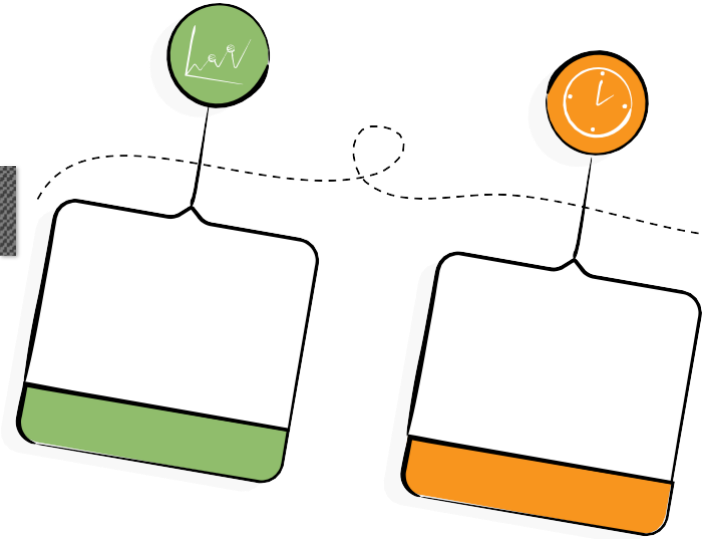
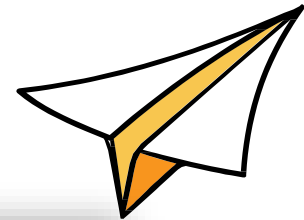


# PENGURUSAN TEBATAN BANJIR DI MALAYSIA

BAHAGIAN PENGURUSAN BANJIR  
23 MEI 2023



# ASSALAMUALAIKUM DAN SALAM SEJAHTERA



**Ir. YUSLINA BINTI HJ MOHD SANI S.I.S**

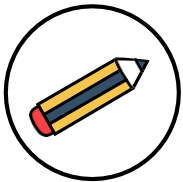
Timbalan Pengarah (Teknikal)  
Bahagian Pengurusan Banjir



# ISI KANDUNGAN

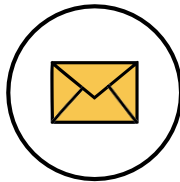
I

DEFINISI DAN  
KATEGORI  
BANJIR



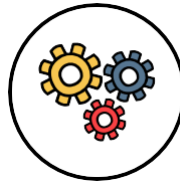
II

PUNCADAN  
IMPLIKASI  
BANJIR



III

KAEDAH DAN  
PENGURUSAN  
TEBATAN  
BANJIR



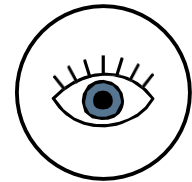
IV

LANGKAH  
SEBELUM &  
SELEPAS  
BANJIR



V

WAY  
FORWARD,  
KESIMPULAN  
& RUMUSAN



1

2

3

4

5

# DEFINISI BANJIR

## KAMUS DEWAN

Keadaan air yang menenggelami atau menggenangi sesuatu kawasan atau tempat yang luas, yang biasanya kering



## LAMAN WEB JPS

Badan air yang melimpah keluar dari tebing sungai, tasik atau sistem perparitan disebabkan oleh hujan lebat, pencairan ais, air pasang, dan halangan pada saluran



# BANJIR

## DI MALAYSIA

Flood disaster are the most threatening natural disaster in Malaysia compared to landslides, hurricanes, tsunami, haze and others (DID Malaysia, 2016)

### MAKLUMAT UMUM BANJIR



**10.1%** (33,298 km<sup>2</sup>)

Kawasan Dataran Banjir

**21%** (5.7 juta penduduk)

Terdedah kepada Risiko Banjir

**RM36 (USD9) Bill**

Annual Average Damage (AAD)

Source: Updating of Condition of Flooding and Flood Damage Assessment in Malaysia, 2012

### SEJARAH KEJADIAN BANJIR

### JENIS BANJIR



#### BANJIR MONSUN

Banjir yang disebabkan keamatan hujan yang tinggi dan berterusan (>6 jam) pada musim monsun timur laut / tengkujuh (Nov - Mac)



#### BANJIR KILAT

Banjir yang disebabkan keamatan hujan yang tinggi dan setempat (<3 jam) mengakibatkan kenaikan dan penurunan air dalam masa yang singkat (<6 jam)



#### BANJIR AIR PASANG

Banjir yang disebabkan keamatan hujan yang tinggi dan kenaikan air laut semasa air pasang dan melebihi aras air sungai / tebing sungai

### KESAN UTAMA BANJIR

#### Extreme Rainfall

>60mm/hour (urban) & >6 continuous rainfall storm (rural)

#### Tidal Effect

High tide varies less than 1.8-6.1m combine with surge

#### Low Lying Areas

61% peninsular than 100m above level

#### Land Development

Land clearing without MSMA/ESCP compliance

#### Discharge Increase

0-40% development, Q increase 190% V increase 2 times

#### River Obstruction

Column/bridge structure in river & rubbish dumping

#### Floodplain Encroachment

River corridor obstruction affecting maintenance

#### Insufficient Drainage

Minor system (2-5 ARI) Major system (up to 100 ARI)

#### Poor Maintenance

River widening & deepening with high cost

**1971**

Catastrophic flash at flood in Kuala Lumpur claimed 241 deaths, DID

lead flood control

**1996**

Tropical storm Greg Sabah lives and USD 97.8 million damage

**2000**

15 people killed in Kelantan, Terengganu and 100,000 people at Peninsular affected

**2006**

Flood in Johor caused 18 deaths and USD 489 million in damage

**2008**

Flood in Johor caused 28 deaths and USD 21 million in damage

**2010**

2/3 of Perlis submerged, killed 4 people, 50,000 people moved & 45,000 ha rice field destroyed

