Floods in Malaysia

Jan 2004

FLOODS IN MALAYSIA

by

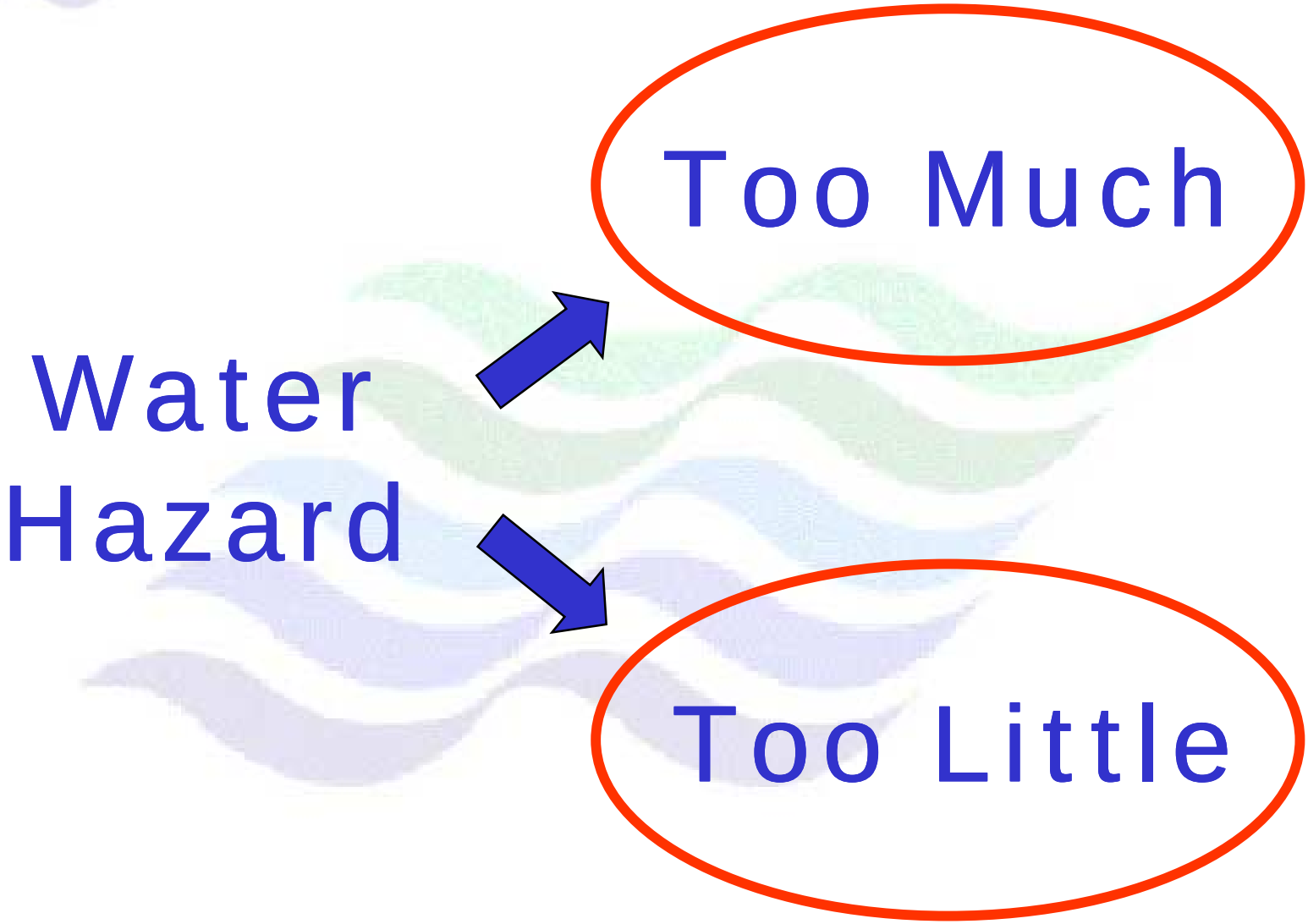
Keizrul bin Abdullah

Director General

Department of Irrigation and Drainage Malaysia

21 January 2004

WATER HAZARD


Too Much
Water
Hazard
Too Little

Floods in Malaysia

Jan 2004

Water, water, water everywhere

Several hours of heavy rain and KL almost comes to a standstill

By Adrian David and V. Ramanan

KUALA LUMPUR, Mon. — In a near repeat of the incident in April this year, the city was again in chaos for several hours today after a torrential downpour caused flash floods and traffic jams.

Gridlocks were caused by floods in major roads such as Jalan Ampang, Jalan Datuk Sosiman, Jalan Tun Perak, Jalan Tun Razak, Jalan Bukit Bintang, Jalan Dang Wangi, Jalan Sultan Ismail, Jalan Tun H.S. Lee and Jalan Masjid India in the city, and Jalan Gasing and the Federal Highway in Petaling Jaya.

The downpour, which began about 2pm and lasted for three hours, caused sections of the roads to be submerged, making them impassable to motor vehicles. Several cars were also stalled, while traffic lights went out at some of the junctions.

Water also entered the basements and several offices located on the ground floor of the low-lying buildings.

Sales executive Raymond Tan said he had gone to pick up a client near the Tenaga Universiti factory in Dataran Komuter to send him to the Concorde Hotel in Jalan Sultan Ismail when he encountered the jam along Jalan Ampang. He added that the Concorde Hotel, which is prone to floods, had an emergency before when they arrived.

"The time-tested Datuk Keramat near the Light Industrial factories was also flooded," he said.

In Brickfields, parts of Jalan Sultan Abdul Samad and Lorong Scott Abdul Samad were flooded, causing heavy inconvenience for patrons and attendant operators to park customers from Bukit Bintang to Jalan Brickfields.

Many of the children were seen playing in the ankle deep water, while waiting to be picked up.

Volunteers were also seen rescuing lost away Road water at the entrance of the Our Lady of Fatima church opposite the school.

A regular church goer, Lucien Wijesinha said it was quite normal for the church to get flooded when there was a heavy downpour.

"Whenever the Sungai Klang bank overflows, the church gets affected. We have been complaining about it for a long time now, but the authorities don't respond," he said.

Other low lying areas in the Federal capital were also flooded as the Sungai Klang overflowed its banks.

On the outskirts, the worst affected areas were notably the Jalan Ulam Saw Lin-Sungai Besi area near the Royal Malaysian Air Force station.

Following the downpour, hundreds of motorists were stranded on flooded roads.

City traffic police spokesman said more than 20 vehicles near the light-rail transit station in Jalan Tun Perak had submerged.

A spokesman added that the worst hit areas were Jalan Ampang and Jalan Sungai Besi.

Meanwhile, City Hall's rescue squad were on standby with boats to assist office workers and others who were stranded after work.

In Taman Keasa, Ampang, 100 houses in Phase two and another 200 units in Phase three were flooded but the occupants were not evacuated as the flood waters subsided after the rain had stopped.

The rain also caused landslides in Kampung Datuk Made's and the banks of Sungai Datuk situated behind its campus. Both places are in Ampang.

Dozens of residents of Kampung Pasir Hilir, Batu Kawan, had to be temporarily evacuated to the Pisang building after most of their houses were flooded.

NST pictures by Nushairi Nawi, Mokhsin Abidin, Syaharim Abidin and Amirudin Sahib

BOAT PEOPLE — A City Hall rescue squad ferrying office workers who were stranded along Jalan Melaka, to safety.

IN DISTRESS — Office workers in Jalan Melaka had to wait hours for the flood waters to recede before being able to head home after work.

SAFETY FIRST — Office workers on board a boat being escorted to higher grounds by rescue personnel.

HELPING HANDS — Two rescue team members escorting a woman across the flooded street along Jalan Ampang.

ALTOGETHER — Members of City Hall's rescue squad and passers-by helping to push one of the many cars which were caught in the floods to higher grounds along Jalan Dang Wangi yesterday.

NOT SPARED — Motorcycles parked along Jalan Tun H.S. Lee were nearly submerged. Note the garbage bags floating by.

KNEE DEEP — Office workers wading through the flood waters along Jalan Tun Perak.

Monday October 6, 2003
No. 3232
PP 2644/12/2003
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theSun

HOT FROM SPORTS

While Ranieri fiddles, Roman yearns PG20-21

Striking back
srael hits
arget
nside Syria
ORLDPG12

Bon appetit
Nothing bugs celebrity chef Anthony Bourdain
ENTERTAINMENTPG30

Floods worsen

24,000 in three states evacuated, exam students spend night in school

PENANG: Floods drove some 24,000 people from their homes in three northern states over the weekend and threw train schedules off track.

The continuous rain over the past few days caused rivers to burst their banks, bringing misery to many parts of Penang, Kedah and northern Perak.

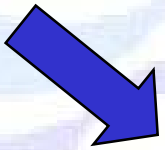
For pupils taking the Penilaian Menengah Rendah (PMR) examination, which starts today, it could not have come at a worse time.

Those in the worst-hit districts of Kedah were forced to spend an uncomfortable night in their school so they could take the examitions centre gave the breakdown: 3,350 fro Seberang Perai Utara, 1,498 from Seberan Perai Tengah, and 986 from Seberang Per Selatan.

As of 1pm yesterday, the water level Sungai Pinang Tunggal, Sungai Bumbun Lima, Sungai Aru Kuda, Sungai Juru an Sungai Junjung went past the danger leve spilling into nearby settlements.

Deputy Prime Minister Datuk Se Abdullah Ahmad Badawi, who is the MP fo Kepala Batas, and Penang Chief Ministe Tan Sri Dr Koh Tsu Koon visited the affecte areas as well as the evacuation centres ye terday.

Water Hazard



Too Little

THE Star
the people's paper

No. 15568 Saturday February 16 2002 PP1641/3/2002
Peninsula RM1.00 / Sabah RM1.50 / Sarawak RM1.50

INSIDE

BUSINESS

DRIER DAYS

Brace for water cuts during long, hot spell

KUALA LUMPUR: Brace yourselves for hotter weather and drier days over the next few months, and face the possibility of water rationing as catchment areas dry up.

Malacca, which faced its worst water crisis in 1991, is already facing the brunt of the unyielding weather and has set up water crisis committees at the state and district level.

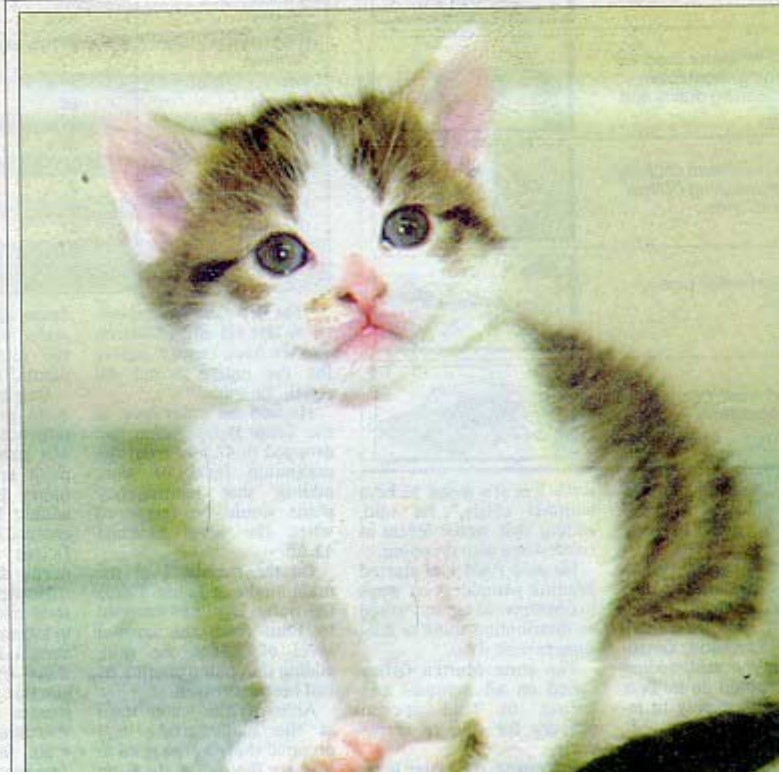
The Malacca Water Corporation (PAM) announced yesterday that rationing might be imposed within 13 days as the level at the state's main drinking water source – the Durian Tunggal dam – was expected to drop to "crisis level" which is 60% of full capacity.

A Meteorological Services Department spokesman here said the weather from May until the end of the year was likely to be much drier than last year due to the El Nino phenomenon.

"We are monitoring the index situation to see the outlook of the El Nino event," he told *The Star* yesterday.

He said most of the department's 33 monitoring stations nationwide had been receiving abnormally lower rainfall since early this month.

"Our monitoring stations have been recording less than half the average monthly rainfall level



Water Crisis

Senior citizens hard hit by water rationing

GOING BACK IN TIME? .. Water rationing causes hardship to everyone, more so to the old and incapacitated as this picture taken by *New Straits Times* photographer *Khairul* Ghazali shows.

Although the inmates of Rumah Seri Kenangan at Jalan Sungai Long, KM18 Jalan Cheras receive supply from two tanks, they still have to carry the water. Just like the days when they were required to fetch water from wells.

Manaiah Radzi, 72, (from left) Nancy Mokhtar Mohamad Ashraf, 61, R. Rajamal, 71, N. Raman, 70, and S. Punnasamy, 80 are seen here with their buckets collecting water from the tanks at the home.

Rumah Seri Kenangan was one of the 13 welfare organisations which received water tanks, with a capacity of 2,700 litres each, donated yesterday by Polystyrene Malaysia Sdn Bhd, a Petronas-BP Chemicals joint venture company.

Dry spell can hit Kedah's 63,000 padi farmers soon

Planting season delayed by a month

By Abdul Razak Ahmad
razak@nstp.com.my

ALOR STAR, Wed. — The current dry spell, which has led to water shortages in several states, can soon affect Kedah's 63,000 padi farmers.

Authorities are delaying the next padi planting season by a month while awaiting water levels at its three dams to rise.

The Muda Agricultural Development Authority (Mada) deputy Engineering Department head Teoh Weng Chaw said water from the dams would be released for use in padi planting in three stages, beginning on March 25 followed by April 4 and 14.

Teoh said Mada originally schedulled to begin releasing the water from Friday, but decided to delay it as the water levels were currently lower than at the same time last year.

"As such, we hope the farmers will take extra measures to prevent wastage of the water."

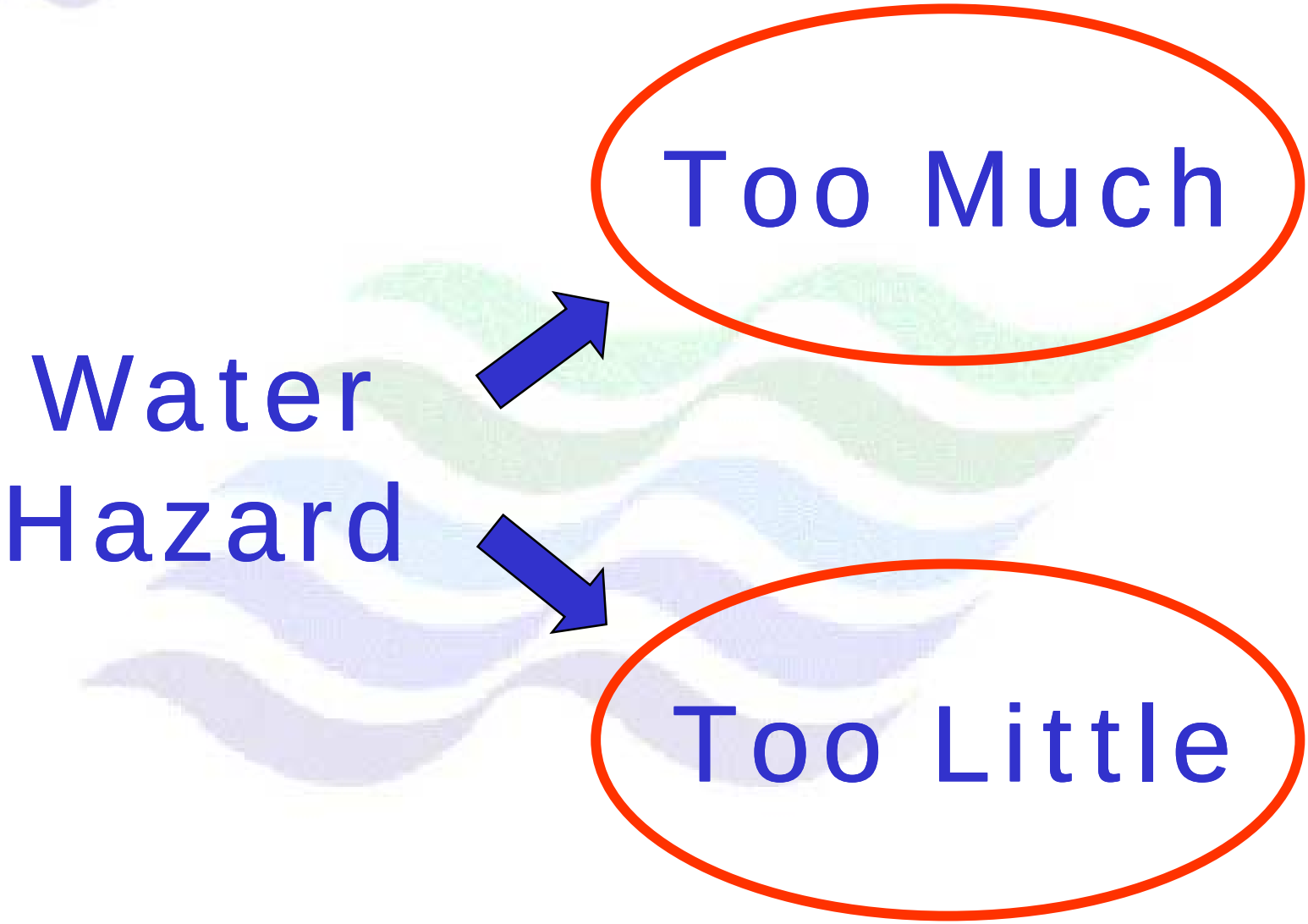
Padi farmers in Kedah plant twice a year, with each seeding exercise spaced about six months apart. The next padi planting season is in September.

Teoh said although the water levels at the dams were currently satisfactory, prolonged lack of rain for the next few months could lead to shortages during the next planting season.

The Pedu dam is now registering an 87 per cent water level, with the critical level at 80 per cent.

The Muda dam was at 56 per cent capacity, six per cent over the critical level, while the Ahning dam was registering an 80 per cent water level, with the critical level at 50 per cent.

Teoh said despite the low water levels at the Pedu and Muda dams, non-agricultural users need not worry as water supply was still comfortably above danger levels for the next few months.


