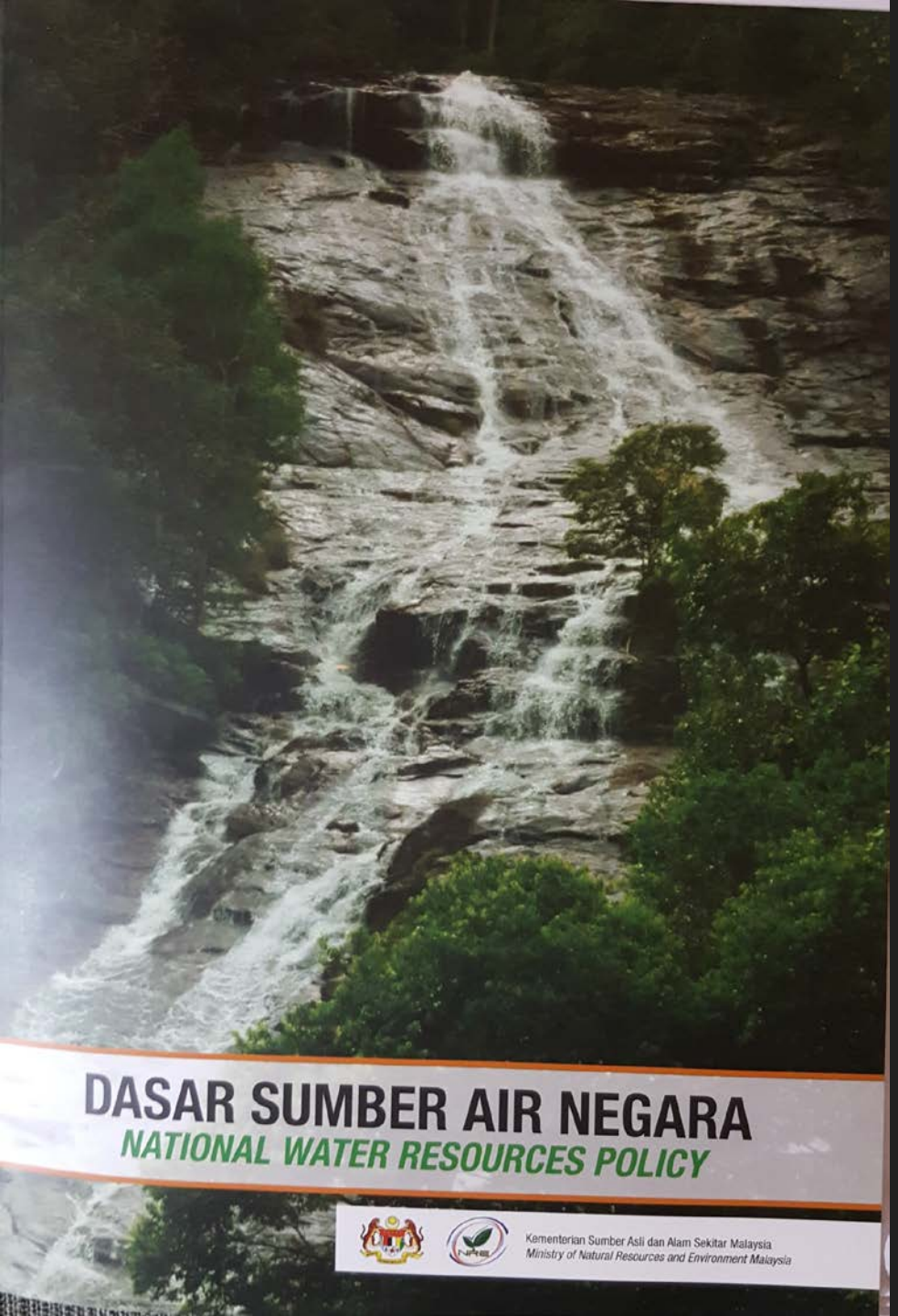
Source: NWRS (2011)