**2014**

"The YELLOW flood" resulted 25 deaths, 500,000 people moved & USD 750 million loss

**2017**

Penang worst flood ever caused 7 casualties and mill in

**2021**

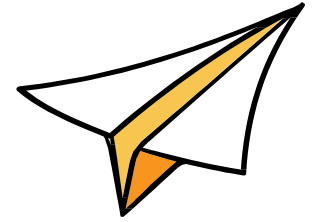
Catastrophic flood in Kuala Lumpur, Selangor, and



BANJIR DI  
KUALA  
LUMPUR  
TAHUN  
1971





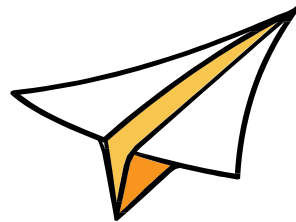


**TROPICAL STORM GREG  
AT SABAH TAHUN  
1996**





**BANJIR DI SIBU  
TAHUN  
2001**



**BANJIR DI  
KOTA BHARU  
TAHUN  
2004**



# PENANG — DISASTER ZONE

FIVE people are killed, thousands evacuated, and countless properties destroyed or damaged in the state's worst-ever floods.

■ **GUAN ENG**  
THANKS ZAHID FOR  
FEDERAL HELP

■ **STATE GOVT SAYS**  
FLOODS DUE TO POOR  
DRAINAGE

■ **NGOs TELL STATE**  
GOVT TO STOP BEING IN  
A STATE OF DENIAL

» REPORTS ON **PAGES 2, 3, 4, 5, 6, 7, 10 & 11**

BANJIR DI  
PENANG  
TAHUN  
2017



THE SHEDDING



Above: Teachers at SK Pintas, Beaufort salvaging chairs and tables.

Below: SK Pintas Beaufort chairs and tables in the water.



An aerial view of Beaufort town.

## Number of flood evacuees dropping

**Sherell Ann Jeffrey and Mail Mathew**

**KOTA KINABALU:** The number of flood victims at the relief centres in Beaufort, Tenom and Keningau districts dropped to less than 2,500 as at 5pm on Sunday.

A spokesperson from the National Security Council Sabah Office said as at 5pm on Sunday, a total of 2,484 flood victims from 748 families were housed at 10 relief centres in the three districts.

Bangkalalak, Kg Gadong and Padas Damit.

Meanwhile, State Education Director Datuk Jame Alip said they were in the midst of assessing the total damages to schools caused by the floods, adding that 10 schools in Beaufort were still submerged in water.

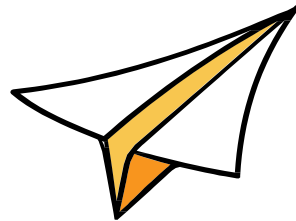
"Two schools in Beaufort - SMK Beaufort 3 and SMK Gadong - have been turned into relief centres for 138 flood victims, he said, adding that the floods in Beaufort affected a total of