Too Much
Water
Hazard
Too Little

Water Hazard

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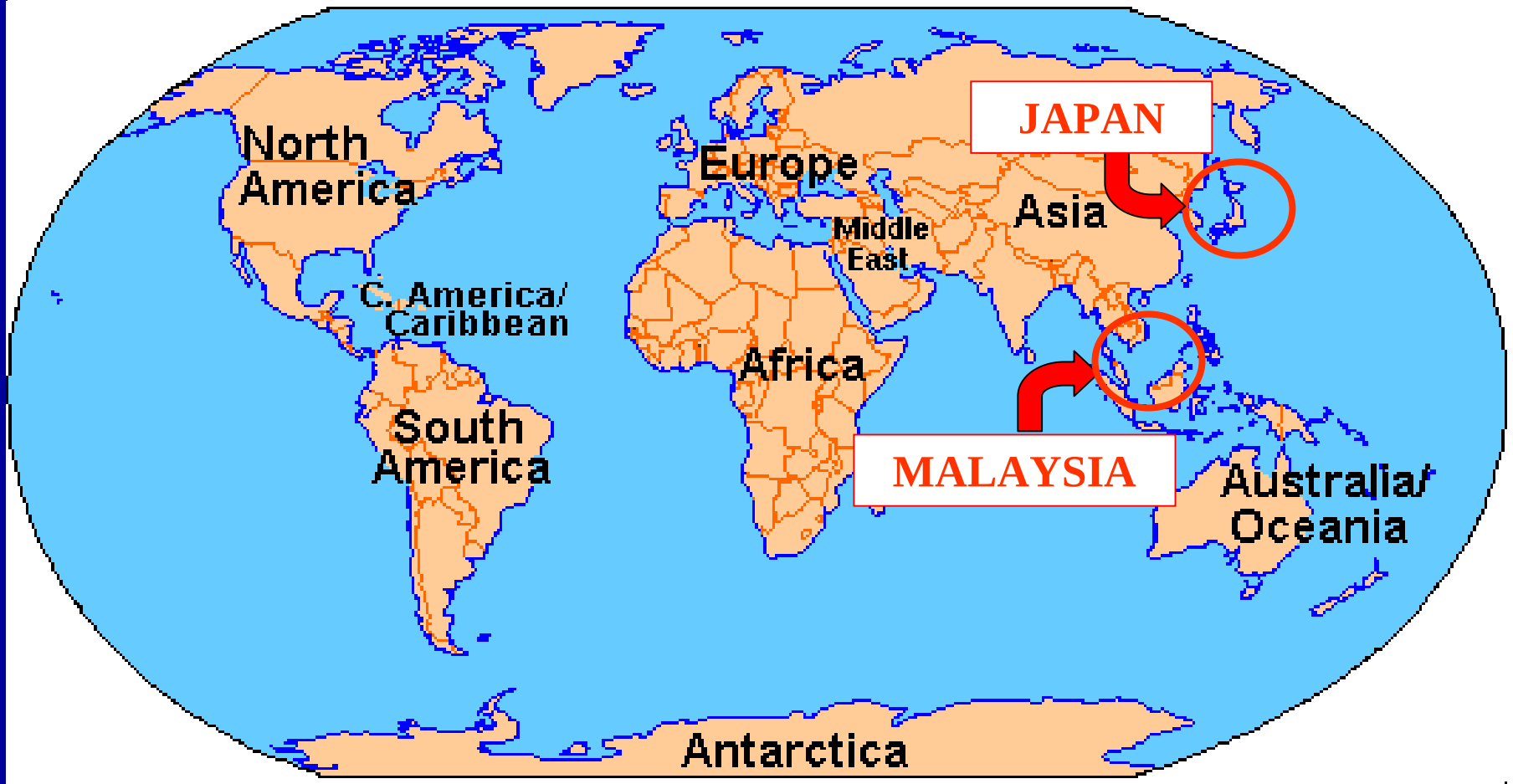
- Causes of flooding
- Strategies to overcome the problem
  - Curative measures
  - Preventive measures

Floods in Malaysia



Jan 2004

Floods in Malaysia

Located in Humid Tropics
Annual Rainfall of 3,000 mm

Jan 2004

Floods in Malaysia

Jan 2004

Frantic calls from motorists

FROM PAGE ONE

flooded.

At most of the motorists caught in the jam were rushing home to break their fast, many were forced to break their fast in their vehicles.

The New Straits Times received many frantic calls from motorists who were trapped at various stretches of all three major links. Several even reported motorists switching off their engines when they were caught in a grid-lock.

Worst hit stretches were Persiaran Jubli Perak in Shah Alam, the Bukit Kajang-Shah Alam stretch of the NKVE and Km153 of the Federal Highway in Batu Tiga here.

As of midnight, a traffic police spokesman said traffic at the Feder-

Several ways to end KL flood problems

Similar downpour expected today

FROM PAGE ONE

TERKANDAS....

Floods in Malaysia

Jan
2004

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Floods in Malaysia

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2004

Floods in Malaysia

Jan 2004

SEKUMPULAN pelajar berbuka puasa di dalam air di Kampung

Floods in Malaysia

Jan 2004

LANS Koperal Shamsuddin Jusoh menyampaikan maklumat mengenai banjir di Besut menggunakan telefon awam selepas Balai Polis Trafik Besut dinaiki air sedalam 0.8 meter, semalam. Semua komputer di balai polis itu juga ditenggelami air dan tidak dapat digunakan. – Gambar Shahrizal Md Noor

Floods in Malaysia

Jan 2004

Typhoon Greg, Sabah

Floods in Malaysia

Jan 2004

NEW STRAITS TIMES

NATION

Two boys drown as floods worsen

KOTA BARU, Wed. — A four-year-old boy drowned in a drain at Kubang Kual in Rantau Panjang.

A police spokesman said Muhammad Yaeri Abdul Aziz was playing near his house when he slipped and fell into the drain at 11am today.

"His body was found by family members about 30 minutes later near the area," he said.

In Bachok, a two-year-old boy drowned after he slipped and fell into an irrigation canal at Kampung Alur Ganu on Monday.

District police chief, Deputy Superintendent Suaibani Rahim identified the victim as Mohammad Hasbam Zaharri.

He said the boy drowned about 6.30pm and his body was found a few minutes later by his mother.

He said Mohammad was playing near the irrigation canal with his siblings when the incident happened.

Meanwhile, 1,284 people in the State were evacuated to five flood relief centres in Gua Musang, Tanah Merah, Jeli, Kuala Krai and Pasir Mas.

By 5pm, those in villages in water one to three metres deep had been evacuated. They were sent to flood relief centres in Jeli (878 people), Tanah Merah (132), Kuala Krai (125), Gua Musang (120) and Pasir Mas (29).

He said several roads in the districts had also been closed, including Km9 Kampung Kajang-Penglima Bayu-Rantau Panjang, Kampung Gual Raja Jerungau-Gual Ipoh and Chukok Ipoh-Kuala, all in Tanah Merah.

In Machang, the roads closed to all traffic were Jalan Temangan Batu 30 and Jalan Temangan Batu Lama.

Three others opened only to heavy vehicles were Jalan Besar Temangan, Jalan Kampung Pertok and Jalan Paloh Rawa.

He said at 4pm today, the water level at all the State's assessment points had risen since the same time yesterday. The water level at the Sultan's pier was 5.25m today, passing the danger level of 5.00m.

Others that had passed the danger level were Kuala Krai 25.90m (danger level 25.00m), Sungai Golok 10.06m (danger level 9.00m) and Guillemard Bridge 17.83m (danger level 16.00m).

The levels at Sungai Galas and Sungai Lebir are above the warning level.

HIT BADLY: A house in Kampung Nibong, Tanah Merah, which was hit by flood waters yesterday.

Landslides at 10 stretches in Kelantan

JELI, Wed. — Minor landslides were reported at 10 stretches, from Air Lanas here to the East-West Highway, following continuous rain.

There was no report of casualties.

Kelantan police chief Datuk Mohd Najib Abdul Aziz said the highway was still open to traffic as diversions

Number of evacuees rises to 705 due to heavy downpour

KUANTAN, Wed. — The number of evacuees here rose to 705 today as more areas were hit by floods due to heavy rains over the last three days.

More than 400 were from 10 villages who had to vacate their homes

The showers were expected to continue until Friday morning, the department said.

Pahang police have denied that the floods had claimed its first victim, as reported in an English daily today.

Flood Impacts

- Flooded area - 29,720 km²
- 9 % of the total land area of Malaysia

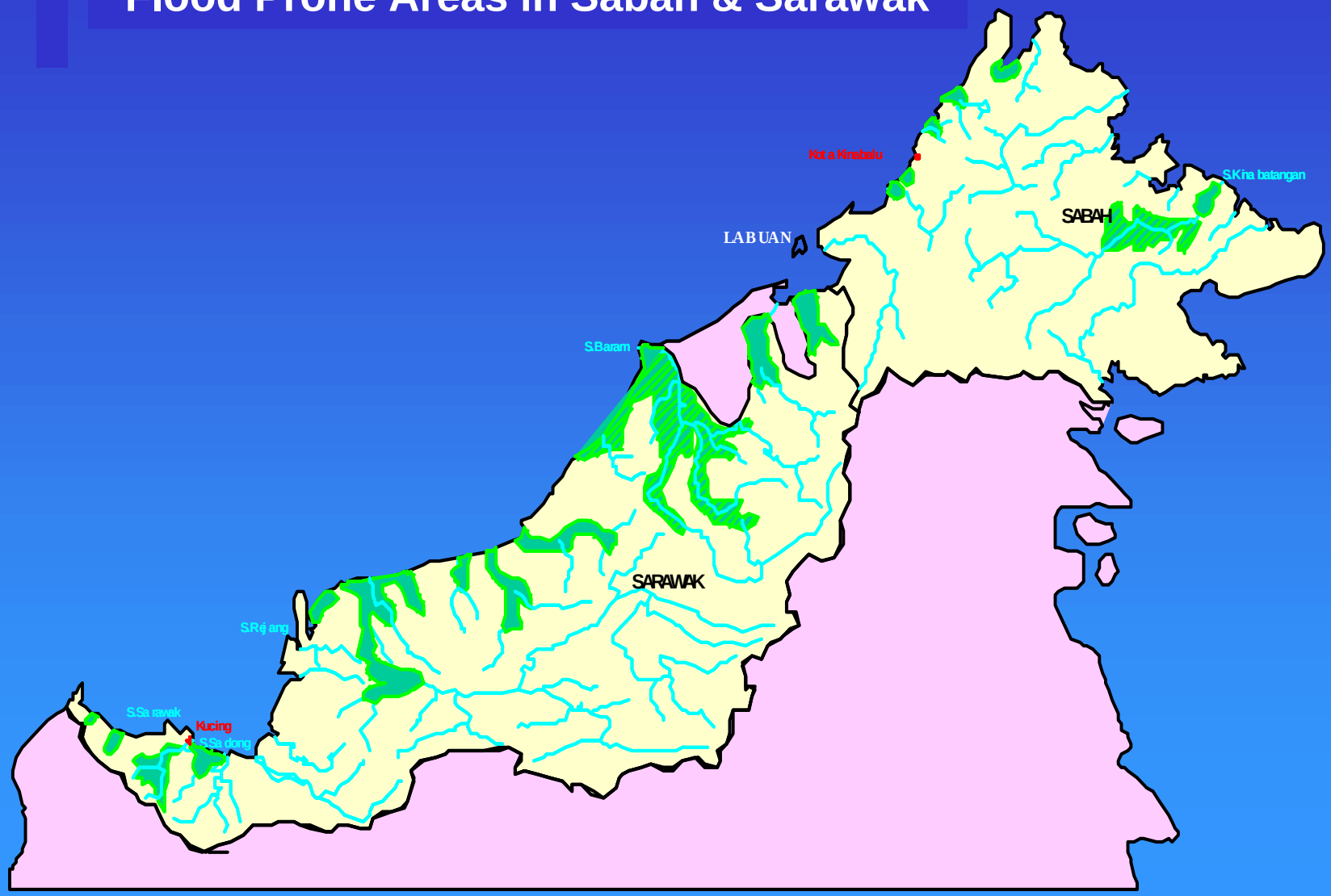
Floods in Malaysia

Flood Prone Areas in Peninsular Malaysia

Jan 2004

Floods in Malaysia

Flood Prone Areas in Sabah & Sarawak



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2004

Flood Impacts

- **Flooded Area - 29,720 km²**
- **9 % of the total land area of Malaysia**
- **4.9 million (20 %) people affected**

Flood Impacts

- **Flooded Area - 29,720 km²**
- **9 % of the total land area of Malaysia**
- **4.9 million (20 %) people affected**
- **Average annual flood damage for country is estimated at RM 1 billion (US$ 263 million)**

Causes of Flooding

- Natural Phenomenon
- Human Activities

Causes of Flooding

- Natural Phenomenon

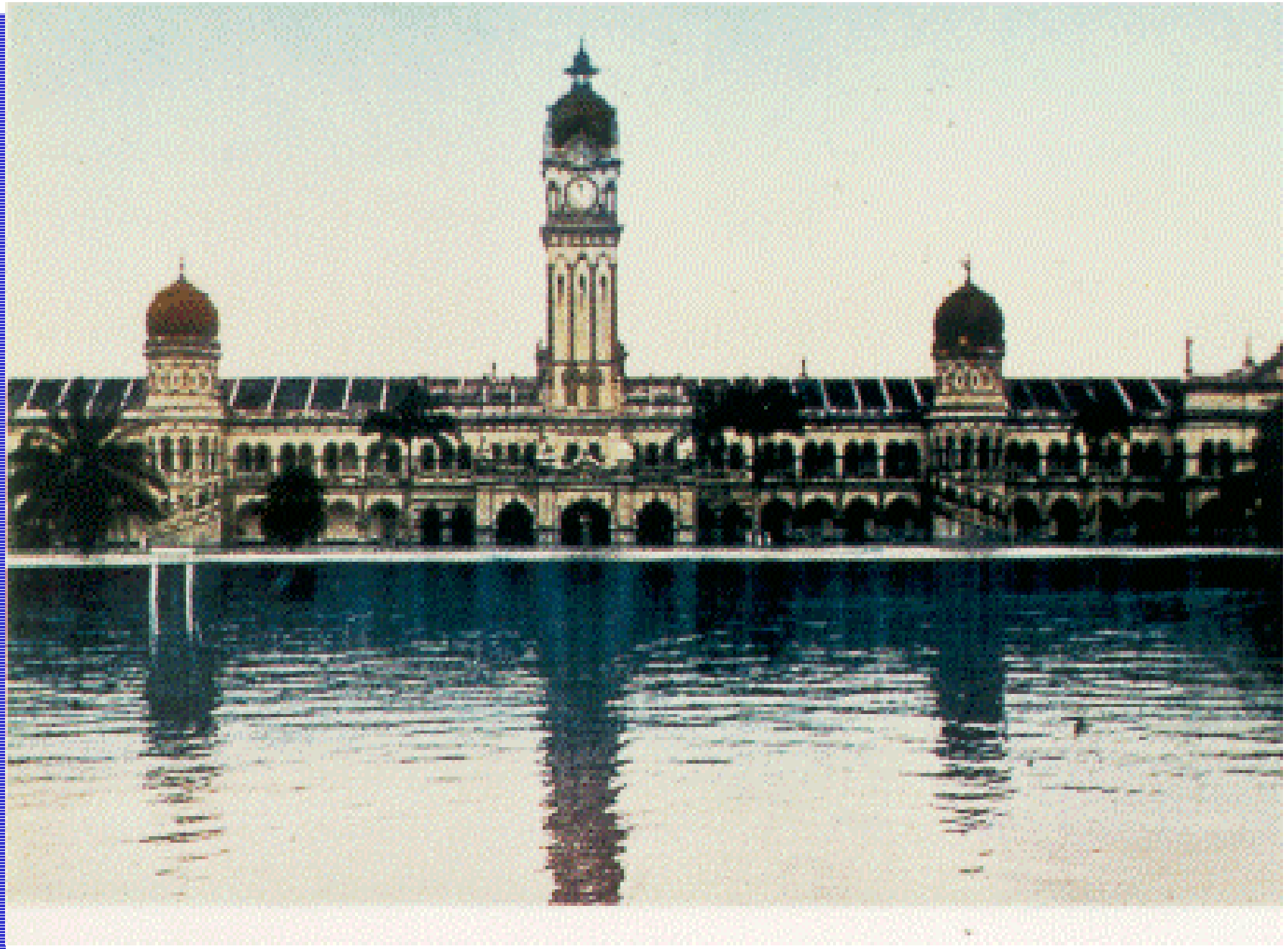
Floods in Malaysia

Jan 2004

Kuala Lumpur in 1926

Floods in Malaysia

Jan 2004



Selangor Club Padang, Kuala Lumpur in 1949

Floods in Malaysia

Jan 2004

Muda River 1949

Floods in Malaysia

Jan 2004

Kuala Lumpur 1971

Causes of Flooding

- Natural Phenomenon
  - Heavy Rainfall

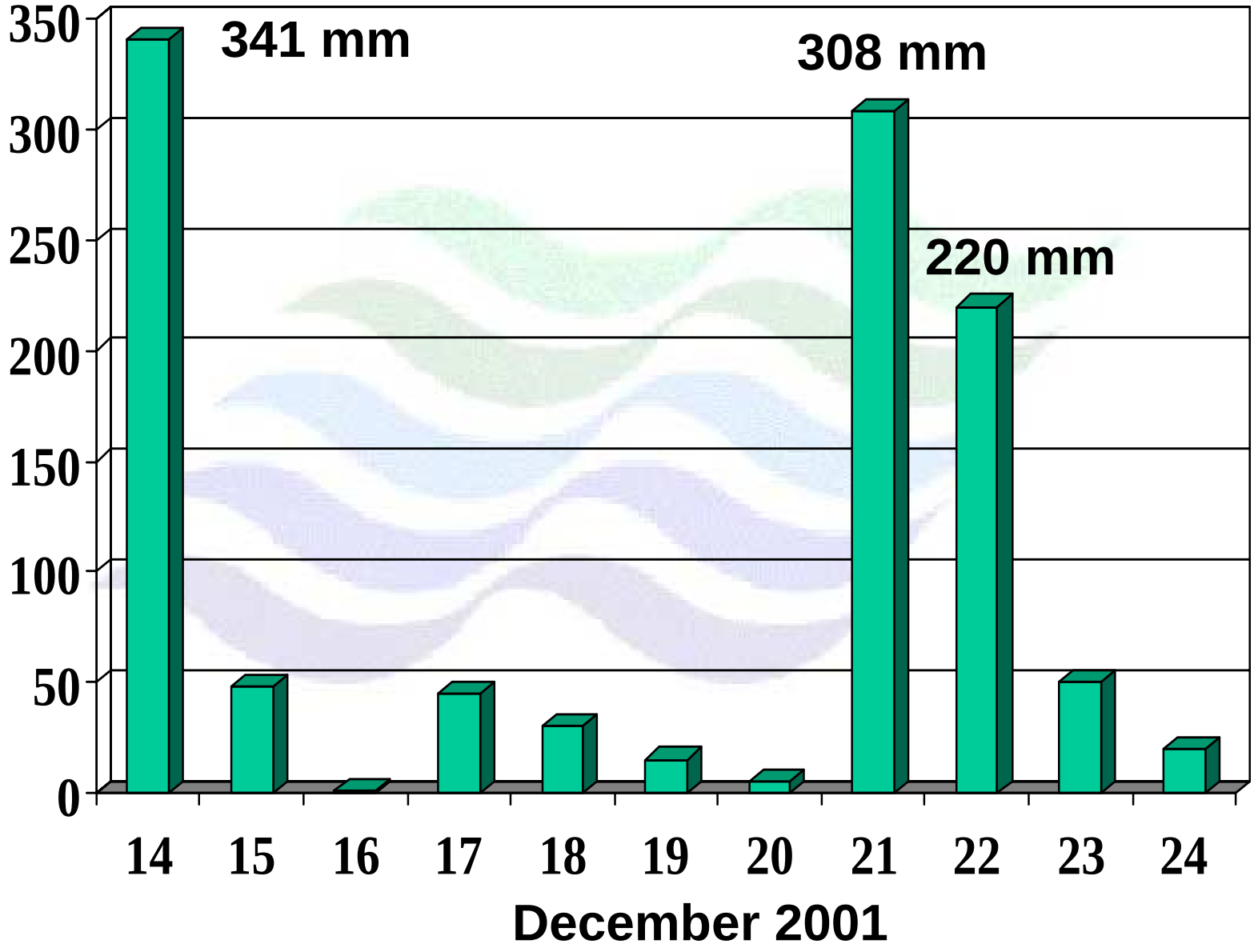
26 April 2001

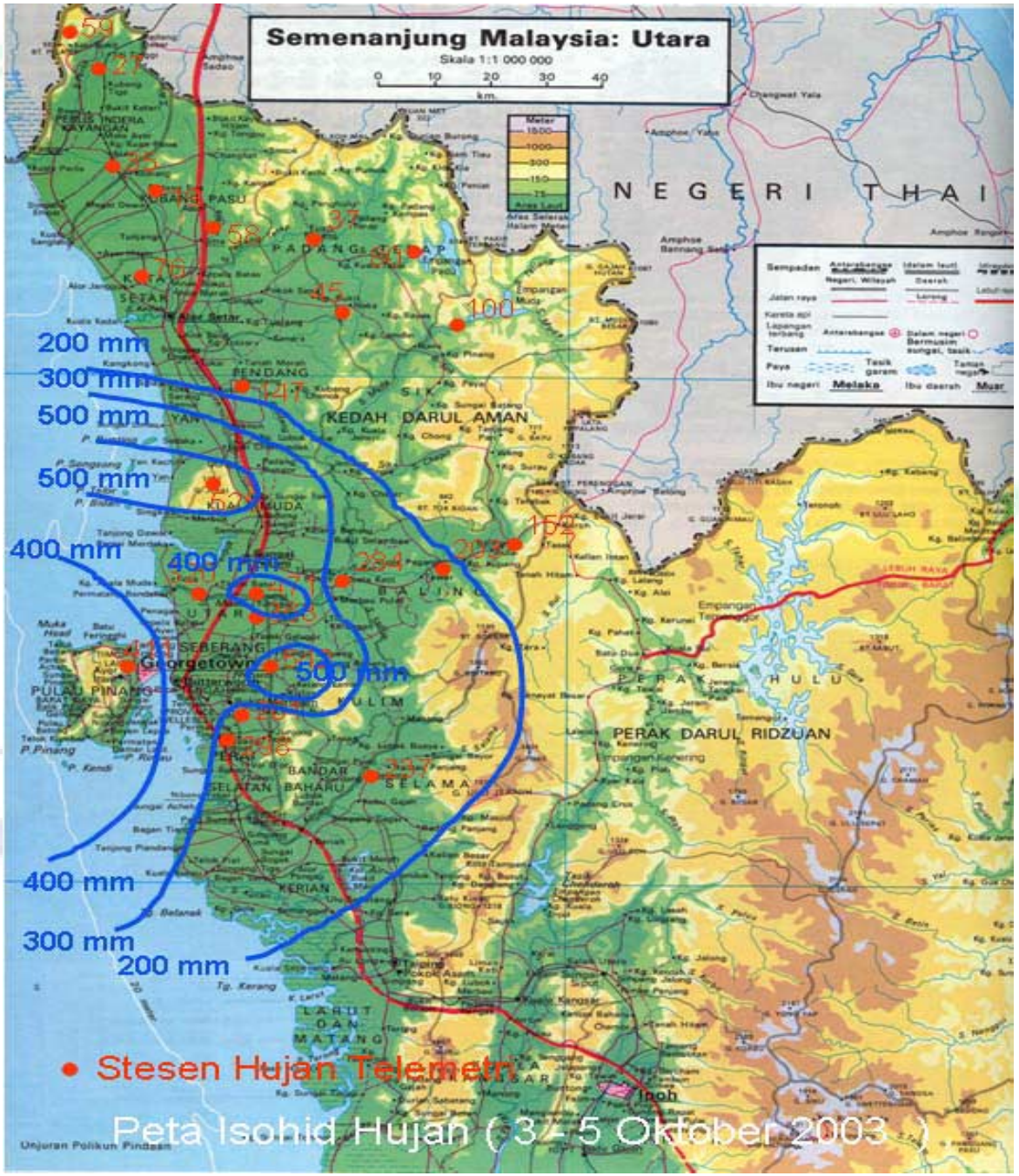
Location of Rainfall Station	Rainfall Duration	Rainfall Intensity	Return Period
JPS Ampang	1 hour	103mm	50 years