# Planning

- Water resources as national agenda; development and investment
- Water security and build climate resilience
- In managing water resources, require data integrity (sustainable, reliable and sufficient)
- Data management framework – require enterprise architecture;
  - ✓ Water resources management system gateway
- Data collection and management for decision process;
  - ✓ Water resources data; online and manual from designated station
  - ✓ Application system;
    - ✓ flood forecasting and warning (40 river basins, RM550mill, 2015 – 2022, 7days forecasting and 2 days warning)
    - ✓ national water balance (phase 1, 5 river basins, RM45mill, 2016 – 2020; phase 2, 9 river basins, RM100mill; phase 3, 19 river basins, RM190mill)
  - ✓ Utilisation of flood water; not to discharge and waste
- Data sharing; interagency from provider to user with protocol

# Development

- Solving for the future; implementation and operation
  - ✓ 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
- River basin study to develop management plan;
  - ✓access the present scenario and plan for the future (25 plan, 2016 – 2020)
- Providing sufficient budget to execute the action plan




# 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

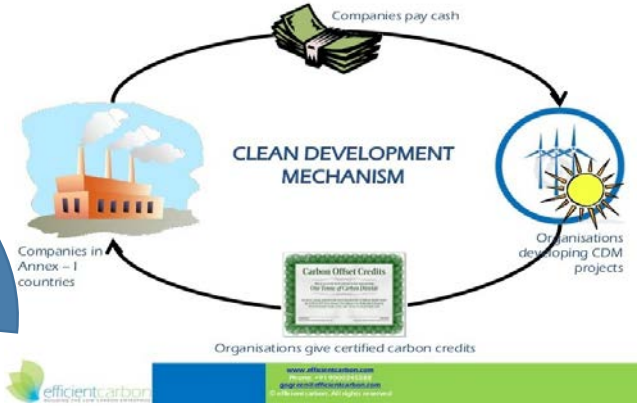
# Legislation


- Water Resources Bills, covers;
  - Water resources usage
  - Planning
  - Protection of water resources area
  - Water hazard control
  - Activity control
  - Licensing
  - Enforcement
  - Offences and penalties
  - Repeal and savings

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




SDGs is WATER BASED


# Conclusion



## Waterman on a mission

By CHRISTINA CHIN
sgchris@thestar.com.my
Photos by IZZRAFIQ ALIAS

DATUK Zulkefli Hassan has been busy meeting DID officers nationwide since his appointment on March 21.

The 59-year-old Perakian, who rose up the ranks from junior engineer more than three decades ago to Drainage and Irrigation Department (DID) director-general, wanted to know what challenges his men faced.

Zulkefli, a father of three, also wanted to drive home the importance of integrity and explain to them his personal KPI.

The youthful-looking grandfather keeps healthy jogging but with retirement just a year away, he has his work cut out for him.

Recalling how his 91-year-old policeman father always stressed on education – and regular haircuts – the third of four siblings jokes about his cropped army look and shares his plans to keep floods and droughts at bay.

**What's your main water management concern?**

Water security because it concerns national security. Food, health, energy, industry and domestic sectors all need water. DID was formed in 1932.

In the early days, the focus was on rice, crops, farming and the rivers. Today, our function includes flood mitigation, urban drainage, coastal zones, hydrology and water resources. But it's only now that we're focussing on water resources because with climate change, we must.

Take food for example – we import almost 30% of rice from countries like Thailand, Myanmar and India but these countries face the same weather problems as us.

In 2014, taps were dry in the Klang Valley. Without water security, who'll want to invest in our country? Right now it doesn't make sense – floods for a month, no water the next.

**Tell us your personal KPI.**

Making sure that our move from KL to Putrajaya is on track. Implementing the National Flood Forecasting and Warning Programme, or *Program Ramalan dan Amaran Banjir Negara (Prab)*, and National Water Balance Management System (Nawabs).

**Why's having a new building in Putrajaya so important?**

Our offices are scattered all over the place right now – the DID divisions are located in different buildings and locations. Our headquarters in KL is very crammed.

Imagine having to call for an emergency meeting. How can I wait for everyone to come when time is of the essence?

We need a building that can house all the divisions under one roof. We've been planning this for years. It's long overdue. Securing a site and allocation was a problem. We cannot just ask money from the Government. But we're seeing the light at the end of the tunnel. We're getting a building which is more than 30 storeys high with rainfall harvesting facilities in Putrajaya and a training centre in Ipoh, thanks to a land swap deal.