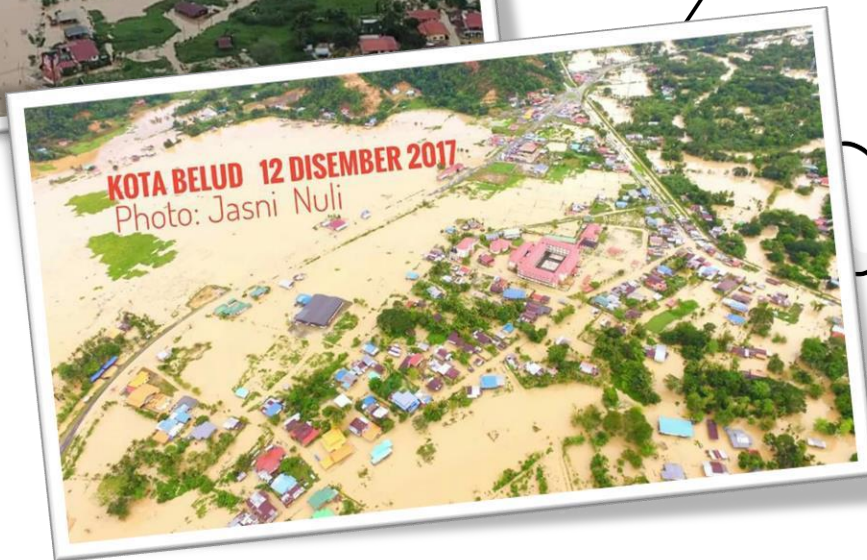
## SABAH FLOOD IN 2017



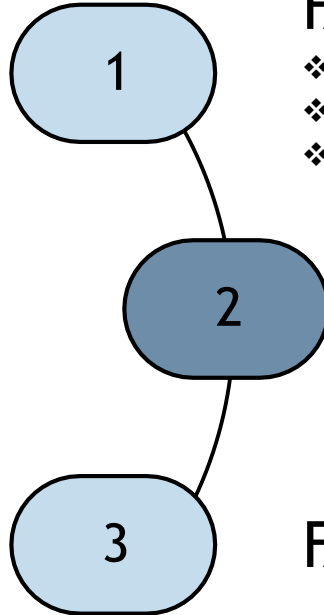




BANJIR  
BESAR DI  
KOTA BELUT  
TAHUN  
**2017**



# PUNCA BANJIR



## FAKTOR SEMULAJADI

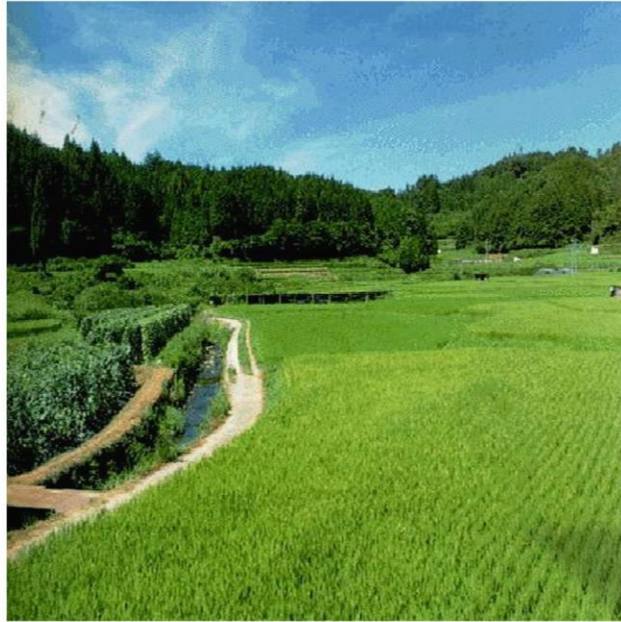
- ❖ Semenanjung Malaysia : 2,500 mm
- ❖ Sabah : 3,000 mm
- ❖ Sarawak : 3,500 mm

## FENOMENA LUARBIASA YANG EKSTREM

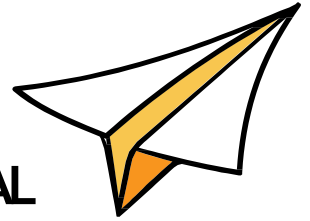
- ❖ Jumlah hujan = 600 mm dalam masa 24 jam (100–200 mm dalam 1–2 jam)

## FAKTOR MANUSIA

## PERUBAHAN GUNA TANAH

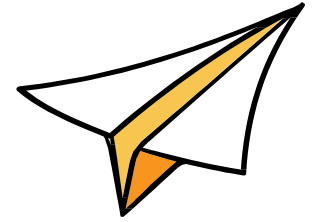


## PEMBANGUNAN TIDAK TERKAWAL

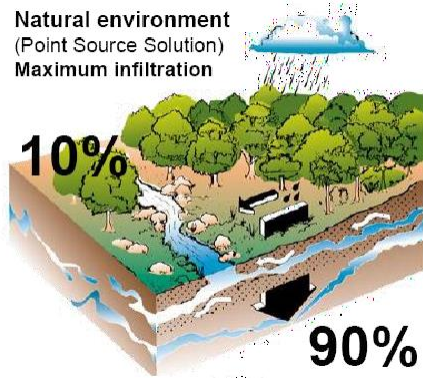




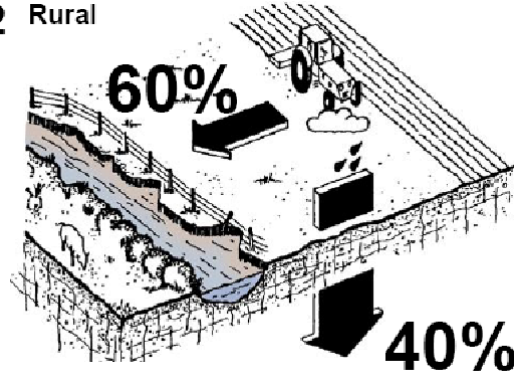
# PEMBUKAAN TANAH TIDAK TERKAWAL



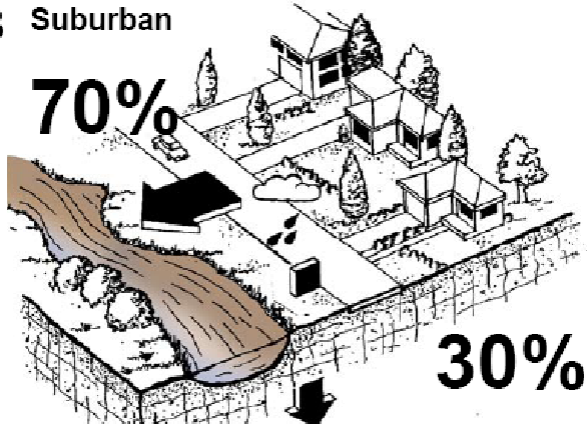
1 Natural environment  
(Point Source Solution)  
Maximum infiltration