Pahang - December 2001

Location of Rainfall Station	Rainfall Duration	Rainfall Intensity	Return Period
Ulu Tekai	1 day	321 mm	100 years
Kuantan	2 days	528 mm	50 years

Rainfall at JPS station (KOMTUR, Kuantan)





Isohyet – 3 - 5 October 2003

SUMMARY OF RAINFALL AND RETURN PERIOD (mm)

October 2003

No	Rainfall Station	District	2/10	3/10	4/10	5/10	Total (2–5 Okt)	3 Days Rainfall (Maximum)	Return Period 3 Days (Maximum)
1	Ladang Victoria	Seberang Perai Utara	38	122	177	64	401	**363**	**>100**
2	Pinang Tunggal	Seberang Perai Utara	58	149	195	127	529	**471**	**>100**
3	Bumbong Lima	Seberang Perai Utara	93	138	110	72	413	341	100
4	Ara Kuda	Sebarang Perai Tengah	95	105	293	114	607	**512**	**>100**
5	Simpang Ampat	Seberang Perai Tengah	127	108	139	49	423	**374**	**>100**
6	Pulai	Baling	28	29	101	22	180	150	normal
7	Kuala Pegang	Baling	43	56	120	27	246	219	50
8	Jam. Syed Omar	Kuala Muda	32	79	148	57	316	**284**	**>100**
9	Kedah Peak	Kuala Muda	147	238	252	128	765	**637**	**>100**
10	Sg. Petani	Kuala Muda	47	124	177	68	416	**369**	**>100**
11	Pendang	Kota Setar	34	72	41	15	162	147	normal
12	Alor Setar	Kota Setar	33	60	33	26	151	125	normal
13	Sik	Sik	96	80	220	85	480	**396**	**>100**
14	Jeniang Klinik	Sik	71	90	115	96	372	**301**	**>100**
15	Kulim	Kulim	12	74	242	77	403	**392**	**>100**
Arithmetic Average Catchment Rainfall			**69**	**103**	**148**	**71**	**390**		

Flood Occurrences by Heavy Rainfall

Date	Location	Rainfall Intensity	Monthly average Rainfall
26/04/01	JPS Ampang	103 mm/1 hr	288 mm
17/09/95	Butterworth	350 mm/day	338 mm
04/09/99	Bayan Lepas	288 mm/day	339 mm
22/12/95	Petaling Jaya	169 mm/day	263 mm

Causes of Flooding

- **Natural Phenomenon**
  - **Rainfall**
  - **High Tides**

BANJIR akibat kenaikan air laut yang tiba-tiba mengakibatkan kesesakan lalu lintas yang teruk di sepanjang jejantas di Pelabuhan Klang, semalam.

Penduduk kelam-kabut dilanda air pasang

Port Kelang October 1999

Causes of Flooding

The Sun on Sunday May 21, 2000

Man-made causes led to floods

In spite, or perhaps because, of rapid development, floods continue to plague the capital. The last occurrence was serious enough to provoke the authorities into a flurry of finger-pointing. Reports by *B.S. KUMAR* and *S.C. CHENG*.

Causes of Flooding

- **Human Activities**

  - **Change in Land Use**

    - **Tekam River Experimental Basin Study (1977-86)**
    - **Studied effects of landuse changes on hydrological regimes, soil fertility and water quality**
    - **Jungle → Land clearing → Plantation**

Some Results of Tekam River Study

	Transition	Crop establishment
Streamflow		
Water yield	↑ 157 %	declined but > pre-clearance stage
Peak flow	↑ 185 %	- ditto -
Time to peak	↓ 67 %	↓ by 2 hrs
River sediment		
	sediment load 4 times greater	declined to pre-clearance level

Causes of Flooding

- **Human Activities**
  - **Change in Land Use**
  - **Rapid and Uncontrolled Development**

Floods in Malaysia

Jan 2004

WORLD

MISS U.S.A. CROWNED 22

SPORT

ROBERTS TOPS AGAIN

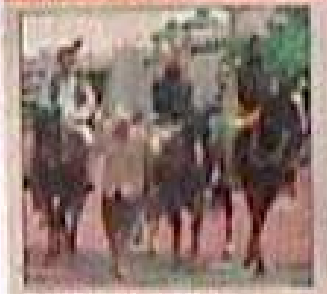
40

New Straits Times
ESTABLISHED 1845

www.nstmedia.com.my

MONDAY OCTOBER 18, 2004

NATIONAL



HORSES STEAL THE SHOW 5

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PM: Don't level hills

'Incorporate greenery into projects like housing'

By Ranjan Said

KUALA LUMPUR, Sun. — Hills should not be levelled and trees felled indiscriminately in the name of development, Prime Minister Datuk Seri Dr Mahathir Mohamad said today.

Instead, he said, projects like housing ... should ... "incorporate" greenery ... making them more attractive and with the trees fetching a higher price.

"There is no need to level hills so that anything can be built on them. It can be done if the foundations for the buildings to be constructed is strong enough and taking into account the slope of the hills," he said when introducing the "New Millennium Tree Planting" ...

... to encourage him to have rapid development only to see the environment destroyed in the process.

"If we want to become a developed nation, one of the criteria that we must have is concern for the environment."

He said while many foreign investors were impressed with the country's greenery, Malaysians often took it for granted.

"We do not value this until we go to countries and see deserts instead of trees. We have lots of trees, so we must protect them. We must fell them as really without any control ... for the environment."

Dr Mahathir also spoke on the need for more parks for the people, especially in areas where the price of land was still low.

"Before long, there will be no ...

Floods in Malaysia

Jan 2004

Uncontrolled Land Clearing

Floods in Malaysia

Jan
2004

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Causes of Flooding

Human Activities

- Change in land use
- Uncontrolled Development
- Effect of Urbanisation

Major Floods in Kuala Lumpur

- 1926, 1971
- 1982, 1986, 1988
- 1993, 1995, 1996, 1997
- 30 April 2000
- 26 April & 29 Oktober 2001
- 11 Jun 2002
- 10 Jun 2003

Floods in Malaysia

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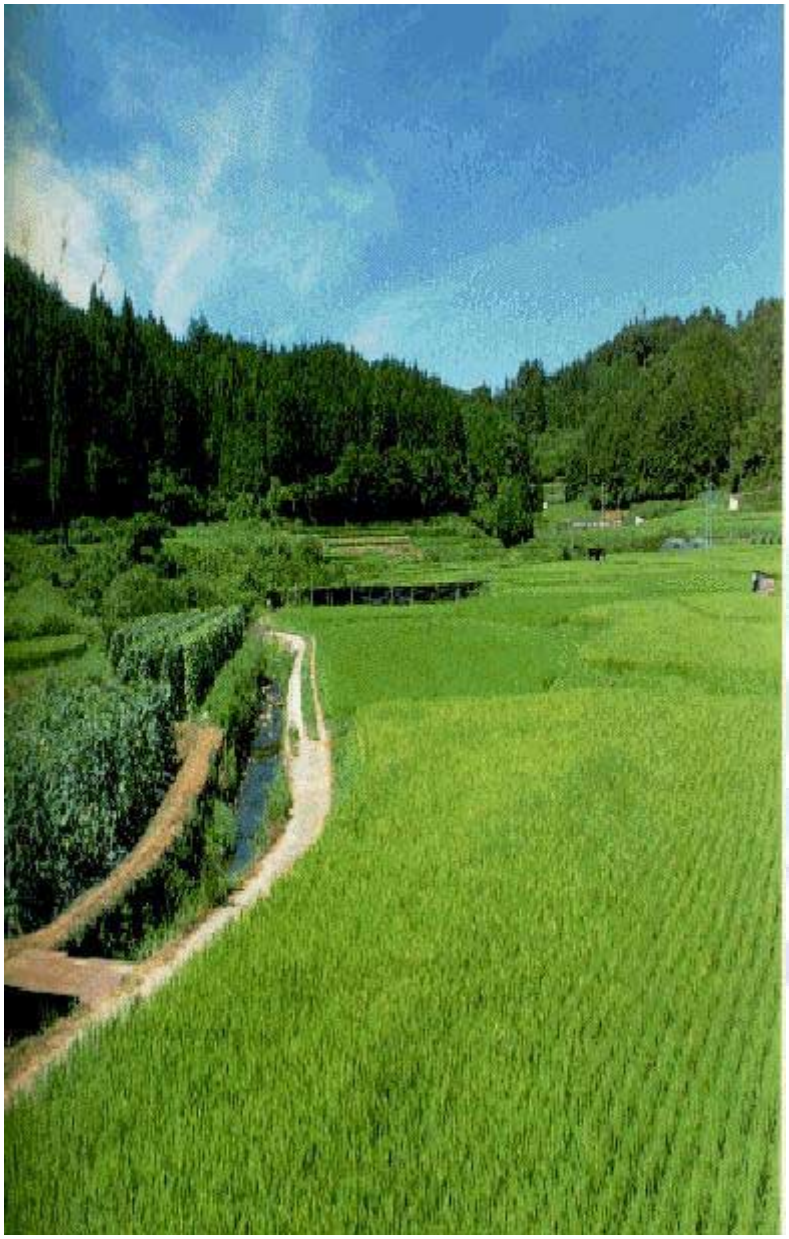
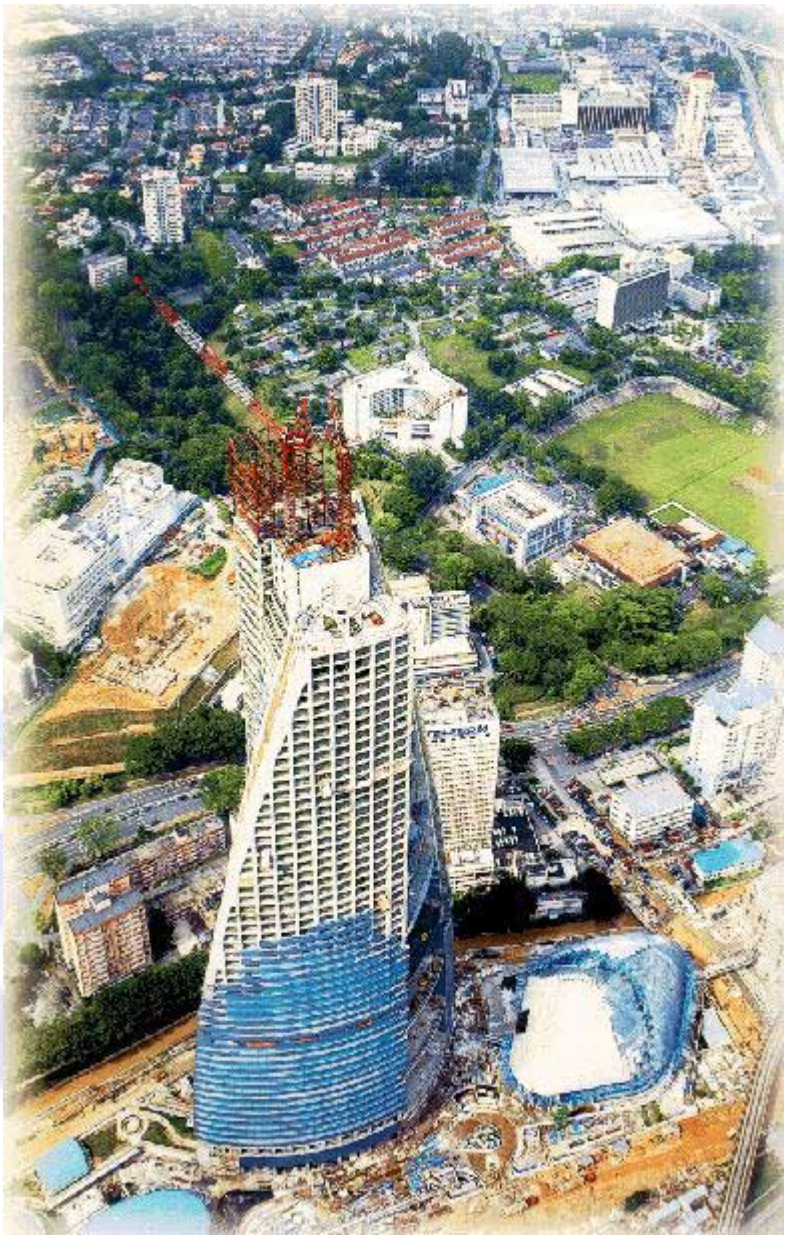




Agricultural Area

Urbanised

Effect of Urbanisation

Increase In Development Area

0 ➡ 40 %

Runoff Quantity

Q ➡ Increase 190 %

Velocity

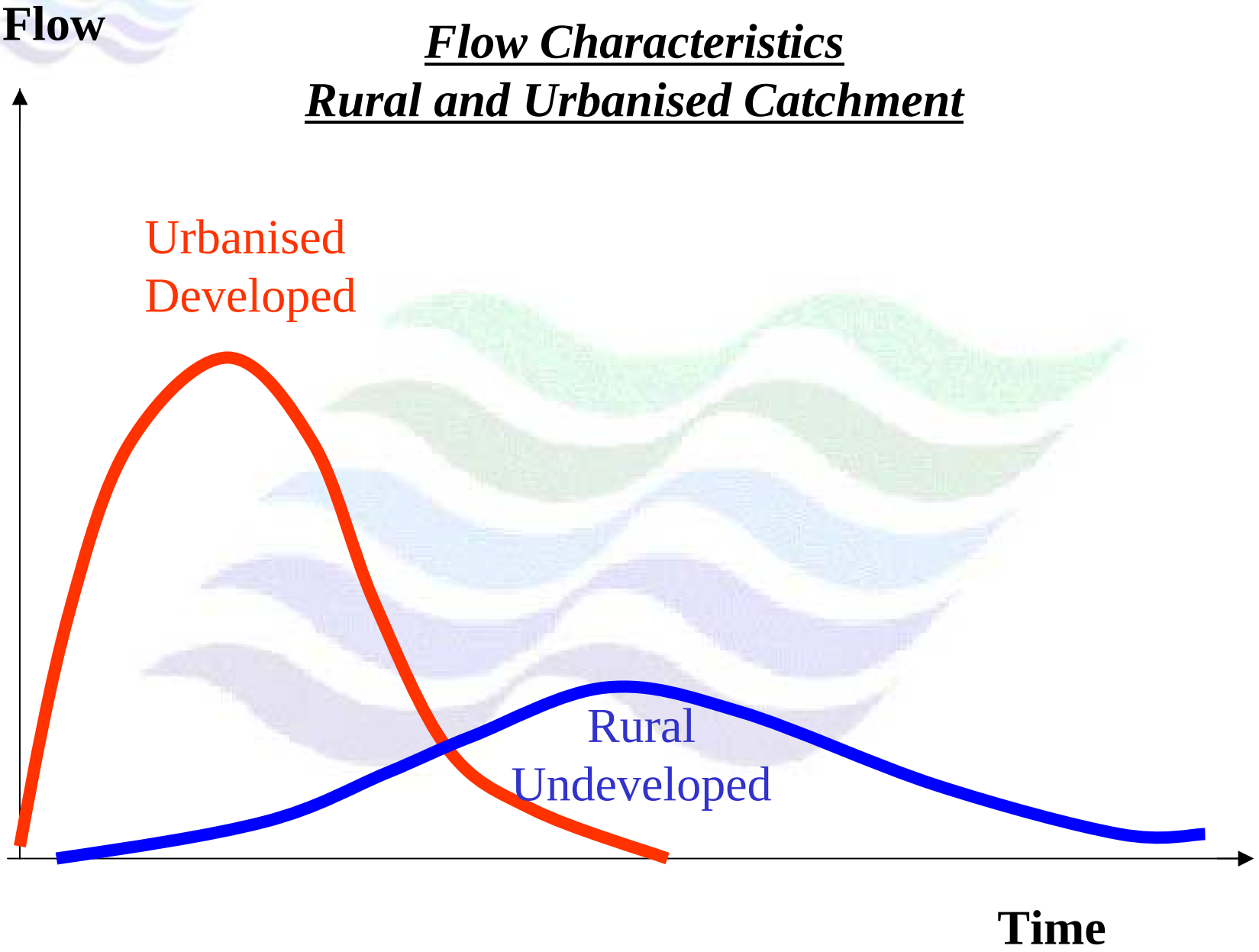
V ➡ Increase 2x

Tc ➡ 50 % decrease

Floods in Malaysia

Jan
2004

Flow Characteristics
Rural and Urbanised Catchment



Green areas reduced by 21pc

Forest clearing and lack of co-ordination in Klang Valley among causes

By Chow Kum Hor

[illegible] The Klang Valley's green areas have been reduced by 21 per cent between 1984 and 1998 following forest clearing, conversion of plantations into development projects and lack of co-ordination in planning.

This has brought about flash floods and darker haze cloud to the area, Science, Technology and Environment Minister Datuk Law Hieng Ding said today.

Between between 1993 and 1998, vegetative cover in the same area has by one per cent following tree planting projects by the local authorities.

Law said this was found in a study conducted by the Malaysian Centre for Remote Sensing, which obtained data from the United States Landsat Satellite.

He cited overdevelopment south and [illegible] land clearing and cutting of hillslopes as examples of non-controlled planning while the development projects included the construction of condominium, commercial and industrial areas.

"It's also noticed a pattern in the development. Usually, a particular area would be rapidly developed at the same time," he said.

He added at present, places like Putrajaya, Bangsar and Cyberjaya were undergoing rapid growth.

Law said local authorities should include high development projects to ensure they were not carried out in environmentally.

He added the Ministry would be pursuing officials from the Kuala Lumpur City Hall and the Petaling Jaya Municipal Council next to learn from them on ways to avoid having more green areas.

Law said the authorities should utilise technologies like remote sensing and geographic information system in the formulation of an integrated development plan.

"This should [illegible] ministry to [illegible] regulations and guidelines, particularly the environmental impact assessment and avoid all environment land clearing and cutting of hillslopes," he said.

To ensure the water retaining capacity in catchment areas, Law said natural vegetation in these catchment areas should be maintained [illegible] preserved.