The DID headquarters will also be upgraded. It'll house the Federal Territories office when we move out. After construction is done, we'll hand over our 4.8ha land in Ampang to the developer. The deal is now being handled by the Public Private Partnership Unit (Ukas). Hopefully, a developer will be picked soon. At least once I've signed on the dotted line, the project will officially be on. This will really motivate our junior engineers.

**What's the National Flood Forecasting and Warning Programme (Prab) about?**

All this while, during floods, we evacuated victims by boat. Warnings issued to them are very late – which means they have barely six hours to pack up and move. Our job is to warn.

I feel bad for the uniformed forces because they have such a short window period to evacuate the victims. I want to give them accurate, early warning – at least two days before it starts to flood, so that important documents and belongings can be salvaged.

We can do it with Prab. Simply put, Prab allows evacuation by lorry, when the land's still dry. No need for boats. Now, we rely on sirens and the warning is only sounded hours before the water rises. It's embarrassing if the DID has to find out about floods when people call us and we're caught unaware. Our warning system needs to be better. And, it'll be with Prab.

We'll work closely with the Meteorological Department. Detailed information on the topography is needed. Radars, rainfall and water level stations must be increased for better forecast. With all warning systems in place and linked up, we can give early alerts. We're starting with Kelantan, Terengganu, Pahang, Perak and Sarawak, because these states are the ones worst effected by monsoon floods.

**And the National Water Balance Management System (Nawabs)?**

It's related to Prab. The infrastructure, monitoring systems and devices for both are about the same but Nawabs is focussed on linkages between the water sources. Nawabs is the "brain" that tells us where to get the water from and how to distribute it. It tells us where sources like ponds, groundwater, dams, and lakes are and how much water there is.

With Nawabs, we can give early drought warnings and prevent dry taps. For example, we will be able to tell if in two weeks, Selangor will be dry and we can plan to get water from another state (inter-basin) or from alternative water sources within the state (intra-basin). But sourcing via inter-basin can only happen if there's a protocol between the states because water and land are under the state purview.

We have so many states and all are independent so there must be an agreement to ensure easy access to the water source if and when needed. We must look at water management in terms of resource and usage holistically.

Inter-basin water sharing is the key to Nawabs' success. The Natural Resources and Environment Ministry is selling the idea to the individual states and response has been good so far. Hopefully, the first reading of the Water Resources Bill, which covers this, will take place by the end of the year or early next year.

**When is Nawabs kicking off?**

We're starting with Sungai M
Kedah, Sungai Bernam, Sungai
Sungai Klang because these are
stressed urban areas. Not forge
areas, we're also going to Saraw
many living in the hinterlands
ter harvesting and groundwate
sources.

**Must we resort to treating wa
Singapore's NEWater?**

We're only collecting about 1
annual rainfall. If we can get at
be enough for sure but our rain
tered. We have lots of water bu
we going to store it?

With infrastructure – more d
ing the capacity of existing dam
in urban areas, tapping into gro
the rural areas and rainfall har
retain more water, and an inter
col between the states in place
be anymore dry taps.

Treating wastewater is the ex
can get water from dams, pond
ter and rainfall. Eventually, we'
gate barrages like Singapore. Al
very expensive, we can use bar
fresh water, prevent salt water
in from the sea, and during the
excess water into the sea.

**Malaysia faces heavy rains and
yearly yet we haven't figured out how to
solve our flooding woes. Why?**

We're very urban-centric. We talk about flash floods in the city while the villagers suffer in silence. We've already got small pro-

towns to implement. The local authorities just have to follow it but allocation for them, is an issue.

States like Selangor, Penang and Johor are okay because their assessment rates are high but what about the small towns in states like

two dams in Nenggiri and Pebir, and drainage works. Once done, Kelantan will be safe.

In Pahang, Kuantan and Pekan are always the worst hit. In Sabah and Sarawak – Kuching in particular – the Minister (Dr Wan Junaidi) pushed very hard to secure alloca-

I like to travel, so maybe when I retire – probably in Ipoh – I'll finally get to do that with my wife. I'd like to visit New Zealand. For now, I'm content watching TLC on Astro. I like exotic locations like Peru and the Bahamas.

Flood-fighting mission is also making water security his priority

- Director General DID Malaysia


ThanKYou
2 11:16 AM