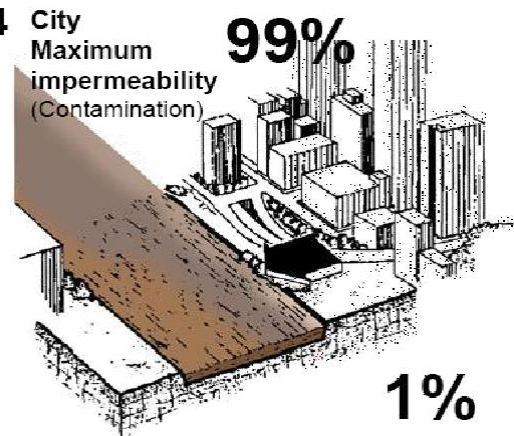
2 Rural



3 Suburban

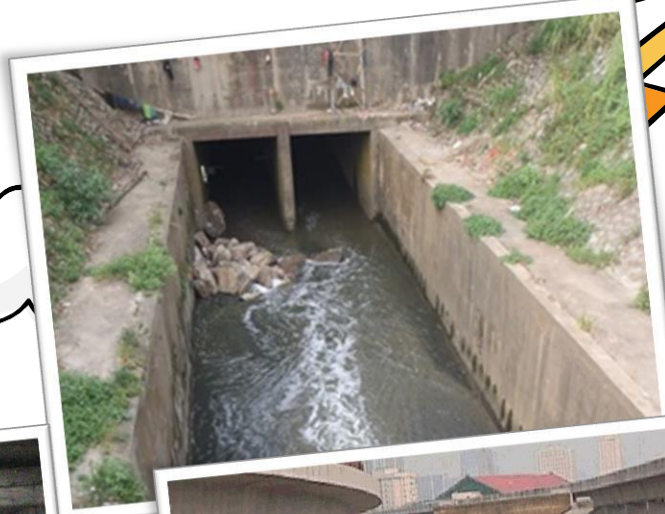


4 City  
Maximum  
impermeability  
(Contamination)



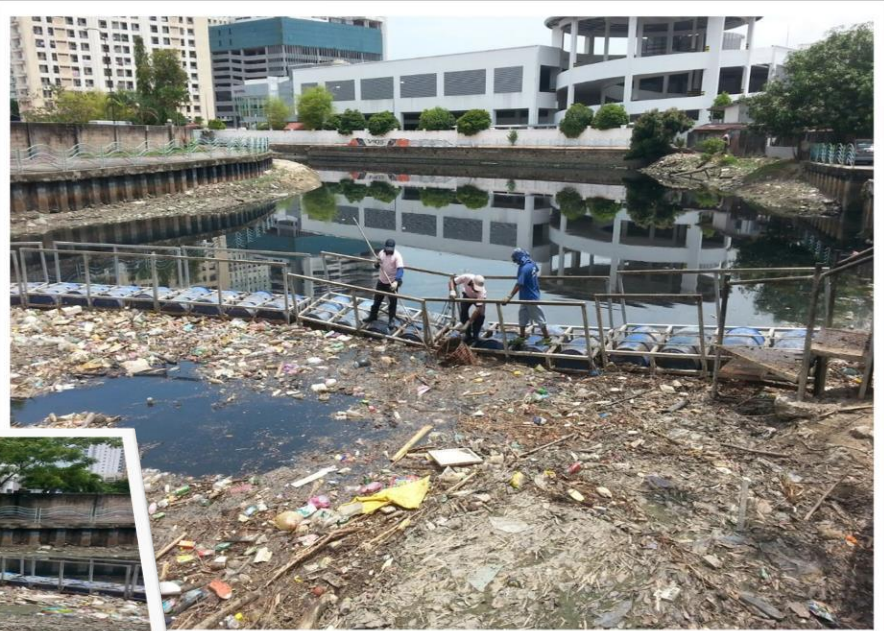
Changes in Hydrology and  
Runoff Due to Development

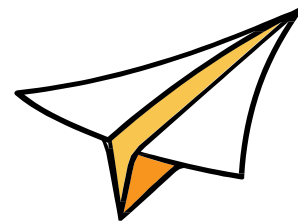
# HALANGAN PADA SUNGAI DAN SISTEM SALIRAN





# SAMPAH DI DALAM SUNGAI

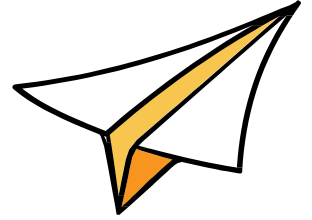




**PENYELENGGARAAN SUNGAI YANG TIDAK  
SEMPURNA**







## **PENCEROBOHAN KAWASAN RIZAB DAN DATARAN BANJIR**





# IMPLIKASI DARI KEJADIAN BANJIR



+VE

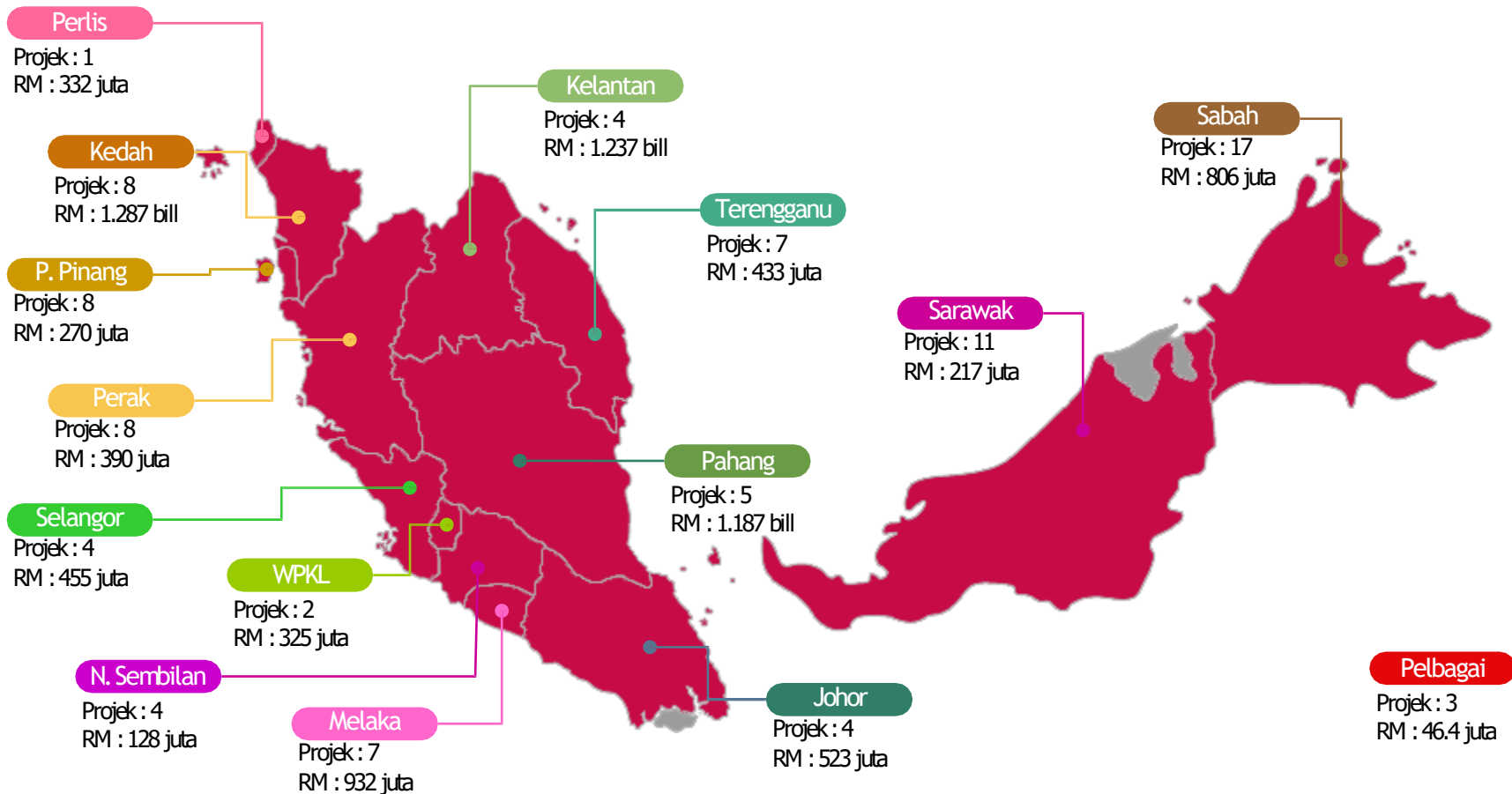
Mengekalkan, memperkaya dan mengembalikan biodiversiti tertentu di dataran banjir, mengembalikan keadaan tanah yang kaya nutrisi dimana ia sesuai untuk pertanian dan tumbuhan semula jadi dan mengisi semula air bumi