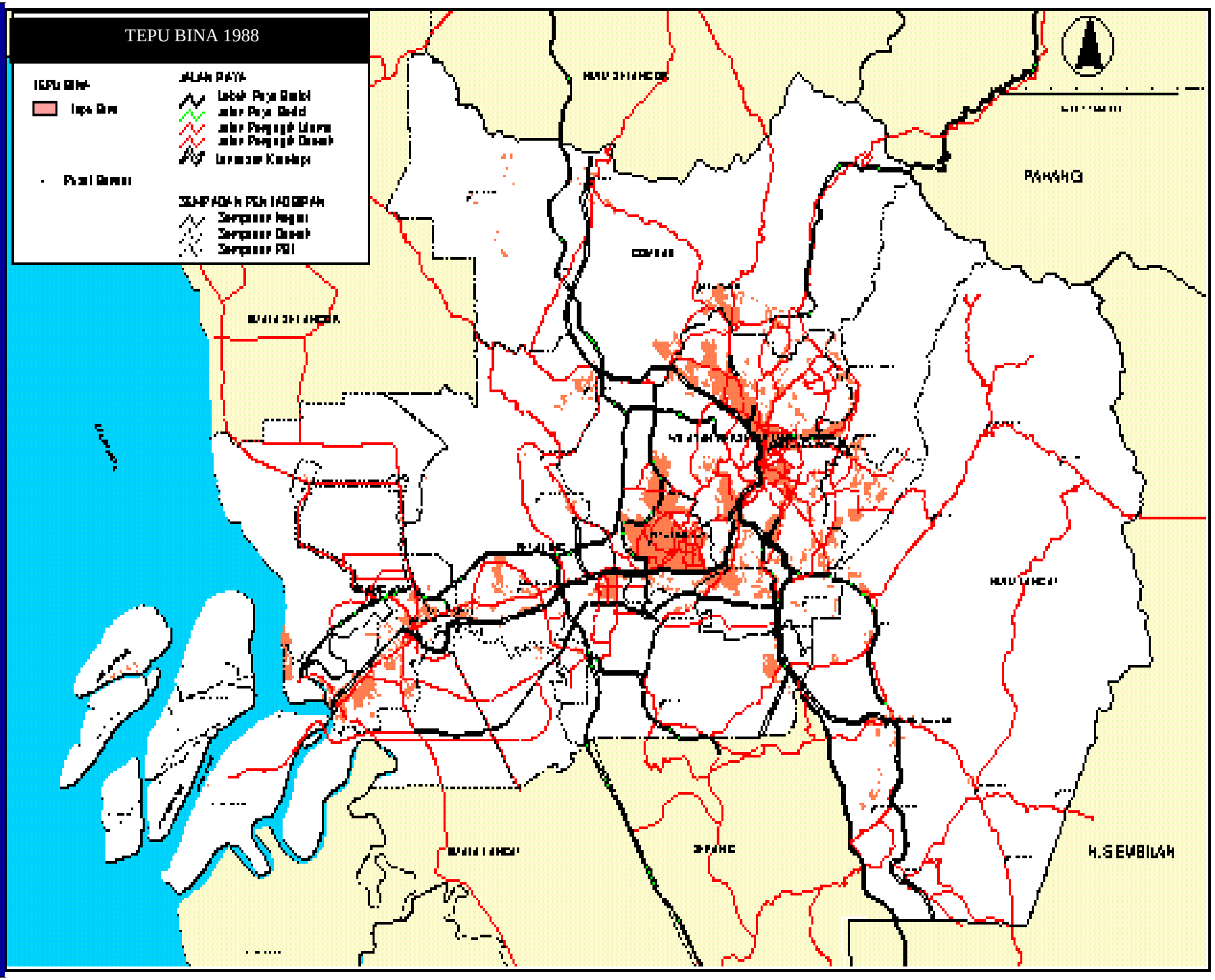
Asked if this showed the failure of the Government's tree-planting project, Law said it was not as a one per cent increase in green areas was recorded for the last three years of the study.

Meanwhile, Law said rain [illegible] from the [illegible] in Bukit Koyan which was [illegible] 600 [illegible] tropical rainforest types had been sent to the Chemistry Department for tests.

The move, he said, was to determine the safety to the area.

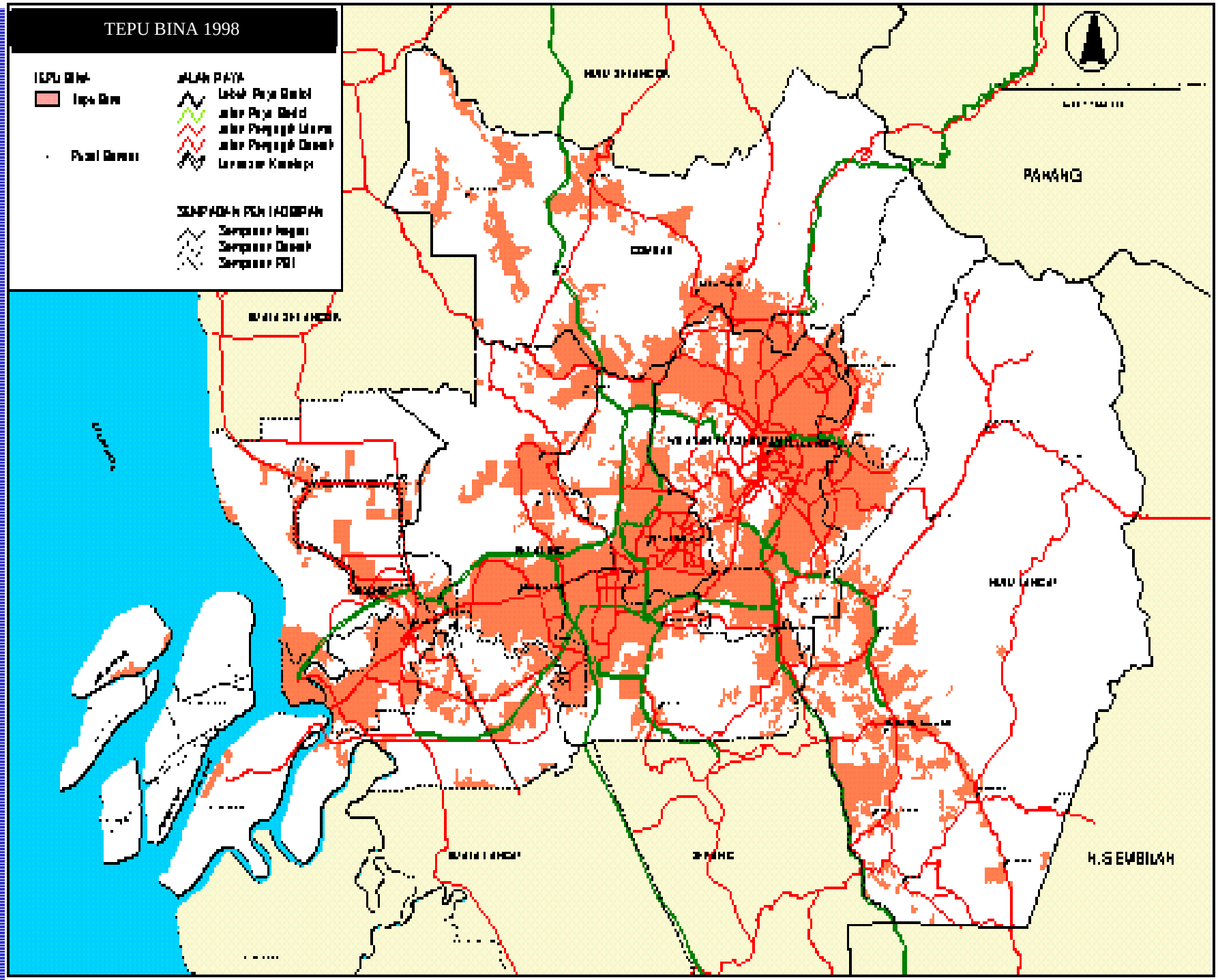
He added the Department of Environment had drawn up an action plan for the [illegible] disposal of the toxic waste currently undertaken by the Public Works Department.

Floods in Malaysia



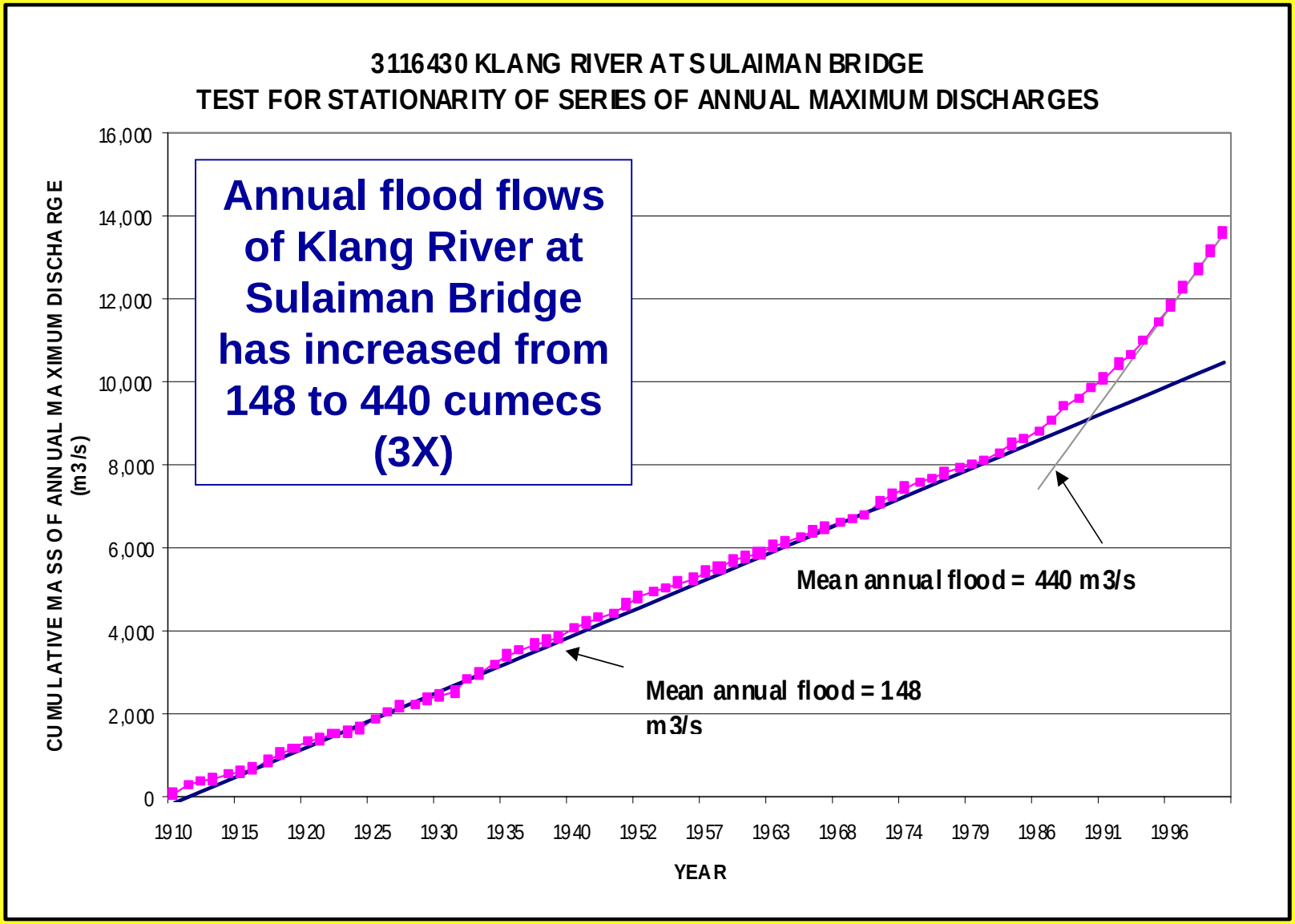
Jan 2004

Floods in Malaysia



Jan 2004

Increasing Trend of Annual Flood Discharge at Sulaiman Bridge

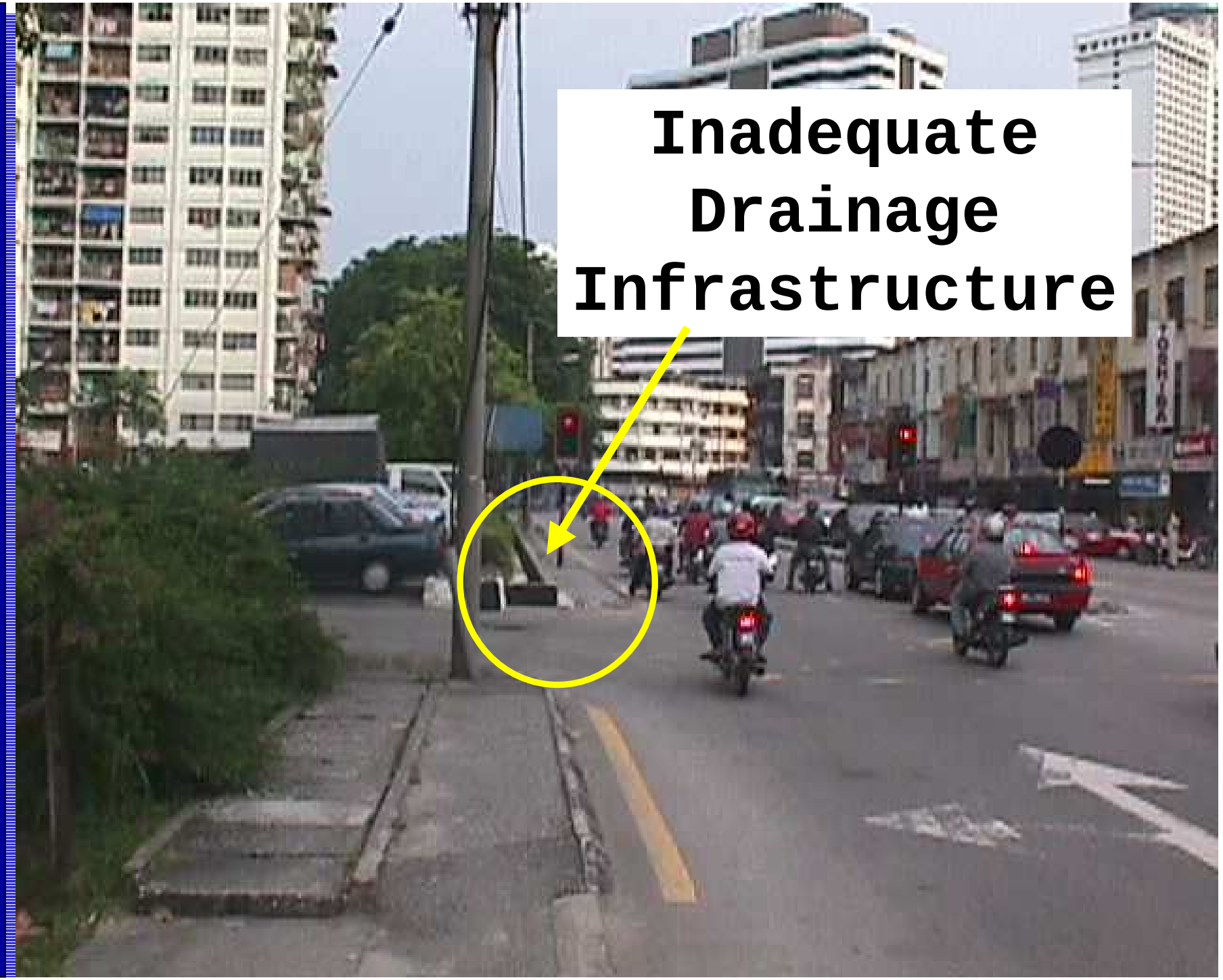


Causes of Flooding

Human Activities

- Change in Land Use
- Uncontrolled Development
- Effect of Urbanisation
- Inadequate Drainage Facilities

Floods in Malaysia



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2004

Causes of Flooding

Human Activities

- Change in Land Use
- Uncontrolled Development
- Effect of Urbanisation
- Inadequate Drainage Facilities
- Obstructions in Rivers

Floods in Malaysia

Jan 2004

LRT Columns in River Berm

Floods in Malaysia

Construction of Piers in the river causing obstruction to the flow

Jan 2004

Construction works constricting river channel

Low soffit of Bridge causing obstruction to flow

Causes of Flooding

Human Activities

- Change in Land Use
- Uncontrolled Development
- Effect of Urbanisation
- Inadequate Drainage Facilities
- Obstructions in Rivers
- Solid Waste and Debris

Floods in Malaysia

Jan
2004

Floods in Malaysia

Jan 2004

Solid wastes being removed from river

Floods in Malaysia

Jan
2004

Floods in Malaysia

Jan
2004

Causes of Flooding

Human Activities

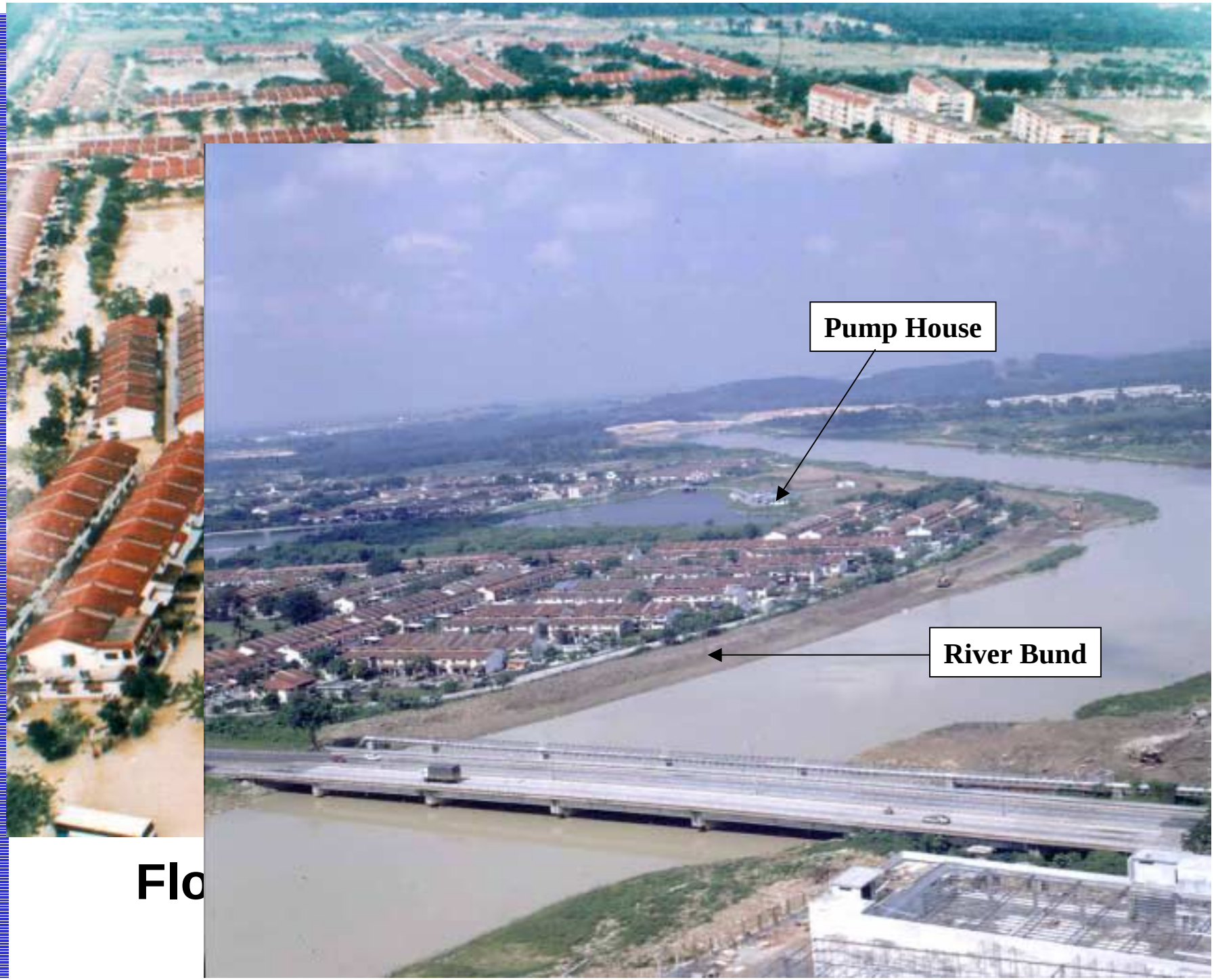
- Uncontrolled development
- Effect of Urbanisation
- Inadequate Drainage Infrastructure
- Obstructions in the river
- Solid Waste and garbage
- Development in Flood Plains