-VE

Mengancam nyawa, mengganggu kegiatan sosial, ekonomi dan memusnahkan harta benda, menyebabkan kesulitan dan kos pemulihan boleh menjadi tinggi buat kerajaan ataupun individu, dan menghalang pelaburan baru di kawasan mudah banjir

# PECAHAN JUMLAH PROJEK DAN PERUNTUKAN MENGIKUT NEGERI



# PECAHAN JUMLAH PROJEK DAN PERUNTUKAN MENGIKUT NEGERI

| RMK     | PERUNTUKAN       | BELANJA          | BIL. PROJEK |
|---------|------------------|------------------|-------------|
| RMKe9   | 5,148,869,888.09 | 5,382,469,912.53 | 159         |
| RMKe 10 | 3,861,535,570.00 | 3,769,275,562.91 | 196         |
| RMKe11  | 1,310,443,672.00 | 1,293,727,211.76 | 82          |



# PENGURUSAN TEBATAN BANJIR

1st

pengurusan banjir tertumpu kepada keperluan mendesak seperti melaksanakan bantuan banjir dan melaksanakan projek-projek tebatan banjir untuk menangani masalah disebabkan pembangunan yang pesat

2nd

Kemudian, kaedah bukan struktur diperkenalkan seperti Manual Saliran Mesra Alam. Sejak 2001, manual ini merupakan keperluan mandatori yang perlu dipatuhi bagi pembangunan baru di kawasan bandar

3rd

Sejak alaf baru, JPS telah mengambil kira pendekatan IRBM dan IFM bagi rancangan pengurusan banjir. Ini akan memberikan pendekatan yang lebih seimbang antara **langkah-langkah struktur** dan **bukan struktur** serta tahap penyertaan masyarakat yang lebih tinggi

> 2001

2001

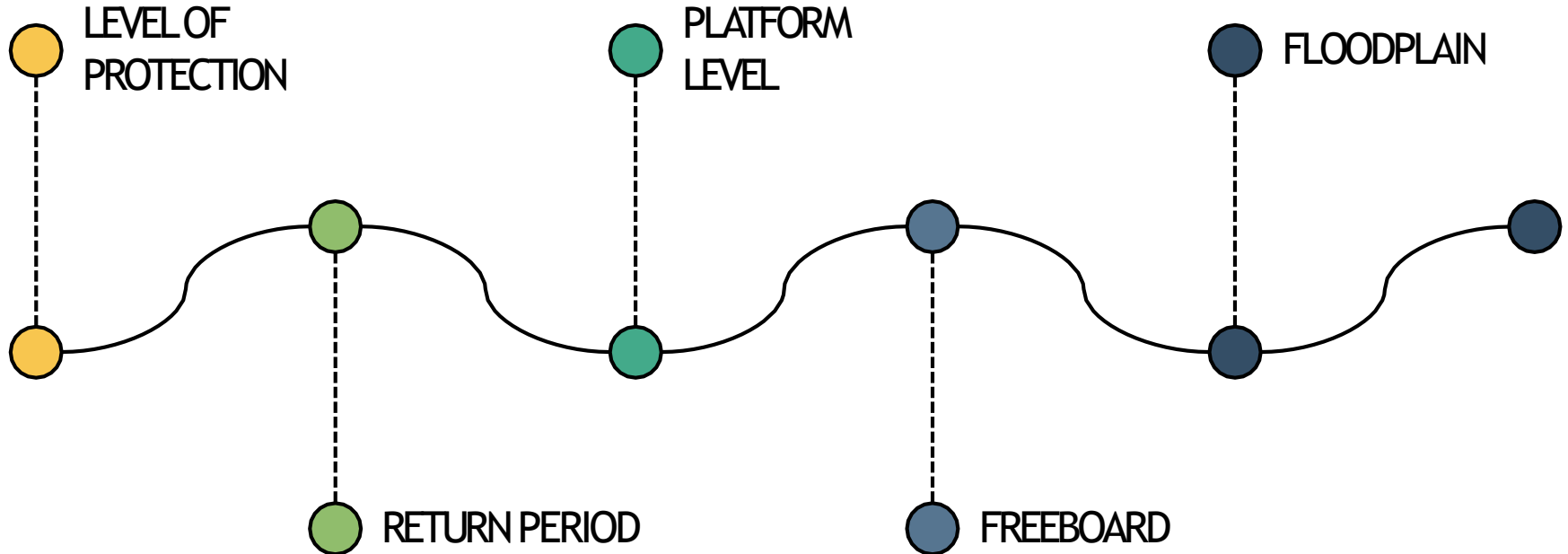
< 2001

Understand The  
Principles And  
Approaches



# PRINSIP DAN PENDEKATAN PROGRAM TEBATAN BANJIR

Translate And  
Implement The  
Principles And  
Approaches



# KAEDAH TEBATAN BANJIR

DI MALAYSIA

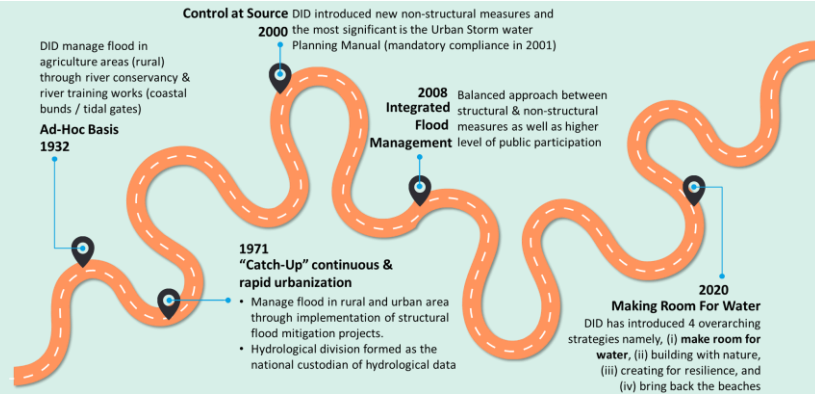
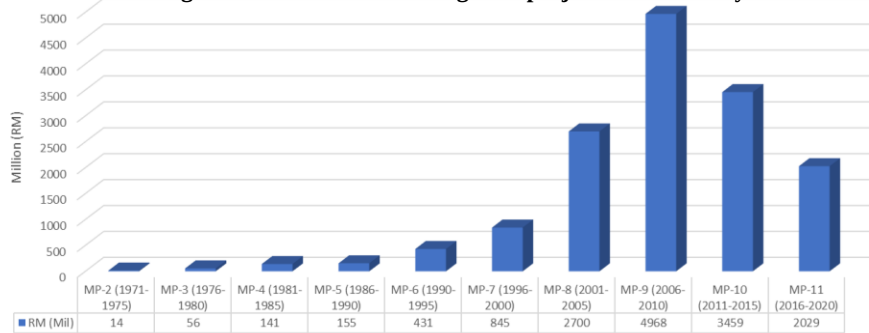
## LANGKAH - LANGKAH STRUKTUR



## LANGKAH-LANGKAH BUKAN STRUKTUR

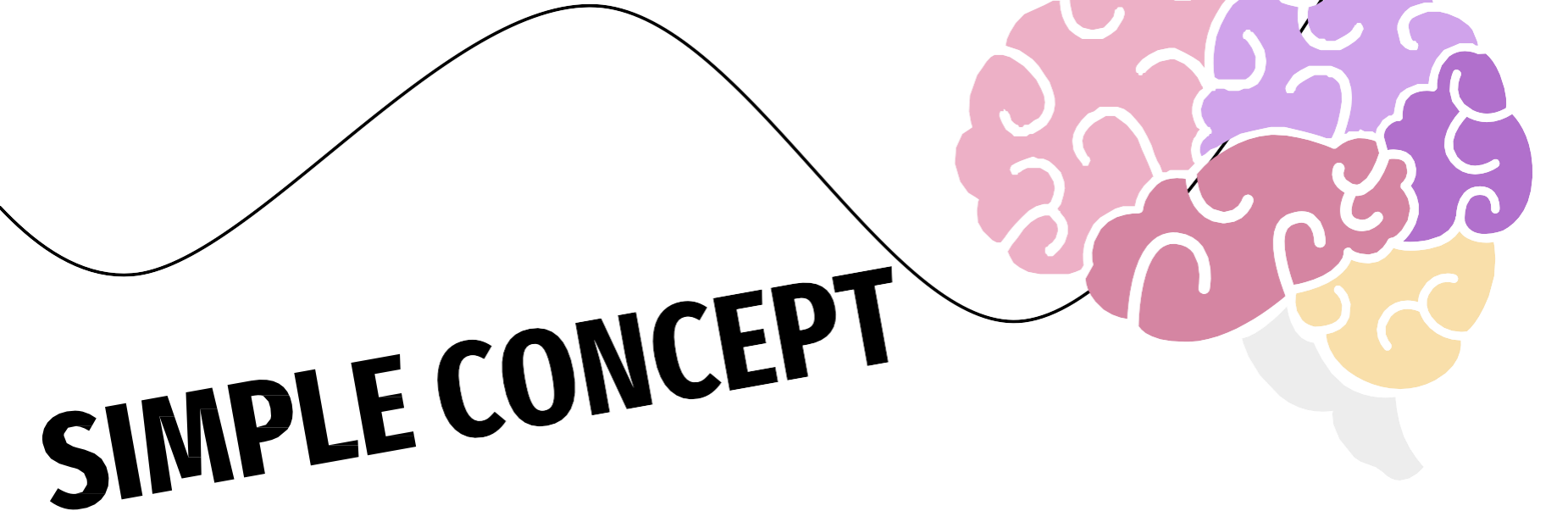


Budget allocation for flood mitigation projects under Malaysia Plan





*Banjir adalah satu proses semula jadi  
tetapi pembangunan di dataran banjir  
telah mengakibatkan risiko banjir  
kepada harta dan nyawa*



# LANGKAH 2 SEBELUM, SEMASA DAN SELEPAS **KEJADIAN BANJIR**

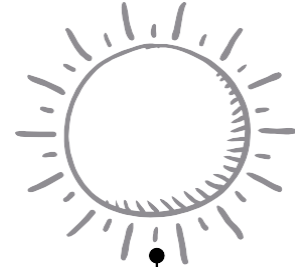
SEBELUM



SEMASA



SELEPAS



?