Floods in Malaysia

Jan 2004

Flood Plain

Floods in Malaysia



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Jan 2004

STRATEGIES TO OVERCOME FLOODS

FLOOD CONTROL STRATEGY

Curative Measures

FLOOD CONTROL STRATEGY

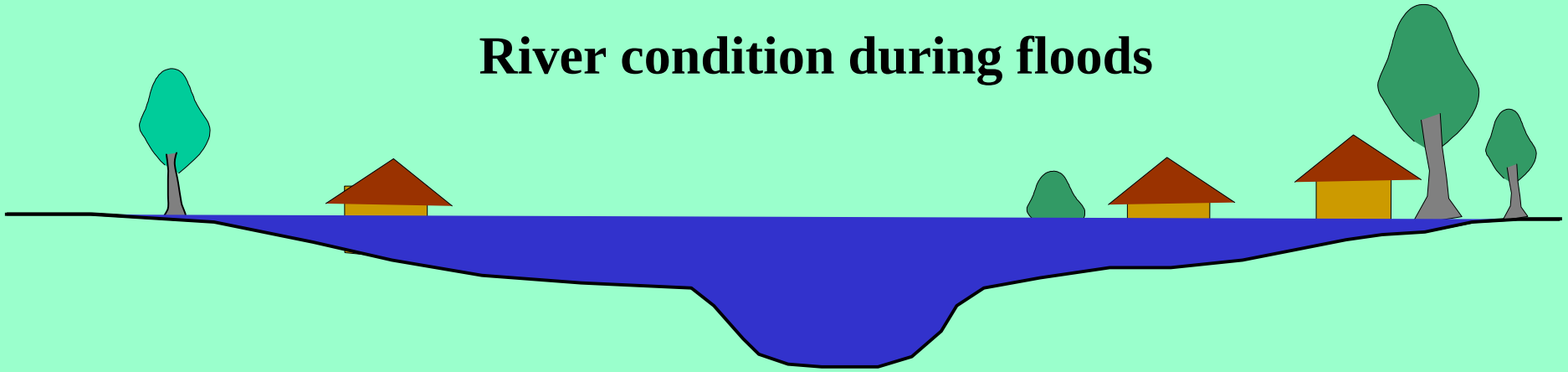
- Curative Measures
- Preventive Measures

FLOOD CONTROL STRATEGIES

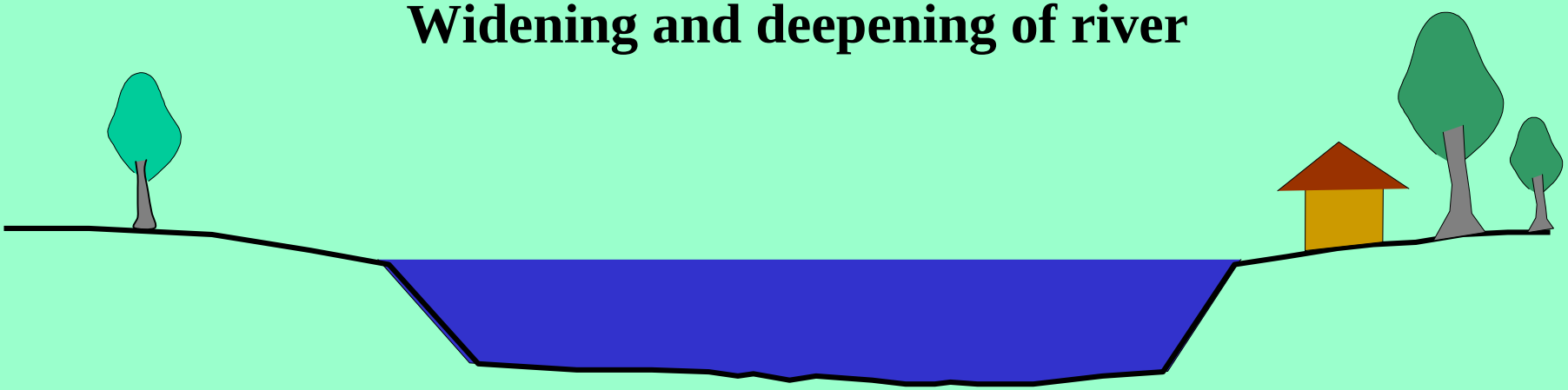
CURATIVE MEASURES

- **Widening and deepening of the river**

River condition during floods



Widening and deepening of river



Floods in Malaysia

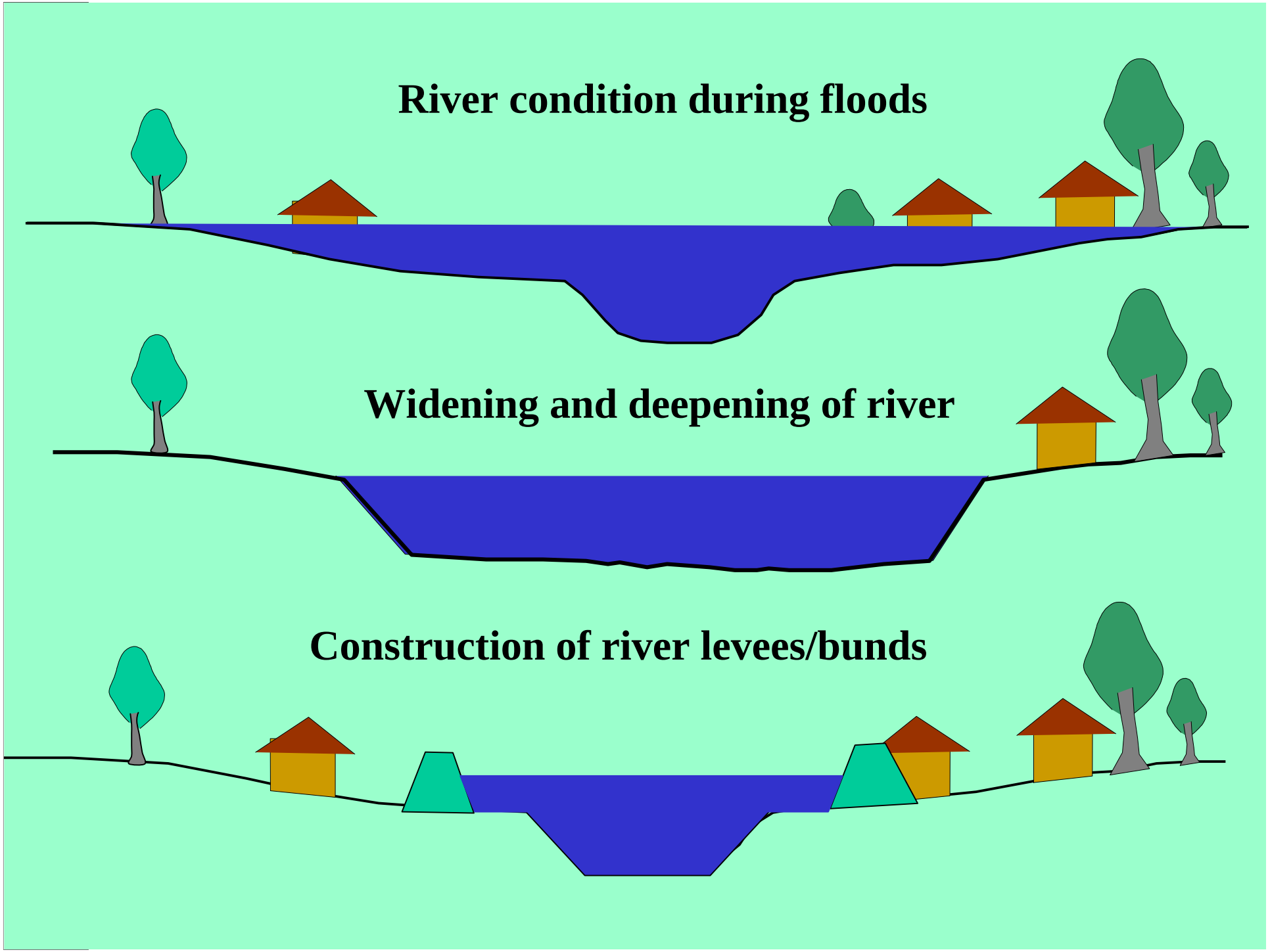
Jan 2004

River Widening and Deepening

FLOOD CONTROL STRATEGIES

CURATIVE MEASURES

- **Deepening and Widening of the River**
- **Construction of Levees and Bunds**


River condition during floods
Widening and deepening of river
Construction of river levees/bunds

Floods in Malaysia

Jan
2004

Floods in Malaysia

Jan 2004

Batu River Improvement Works

Floods in Malaysia

Jan 2004

Klang River Improvement Works in City Centre

FLOOD CONTROL STRATEGIES

CURATIVE MEASURES

- Deepening and Widening of the river
- Construction of levees and bunds
- Construction of Flood Storage dams

Floods in Malaysia

Jan 2004

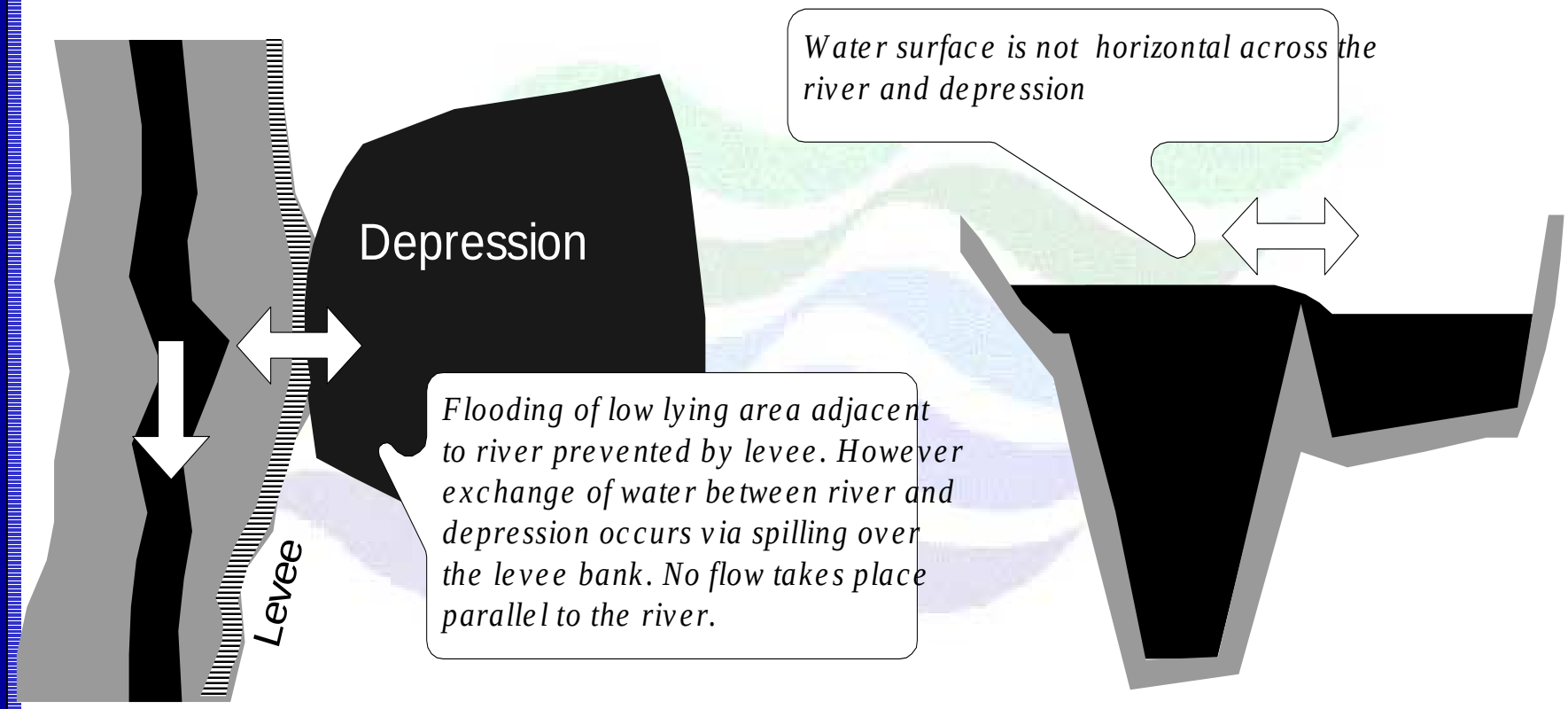
Batu Dam

Klang Gates Dam

FLOOD CONTROL STRATEGIES

CURATIVE MEASURES

- Widening and Deepening of the river
- Construction of Levee and Bund
- Construction of Flood Storage dam
- Flood Attenuation Ponds

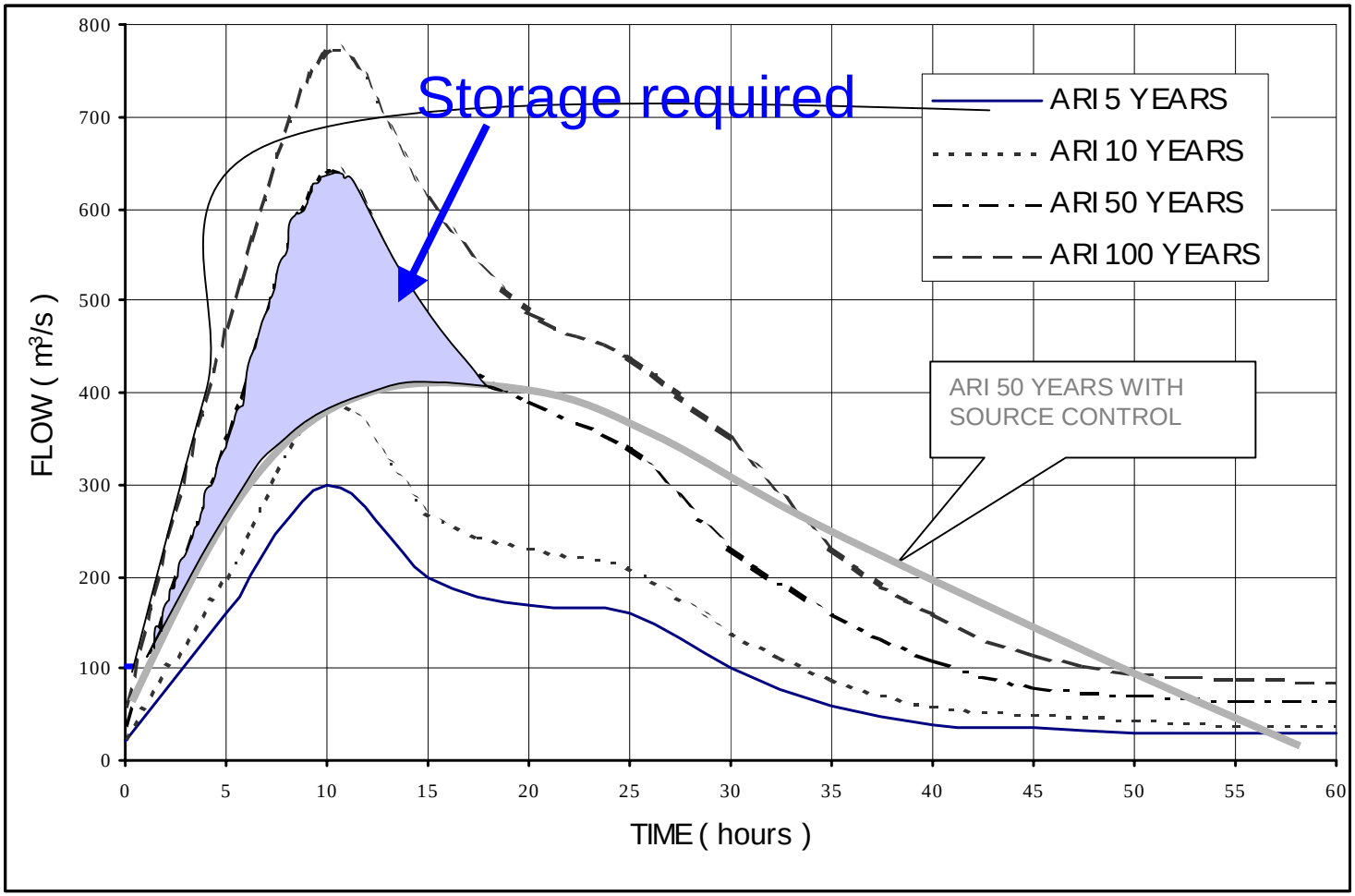

Depression
Levee
Water surface is not horizontal across the river and depression
Flooding of low lying area adjacent to river prevented by levee. However exchange of water between river and depression occurs via spilling over the levee bank. No flow takes place parallel to the river.

Floods in Malaysia

Jan 2004

Batu River Flood Attenuation Pond

Proposal for the Implementation of Stormwater Management Measures to Reduce Flooding in Kuala Lumpur



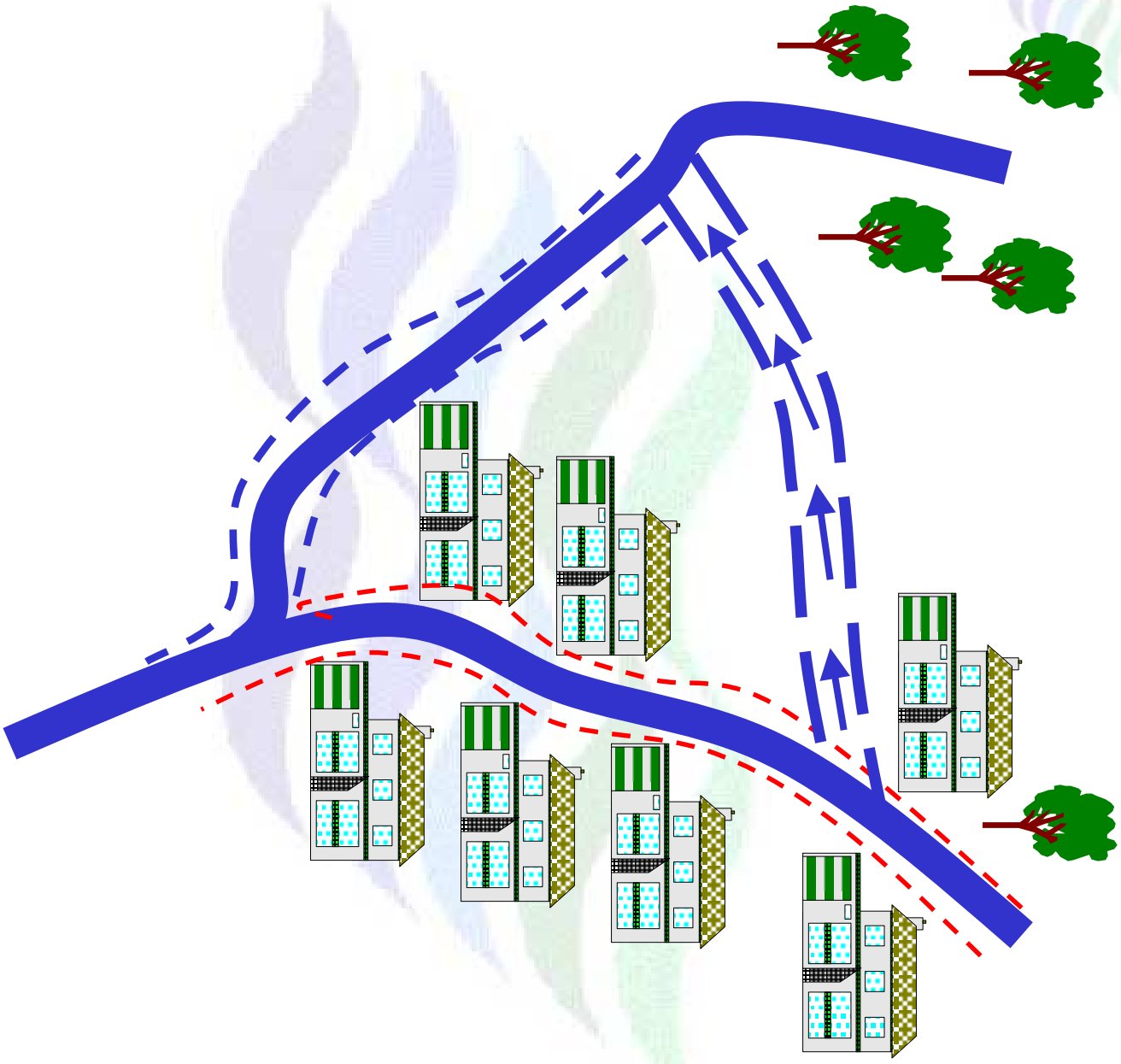
FLOOD CONTROL STRATEGIES

CURATIVE MEASURES

- Widening and Deepening of the river
- Construction of Levees and Bunds
- Construction of Flood Storage dams
- Construction of Flood Attenuation ponds
- Construction of by-pass and flood-way