?

?

# LET'S REVIEW >>>>>> ????



# WAY FORWARD

## #First Approach

### PLANNING OF DEVELOPMENT PROJECTS

01

#### IRBM

Concept Study / blue print

- Provide overview concept of optimum water resources management planning and development for river basins

02

#### MASTER PLAN/ FEASIBILITY STUDY

- To evaluate best option in reducing the flood and drought risk.
- *Cost Benefit Analysis* (CBA)

03

#### DETAILED DESIGN

- Provide detailed design and tender document produced from the selected options

#### Implementation Period

**IRBM : 12 months – 18 months**

**MASTER PLAN : 12 months – 18 months**

**DETAILED DESIGN : 8 months – 18 months**



# WAY FORWARD

## #Second Approach

### PLANNING OF DEVELOPMENT PROJECTS

01

#### MASTER PLAN/ FEASIBILITY STUDY

- To evaluate best option in reducing the flood and drought risk.
- *Cost Benefit Analysis (CBA)*

02

#### DETAILED DESIGN

- Provide detailed design and tender document produced from the selected options

#### Implementation Period

**MASTER PLAN : 12 months – 18 months**

**DETAILED DESIGN : 8 months – 18 months**

# WAY FORWARD

## STRATEGIES AND OPTIONS FOR FLOOD MANAGEMENT

01

### REDUCING FLOODING

- DAMS AND RESERVOIRS
- DIKES, LEVEES AND FLOOD EMBANKMENTS
- HIGH FLOW DIVERSIONS
- CATCHMENT MANAGEMENT
- CHANNEL IMPROVEMENTS



02

### REDUCING SUSCEPTIBILITY TO DAMAGE

- FLOODPLAIN REGULATION
- DEVELOPMENT AND REDEVELOPMENT POLICIES
- DESIGN AND LOCATION OF FACILITIES
- HOUSING AND BUILDING CODES
- FLOOD PROOFING
- FLOOD FORECASTING AND WARNING



03

### MITIGATING THE IMPACTS OF FLOODING

- INFORMATION AND EDUCATION
- DISASTER PREPAREDNESS
- FLOOD INSURANCE



04

### PRESERVING THE NATURAL RESOURCES OF FLOOD PLAINS

- FLOODPLAIN ZONING AND REGULATION

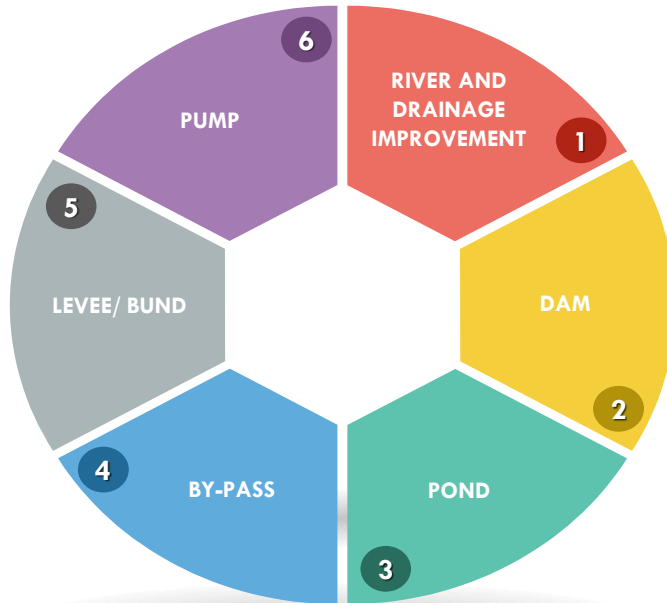


# WAY FORWARD

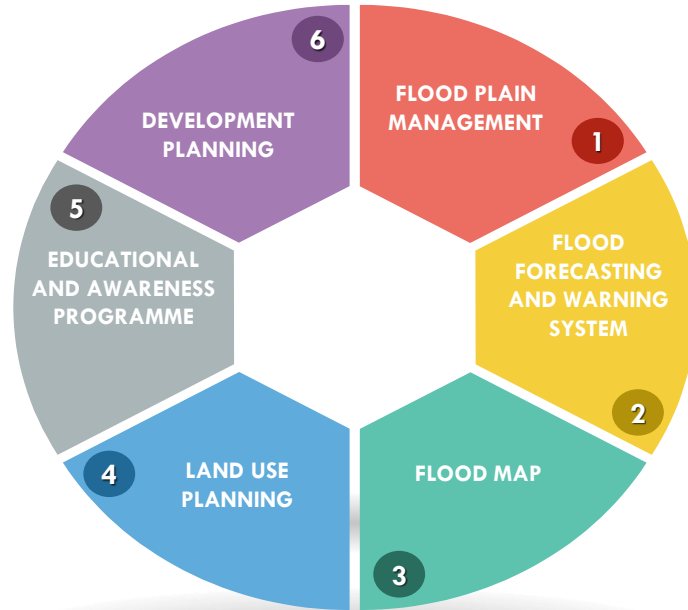
## FLOOD MITIGATION APPROACH

REDUCE AND CONTROL OF FLOOD  
REDUCE FLOOD DAMAGE AND LOSS  
PROTECTION AND SECURED PROPERTIES AND LIFE

### STRUCTURE MEASURE

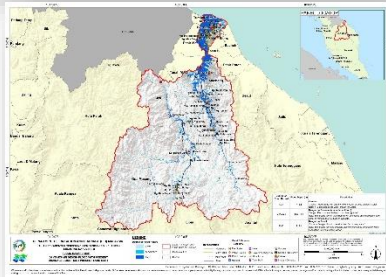
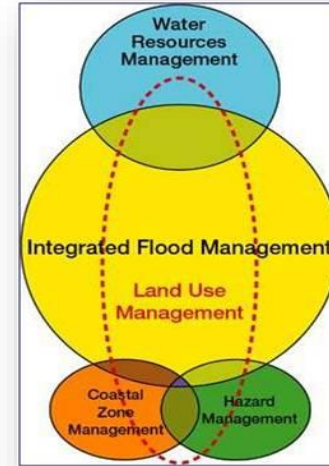