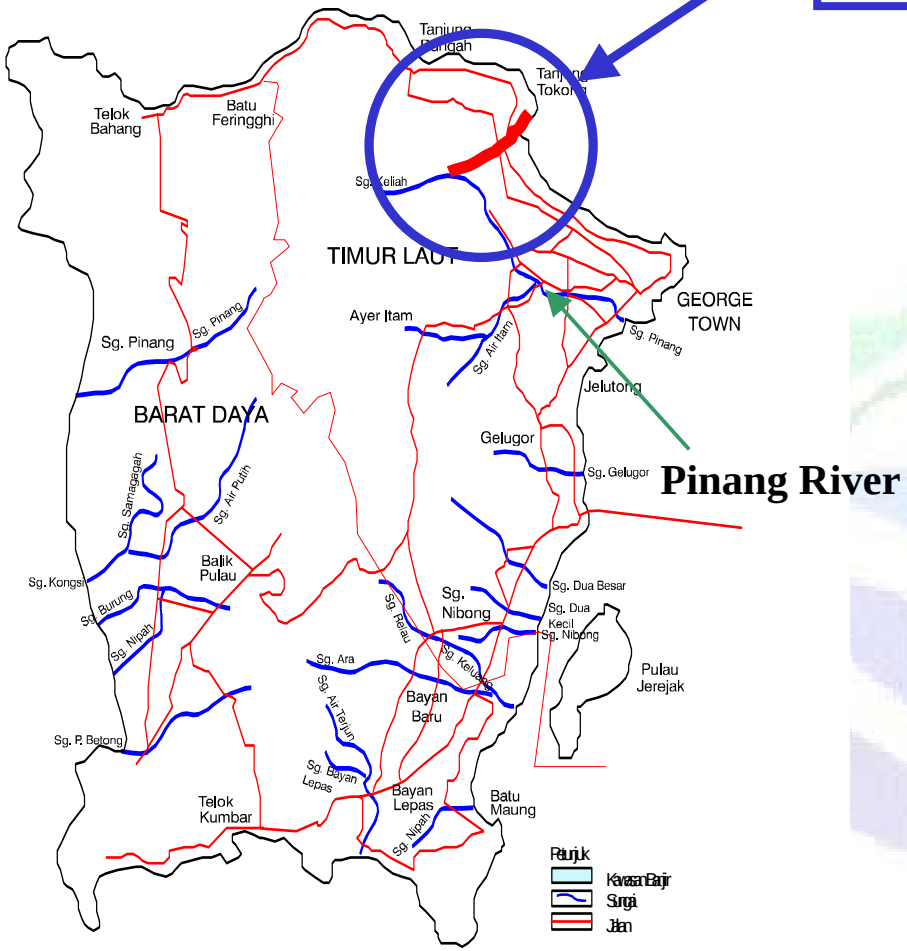
Jan 2004

Floods in Malaysia



Sg Air Terjun Flood Bypass

Projek RTB Pulau Pinang



Pinang River

Floods in Malaysia

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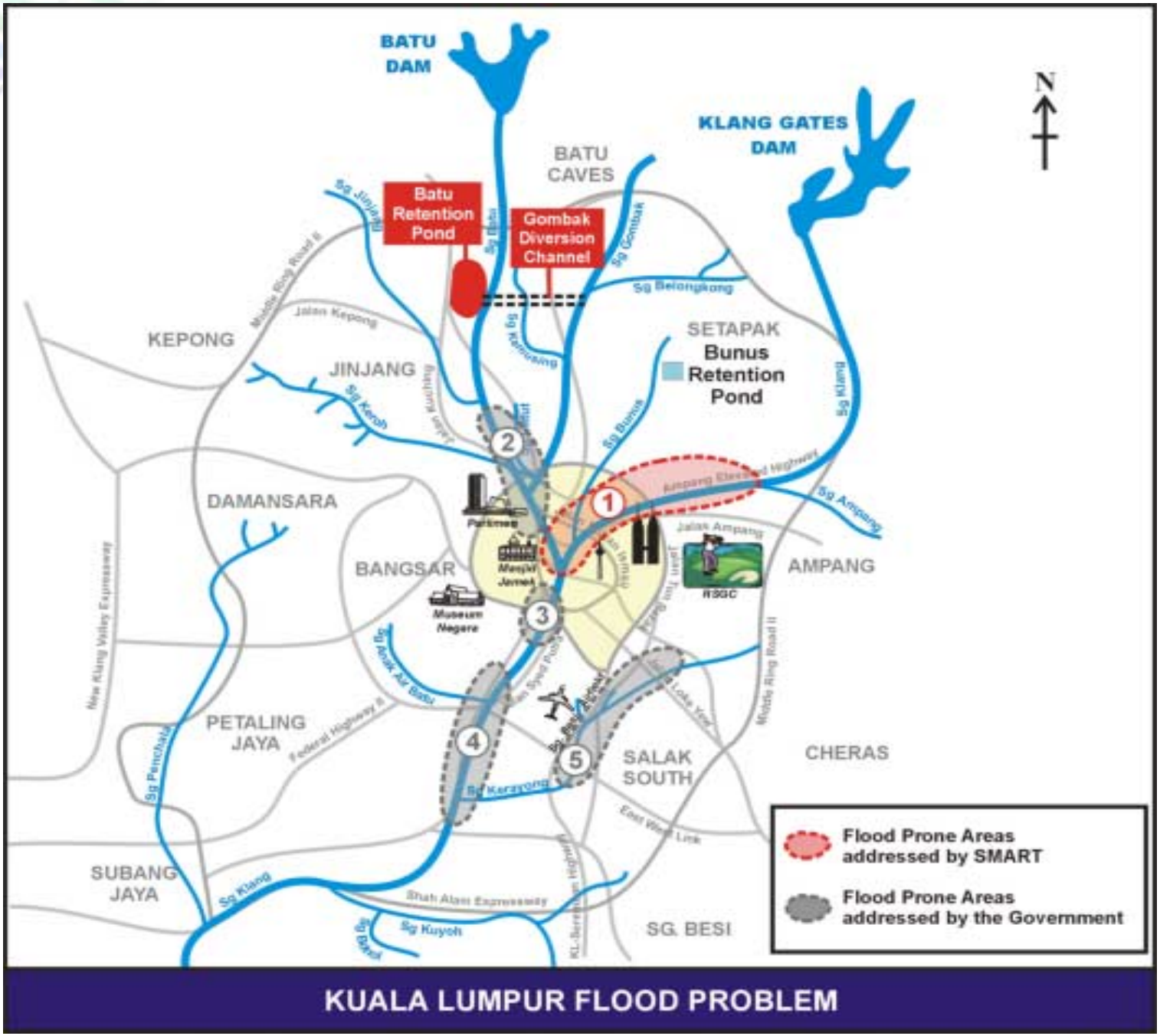
Sg. Air Terjun Flood Bypass Tunnel

Floods in Malaysia

Jan
2004

Floods in Malaysia



Jan 2004

Floods in Malaysia

Jan 2004

Befrienders > Track suicide bids

Star
The people's paper

13 June 2003

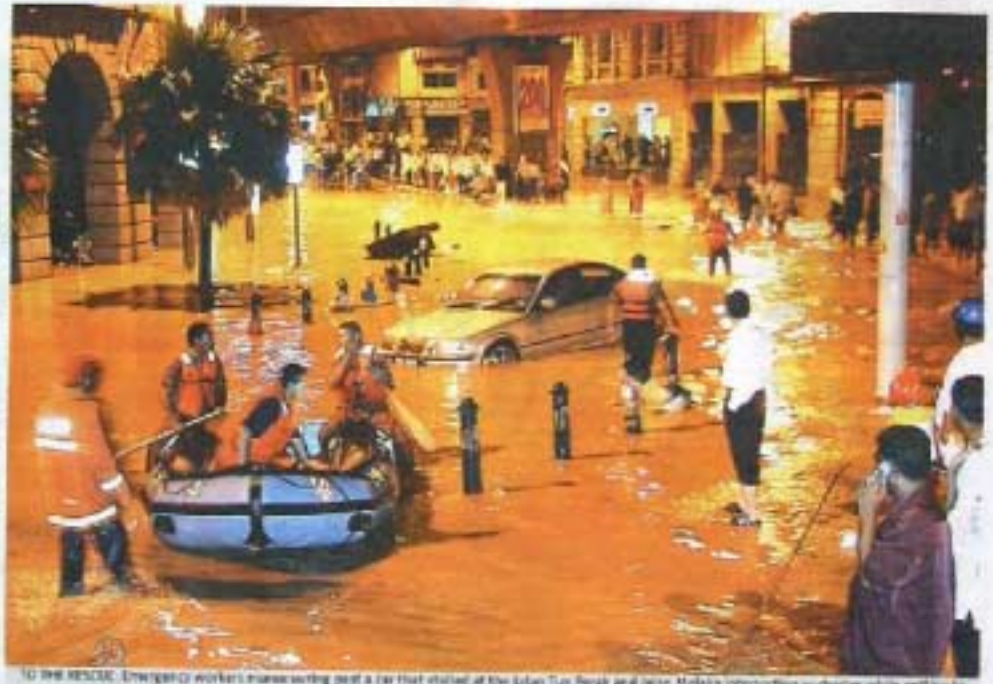
Abdul Kudus sacked with immediate effect

VCD ops to go on until Aug 31

StarBiz > Maruichi to list unit, sell Sumiputeh stake

KL hit by floods

Three-hour downpour causes havoc in city



TO THE RESCUE: Emergency workers manoeuvring past a car that stalled at the Jalan Tun Perak and Jalan Melaka intersection yesterday while getting to those stranded following a three-hour downpour.

Floods in Malaysia

Jan 2004

FLOODS HIT KL

CITY OF WATER ... flood victims getting a boat ride to safety through the heart of Kuala Lumpur (left) and motorists pushing a car at a parking lot near KL Tower yesterday. Major roads in the city were inundated after three hours of heavy rain. — APpix

By ANGELA RAO and SIMON KHOO

KUALA LUMPUR: The city was thrown into chaos after the Klang

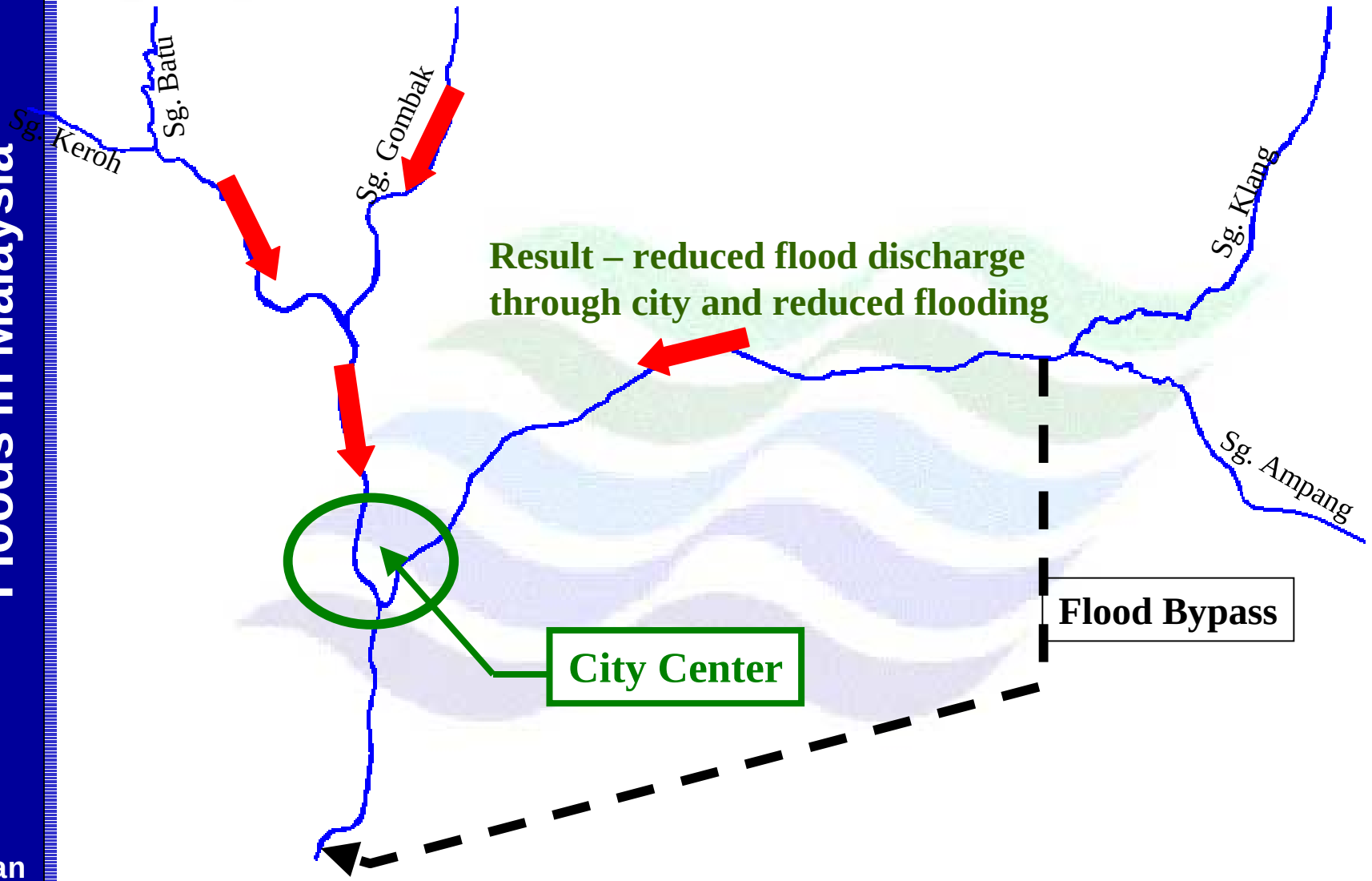
Jalan Sultan Ismail (near Sheraton Imperial Hotel), Jalan Yap Kwan Seng, Jalan Tun Razak (near the LRT station), Jalan Gurney and

Roads were cut off by the waters from the drains clogged with silt and garbage from upstream. Some workers were shocked when they

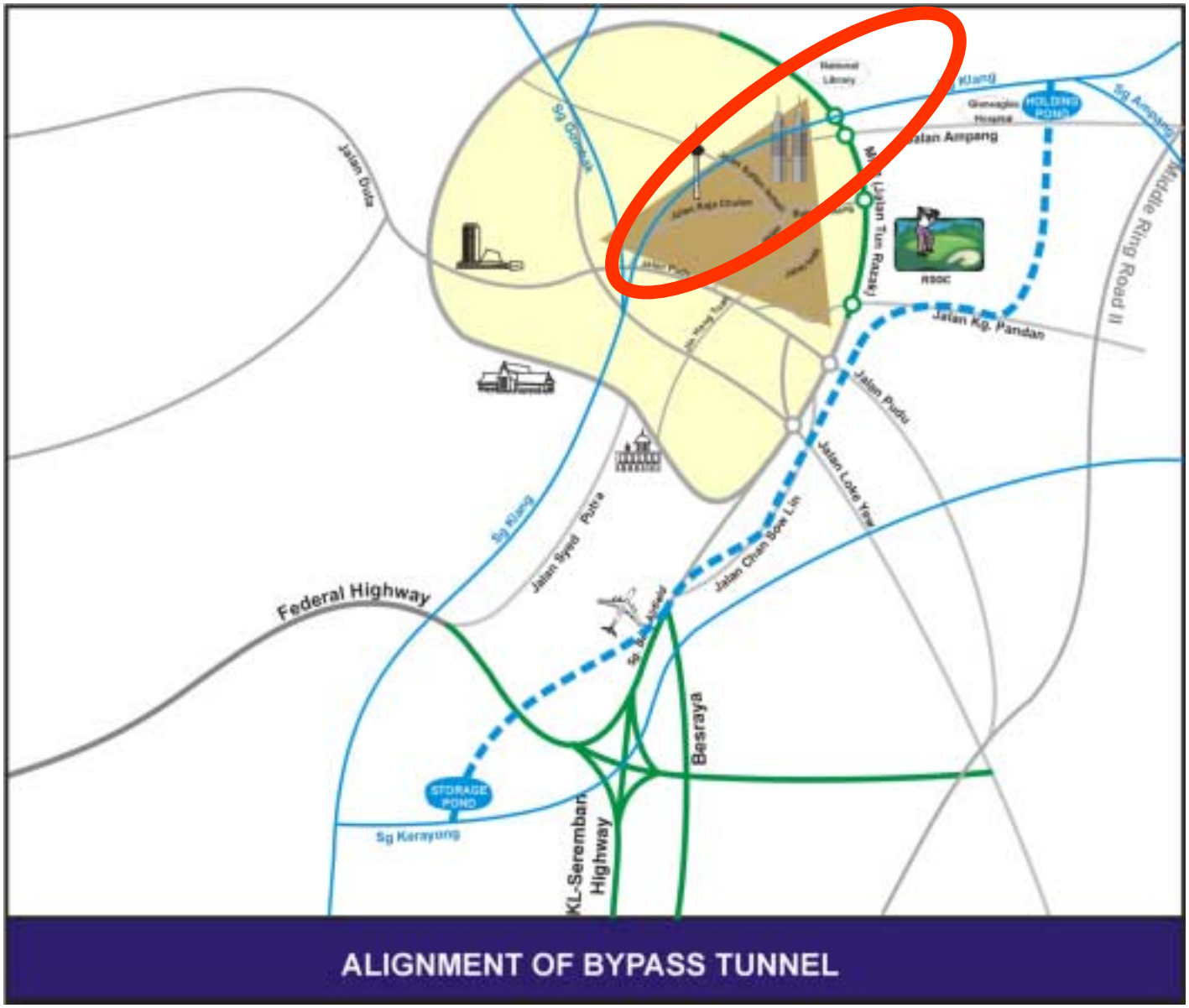
flooded with knee-deep waters, forcing the residents to prepare for evacuation if the situation worsened.

The damage is expected to be massive as private car parks were flooded including Wisma AIA, Wisma Multipurpose and open air

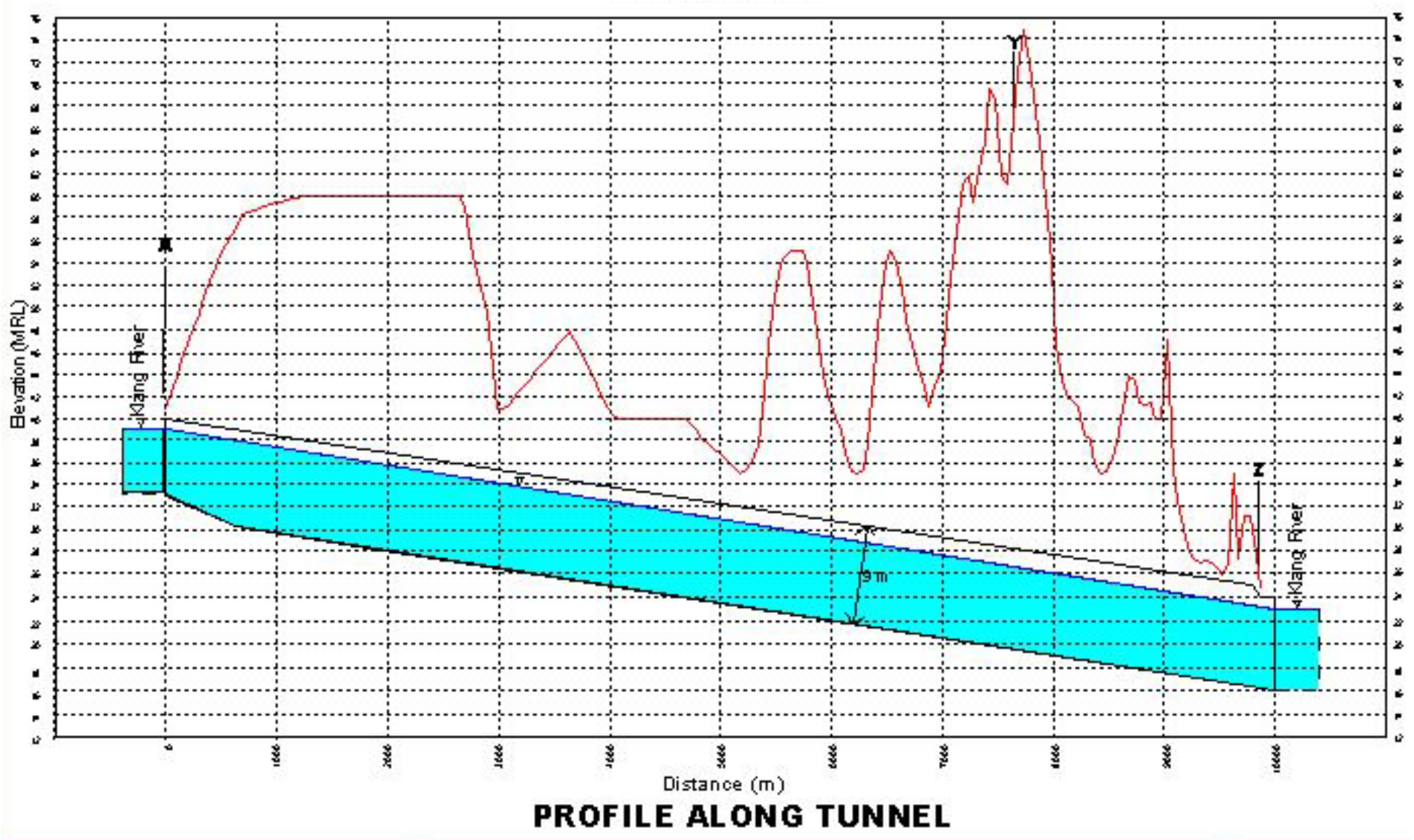
PROPOSED "FLOOD BYPASS"



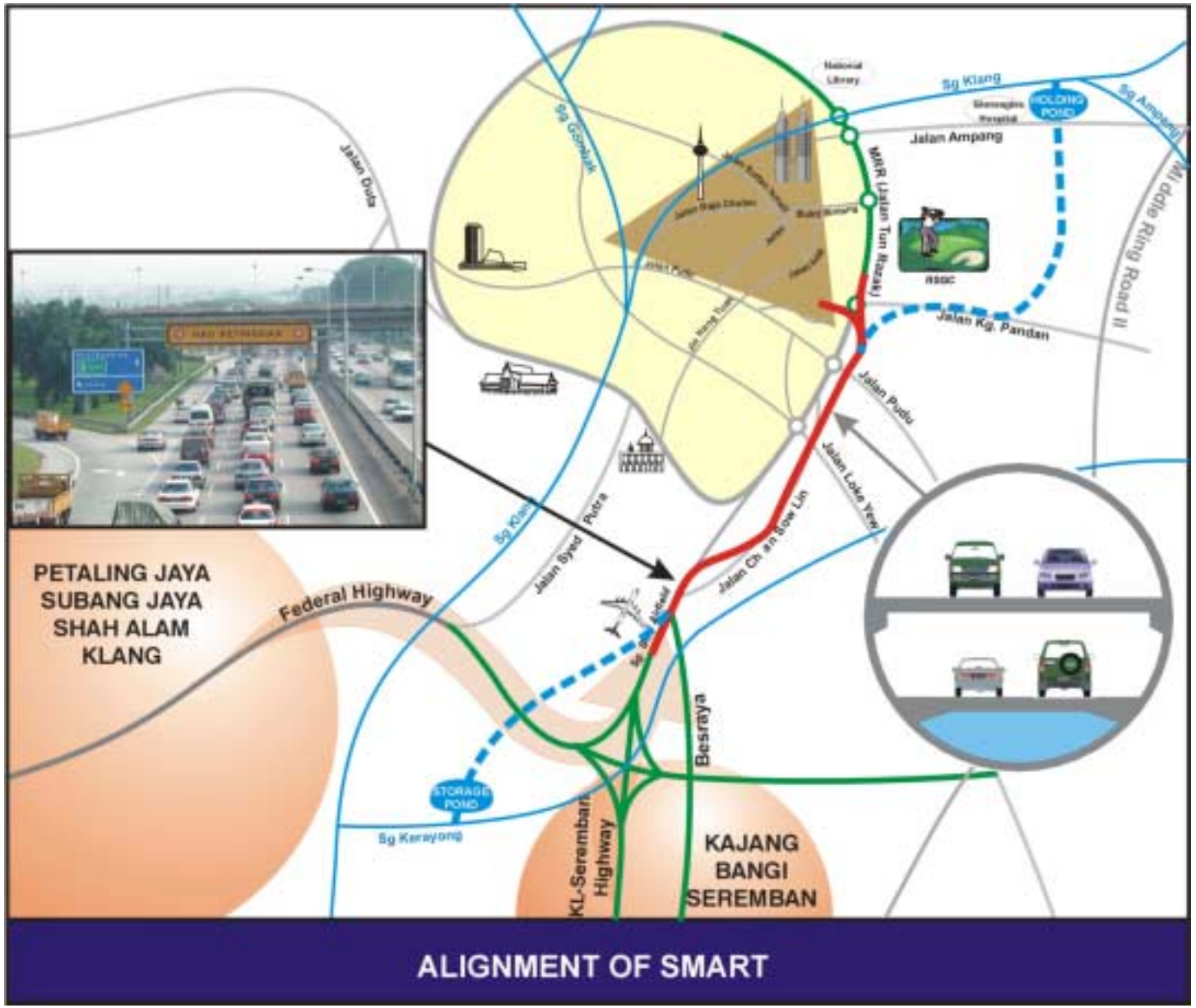
Flood Bypass untuk mengatasi Masalah Banjir



Flood Bypass Profile



Dual Function Flood Bypass Tunnel



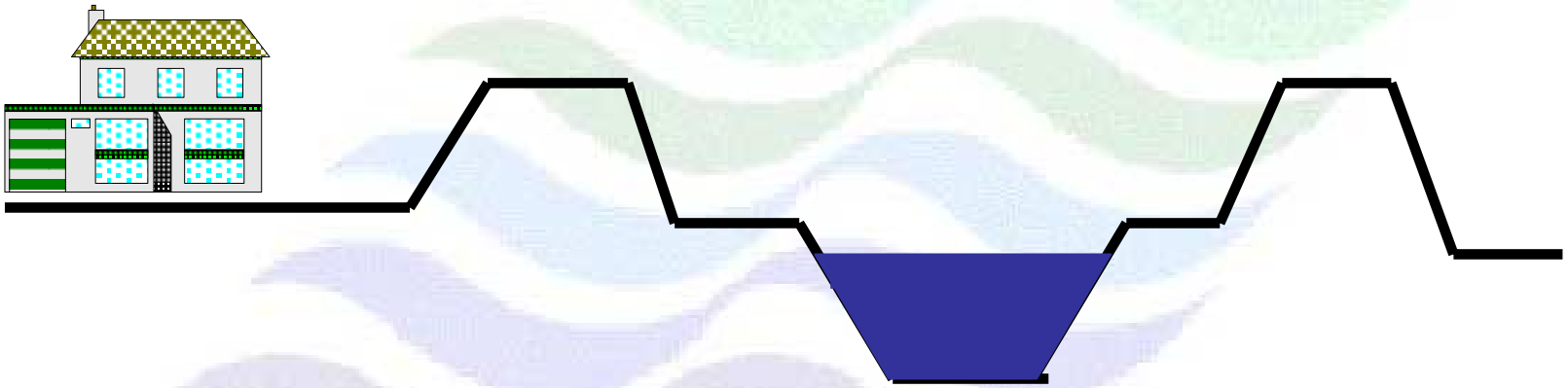
FLOOD CONTROL STRATEGIES

CURATIVE MEASURES

- Widening and Deepening of the River
- Construction of Levees and Bunds
- Construction of Flood Storage Dams
- Flood Attenuation Ponds
- Construction of By-pass and Flood-Way
- Poldering and Pumping

Floods in Malaysia

Jan 2004



Floods in Malaysia

Jan
2004

Floods in Malaysia

Jan
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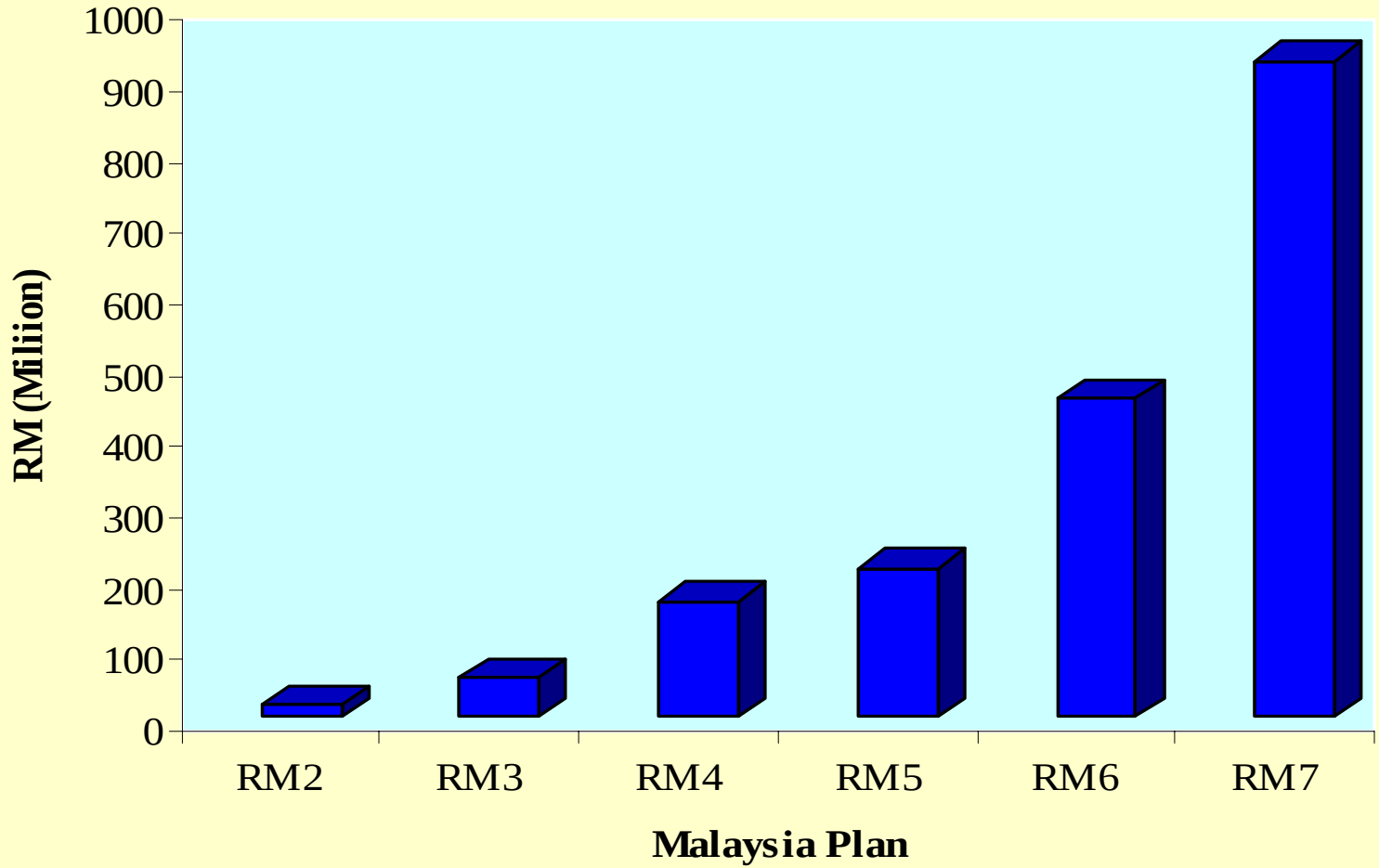
FLOOD CONTROL STRATEGIES

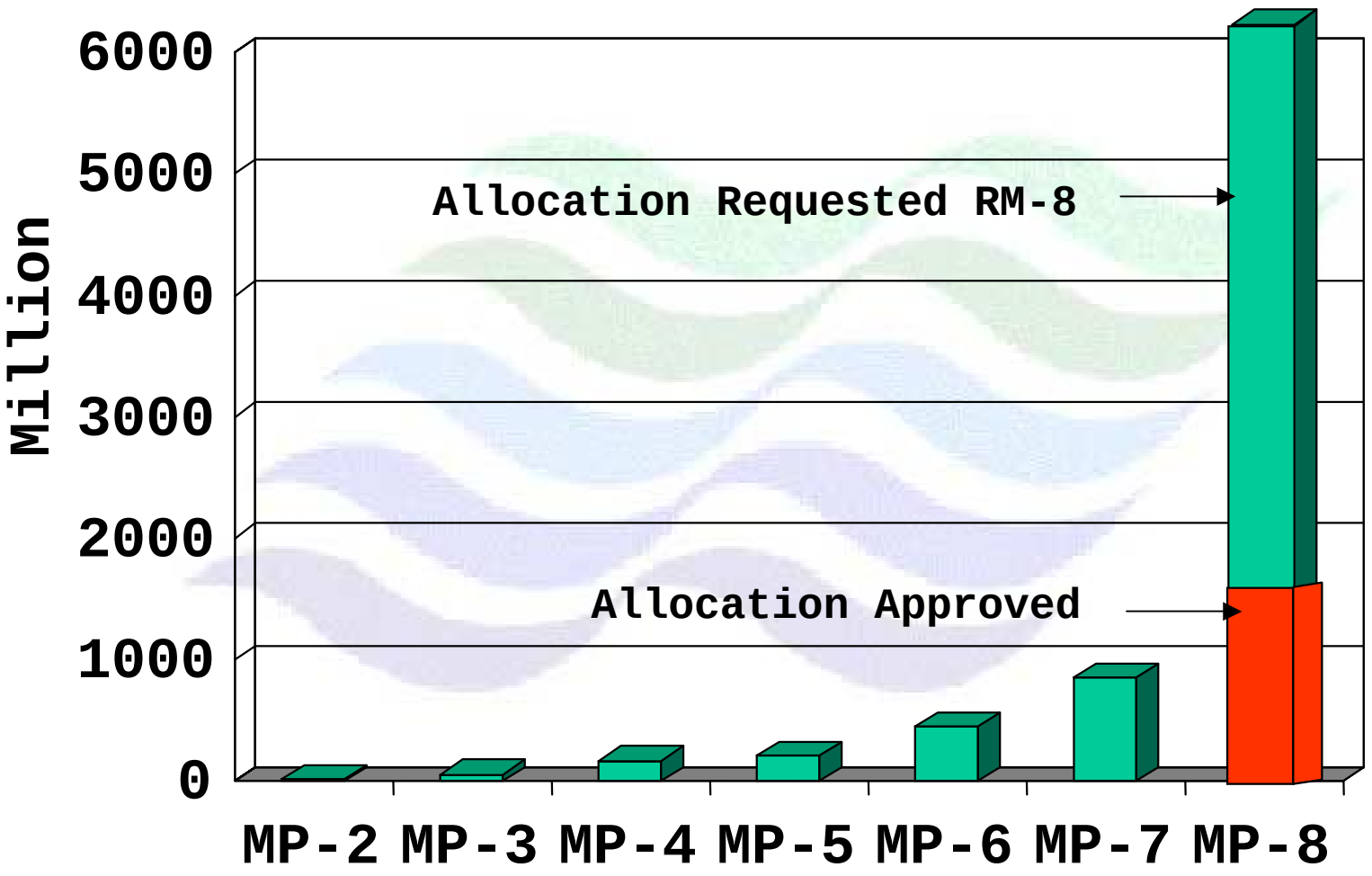
CURATIVE MEASURES

- Program Implementation

Expenditure for Flood Mitigation Projects



Allocation For Flood Mitigation Projects



FLOOD CONTROL STRATEGY

- Curative Measures
- Preventive Measures

FLOOD CONTROL STRATEGIES

PREVENTIVE MEASURES

- Funds for curative measures becoming more limited
- More comprehensive and sustainable approach
- Address flood problem at source
- Aimed at better planning/coordination/ institutional and legislative control
- Community and stakeholder involvement crucial

FLOOD CONTROL STRATEGIES

PREVENTIVE MEASURES

Current focus on :

- **Control at Source (Urban Stormwater Management Manual)**
- **Integrated River Basin Management (IRBM)**

Floods in Malaysia

URBAN STORMWATER MANAGEMENT MANUAL (SWMM)