### NON-STRUCTURE MEASURE

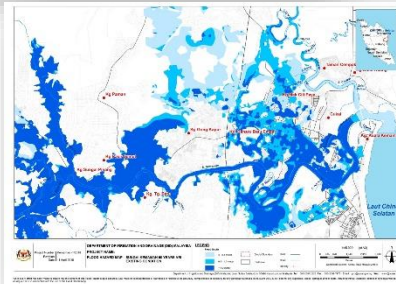


# WAY FORWARD

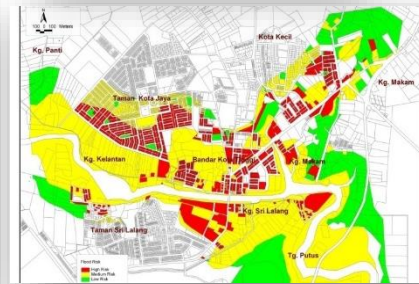
The Flood Management Division is currently carrying out the IFM (Integrated Flood Management) program roadshow to the states for the implementation between the stakeholders.



**FLOOD MITIGATION MASTER PLAN**



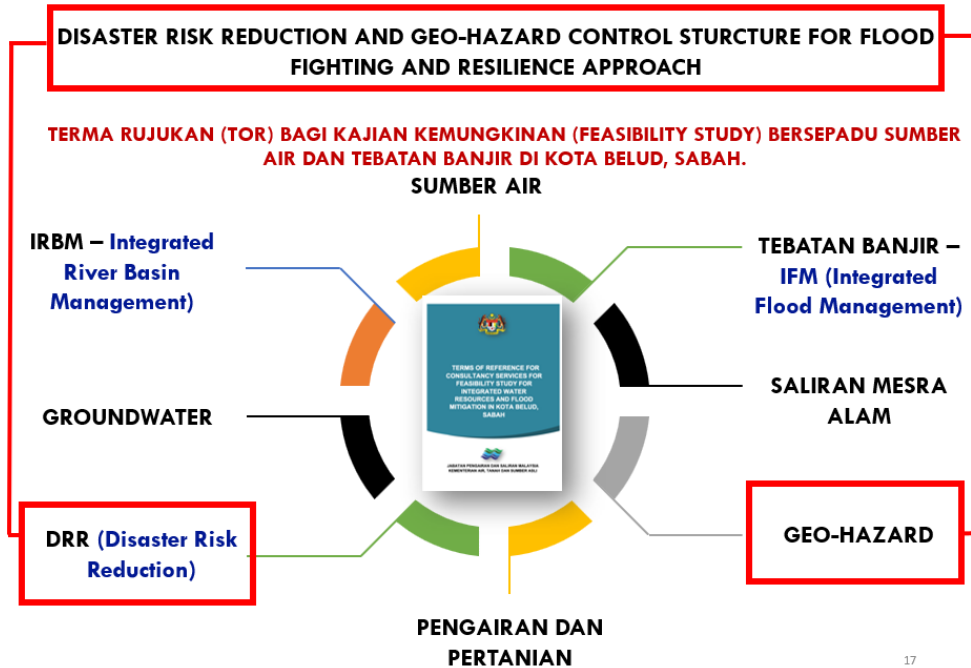
**FLOOD HAZARD MAP**



**FLOOD RISK MAP**



# WAY FORWARD



Establish **Community-led CEPA** (**Communication, Education and Public Awareness**) Program through **Disaster Risk Reduction (DRR)** Program. DRR is the concept and practice of reducing disaster risks through systematic efforts to analyse and reduce the causal factors of disasters. It aims at reducing the damage caused by natural hazards like earthquakes, floods, and landslides, through an ethic of prevention.



**KESIMPULAN ...**

***“Do not always prevent  
flooding – learn to live with  
floods*”**





# HALATUJU JABATAN

## 4 KONSEP PELAKSANAAN FUNGSI JPS

CREATING FOR  
RESILIENCE

BUILDING  
WITH NATURE

BRING BACK  
THE BEACHES

MAKE ROOM  
FOR WATER





# Nature-Based Solutions : Make Room for Water

- Flood Risk Reduction
- Drought Risk Reduction
- Coastal Risk Reduction
- Improve Water Quality

WATER



NATURE

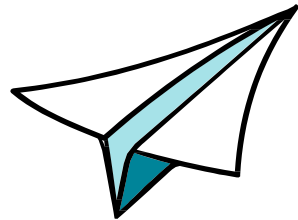
- Increase habitat area
- Improves structure of the riparian area
- Maintain and enhance biodiversity

- Increase recreational opportunities
- Stimulate/increase economic benefits
- Improve community cohesion

PEOPLE



**RUMUSAN ...**



KEE'S WORLD

By C.W. KEE

OI! NO DUMPING  
RUBBISH!



NO WONDER  
DENGUE FEVER  
IS ON THE RISE!  
PEOPLE JUST  
DON'T CARE!

C.W. KEE

# KEE'S WORLD

By C.W. KEE

DON'T THROW  
RUBBISH!

WHO  
CARES?



C.W. KEE

A large yellow circle is the central element, surrounded by several stylized white flowers with yellow and blue accents. The flowers are arranged in a circular pattern around the yellow circle, with some flowers having blue outlines or centers. The background is white.

Terima  
Kasih