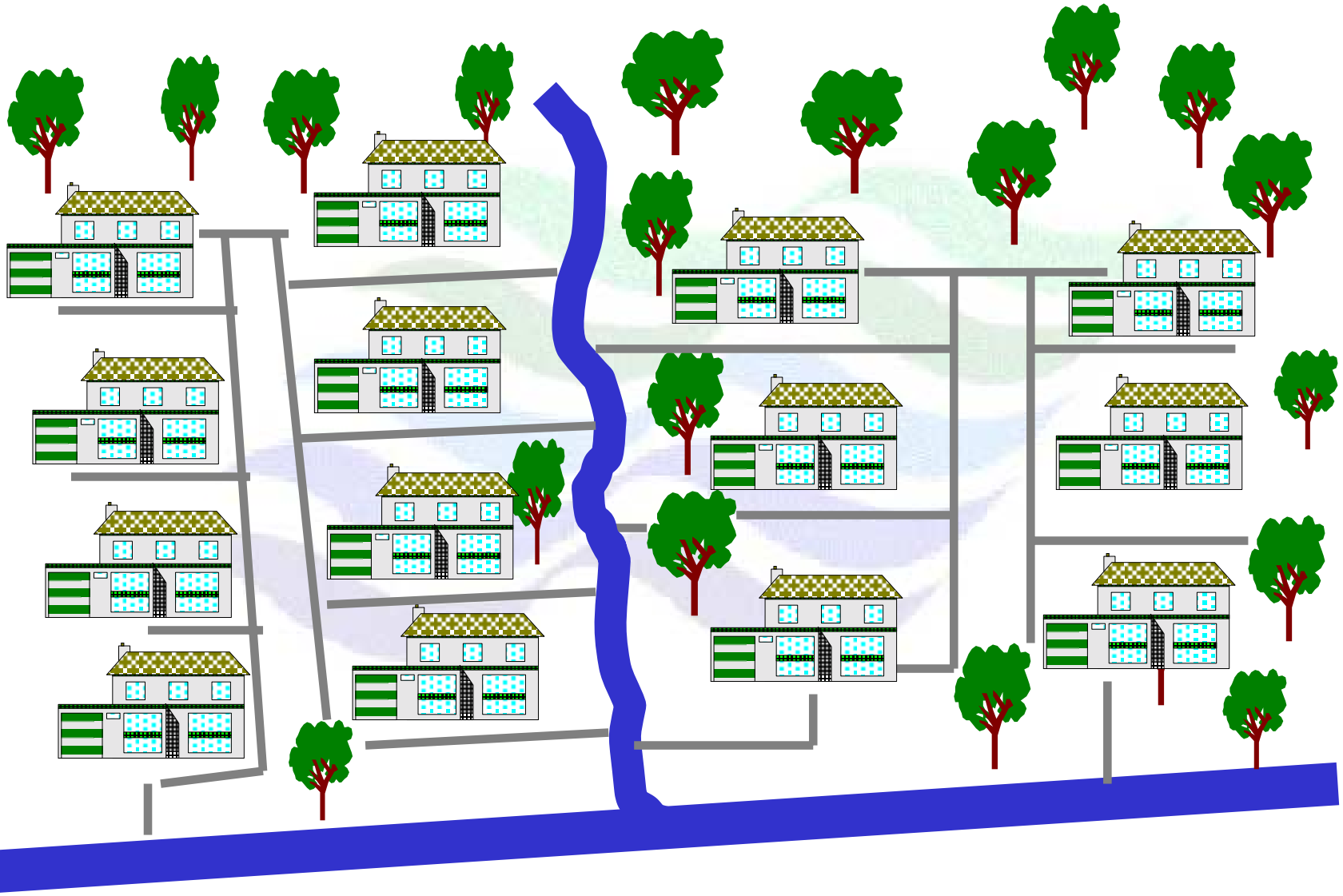
Jan 2004

OLD METHOD

- ***Rapid Disposal of stormwater***

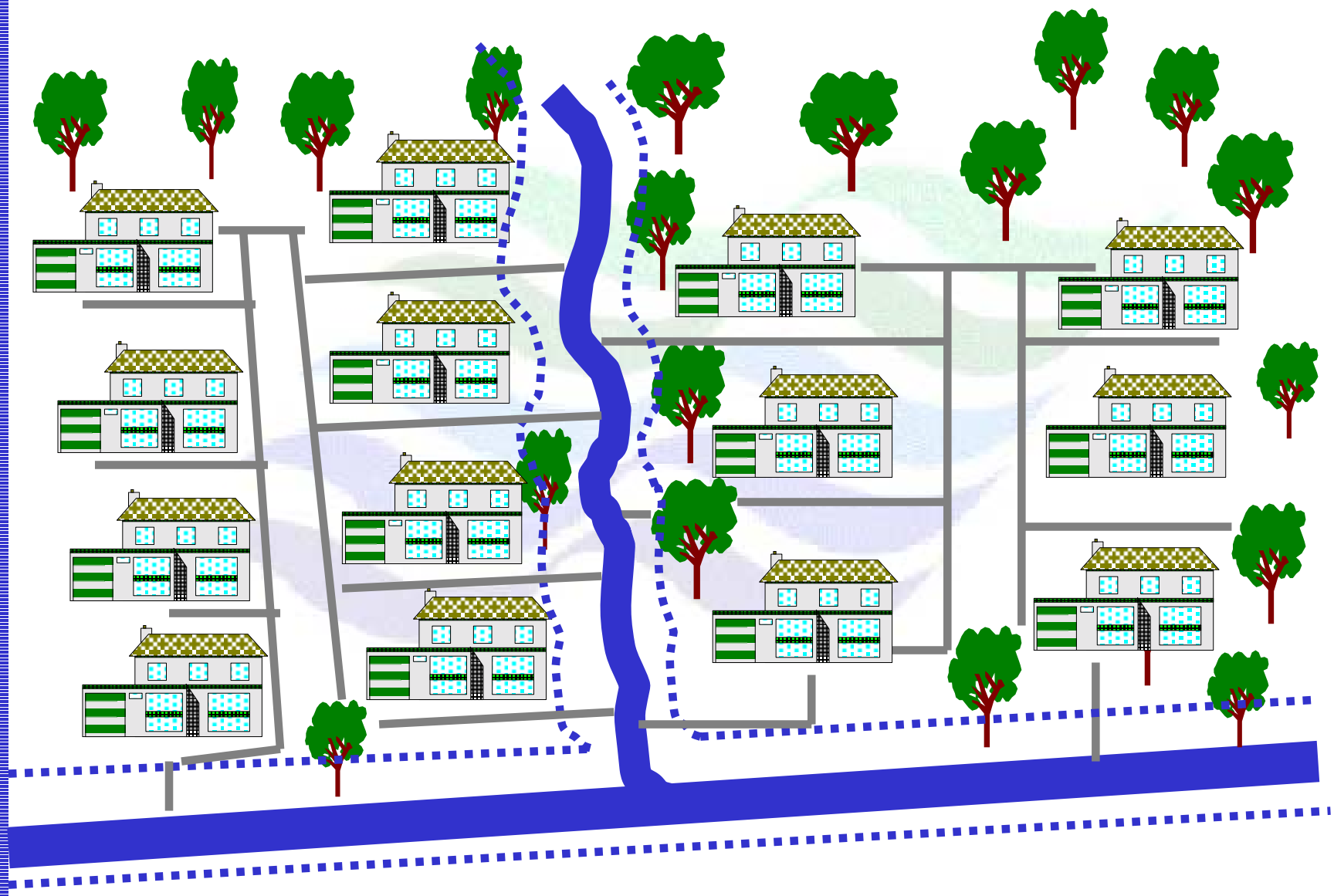
Floods in Malaysia

Jan 2004



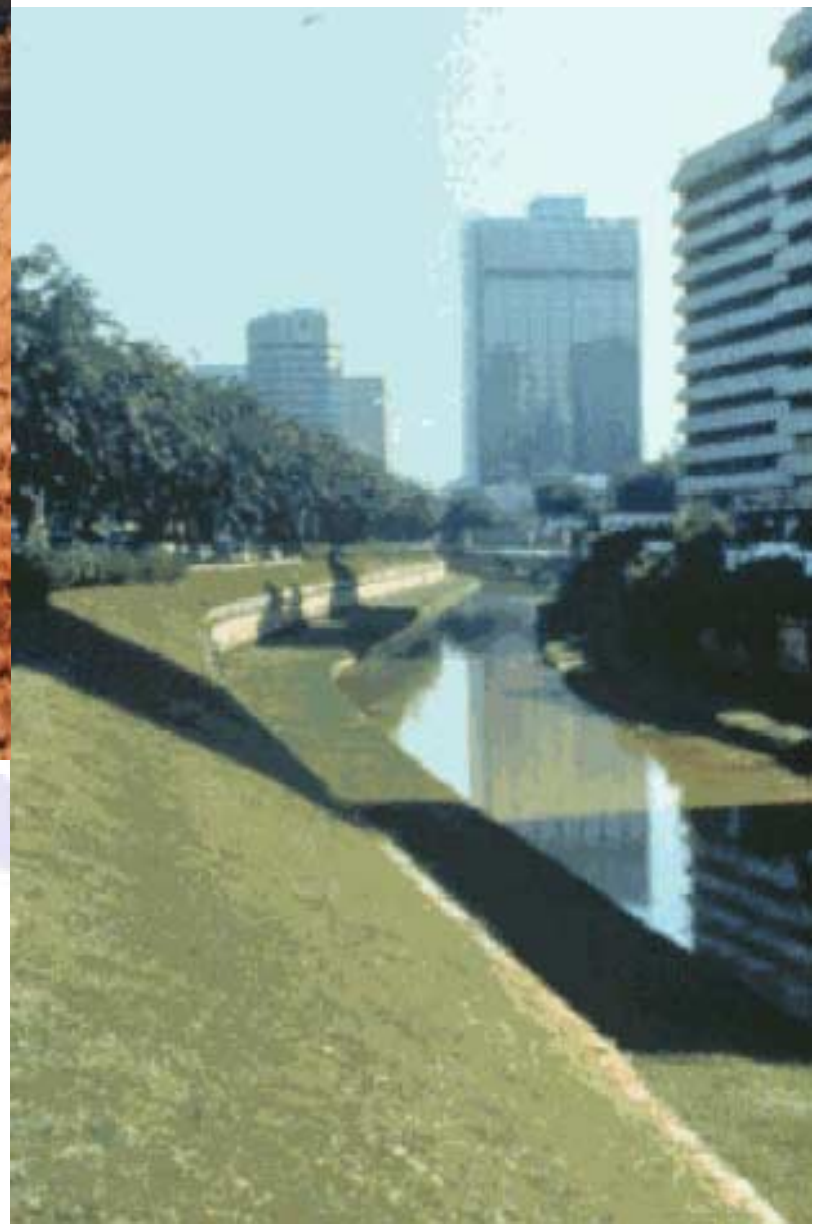
Floods in Malaysia

Jan
2004



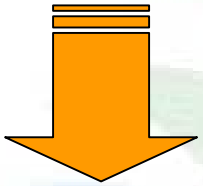
Floods in Malaysia

Jan 2004



NEW METHOD

- ***Rapid disposal***



- ***Control at Source, attenuated flow***

SWMM

Reduce run-off through

- Storage
- Increasing Infiltration
- Decreasing Velocities

SWMM

- **Storage**

SWMM

- **Storage**
  - **Detention Pond**

SWMM

- **Storage**
  - **Detention Pond**
  - **Rainfall harvesting**

SWMM

- **Storage**
  - **Detention Pond**
  - **Rainfall Harvesting**
  - **Modular tanks underground**

SWMM

- **Storage**
- **Increase Infiltration**

SWMM

- **Increase Infiltration**
  - **Infiltration/gravel Drains**

SWMM

- **Increase Infiltration**
  - **Infiltration/gravel Drains**
  - **Previous pavement**

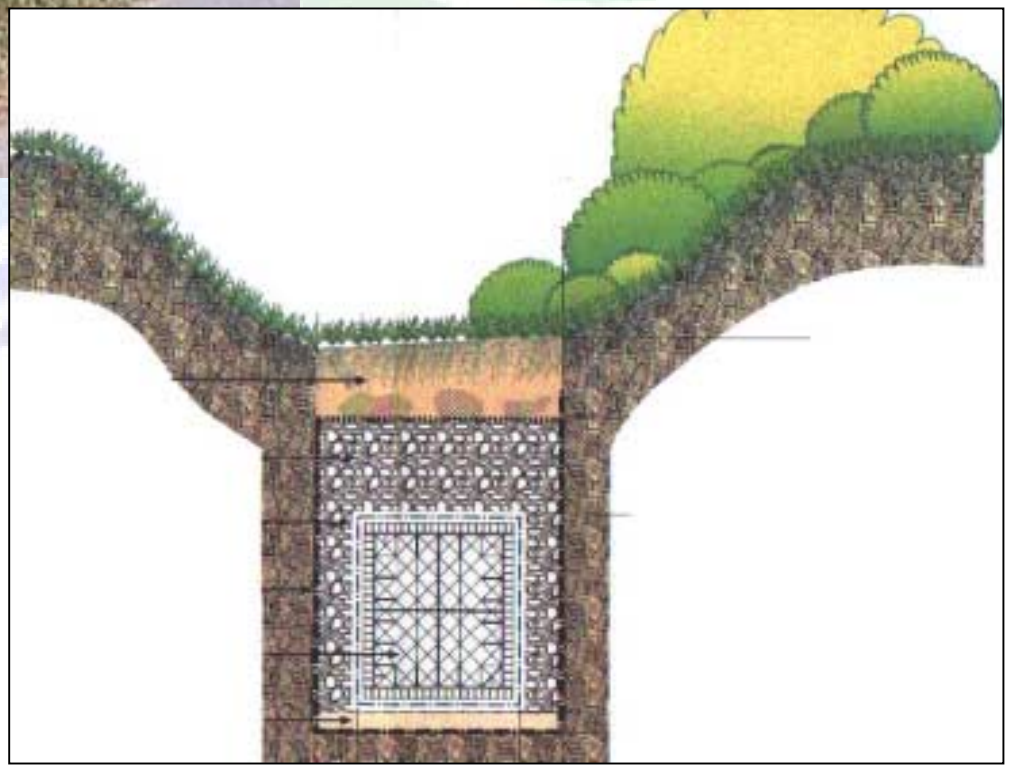
SWMM

- Storage
- Increase the Infiltration rate
- Reduce the Flow Velocity

MASMA

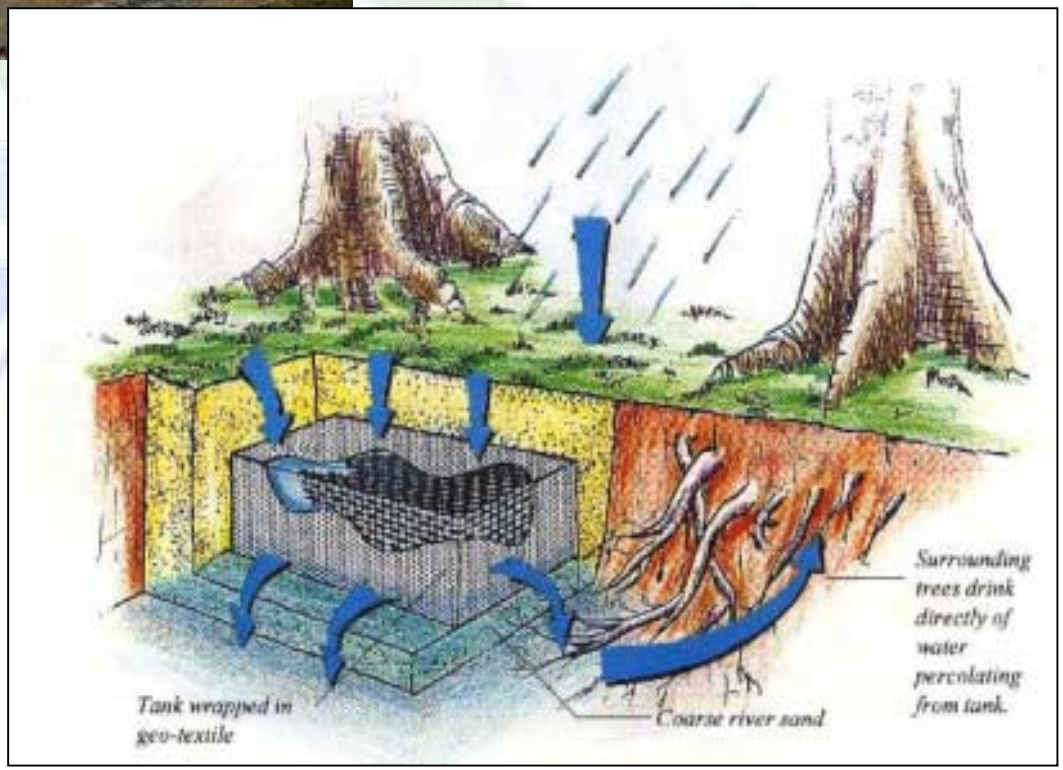
- **Storage**
- **Increase the Infiltration rate**
- **Reduce the Flow Velocity**
  - **(swale)**

Swale

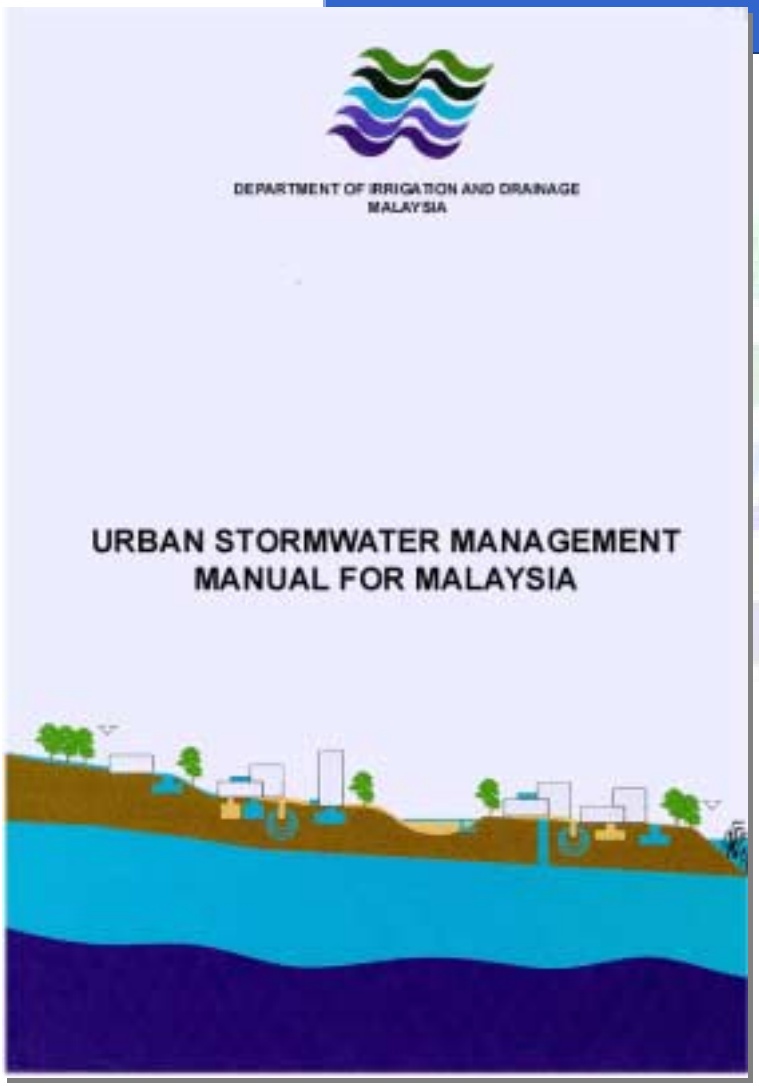


Floods in Malaysia

Jan 2004



URBAN STORMWATER MANAGEMENT MANUAL



- Explains Control at Source Method
- Provides Guidelines
- Gives Examples of World-wide Best Practices

FLOOD CONTROL STRATEGIES

PREVENTIVE MEASURES

Current focus on :

- **Urban stormwater management manual (SWMM)**
- **Integrated River Basin Management (IRBM)**

INTEGRATED RIVER BASIN MANAGEMENT (IRBM)

Integrated River Basin Management (IRBM)

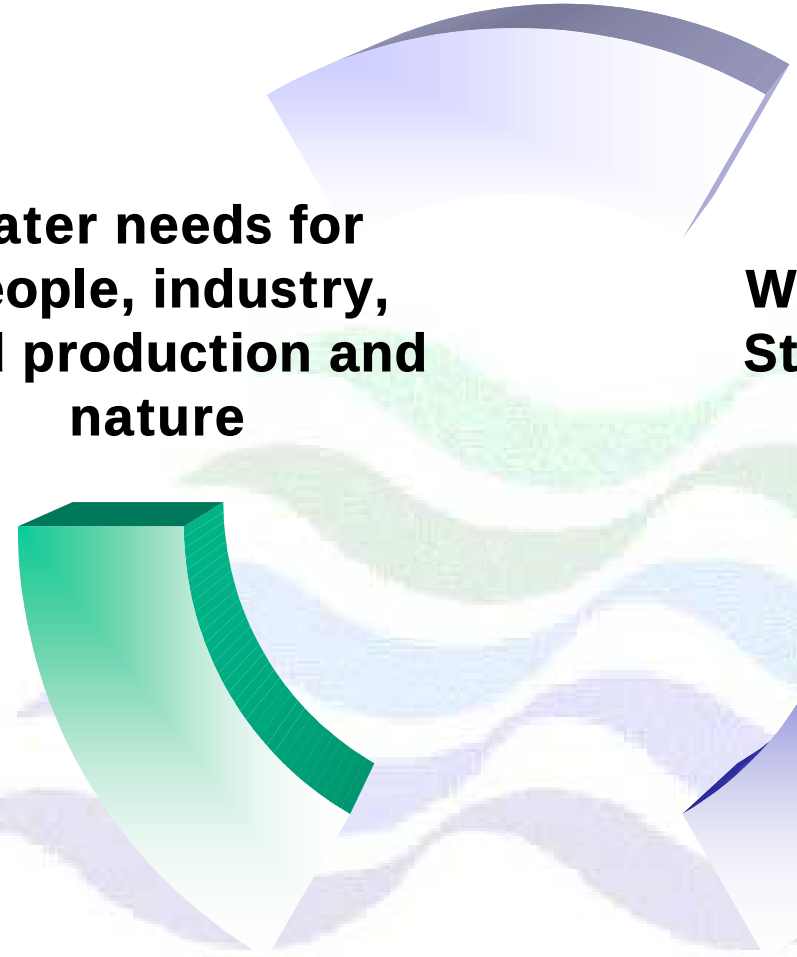
Coordinated management of the resources existing in natural environment,

comprising air, water, land, flora and fauna,

based on river basin as a geographic unit,

with the objective of balancing the needs of man to utilize the resources for the improvement of his living conditions

with the necessity of conserving the resources to ensure their sustainable use



Managing the River Basin in a Holistic and Integrated manner

Floods in Malaysia

Jan 2004

Time to manage our rivers better

A fresh approach is needed to arrest the damaging effects of development in river basins, but can it be done? asks IDROS ISMAIL.

> *The longer remedial and preventive measures are delayed, the greater the environmental deterioration, the more costly the repercussions.*

Integrated River Basin Management (IRBM)

- Government Policy in OPP3 (2001 - 2010) and 8th Malaysia Plan (2001 – 2005)
- Need for appropriate management model
- Need for good information system (RBIS)
- Need for stakeholder participation
- Implemented through River Basin Master Plans
- Managed through River Basin Authorities/ Institution

NEW STRAITS TIMES

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 use at 150 river basins in the country, its director-general Datuk Keizrul Abdullah said.

The master plan would become a basis for all local authorities to use as it was impossible for the department's enforcement officers to monitor the almost 12,000 rivers in the country.

He said a master plan was necessary as "every inch" of the country was part of a river basin and all activities have an impact on rivers.

Keizrul was speaking after witnessing Agriculture and Food Industry Assistant Minister Datuk Mannan Jakasa close the two-day Sungai Kinabatangan Expedition in Sukau on Saturday.

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 "Love Our River" campaign.

Keizrul said integrated plans would be made for major rivers like Sungai Klang and Sungai Langat in Selangor first, while in Sabah, the plan would be for Sungai Kinabatangan which, at 560km, is the longest river in the State.

He said the department aimed to rehabilitate rivers back to Class Three and then down to Class Two.

(Class One refers to pristine rivers; Class Two for rivers which can be used as a drinking source with treatment; Class Three allows for contact sports; Class Four refers to rivers which do not allow body contact; while Class Five is for rivers with poor water quality.)

"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," Keizrul said.

"Rivers are also a source of protein in terms of fish, and provides recreation, economic income, ecotourism and transportation," he added.

Mannan, who represented Deputy Chief Minister Datuk Lajim Ukin, said the Government was committed in its efforts to keep rivers clean.

"In 1998, the State Government passed the Water Resources Enactment to ensure sustainable management of water and to maximise the benefits of rivers.

"We want to make it possible for future generations to continue using rivers as a source of income and for transportation," he said.

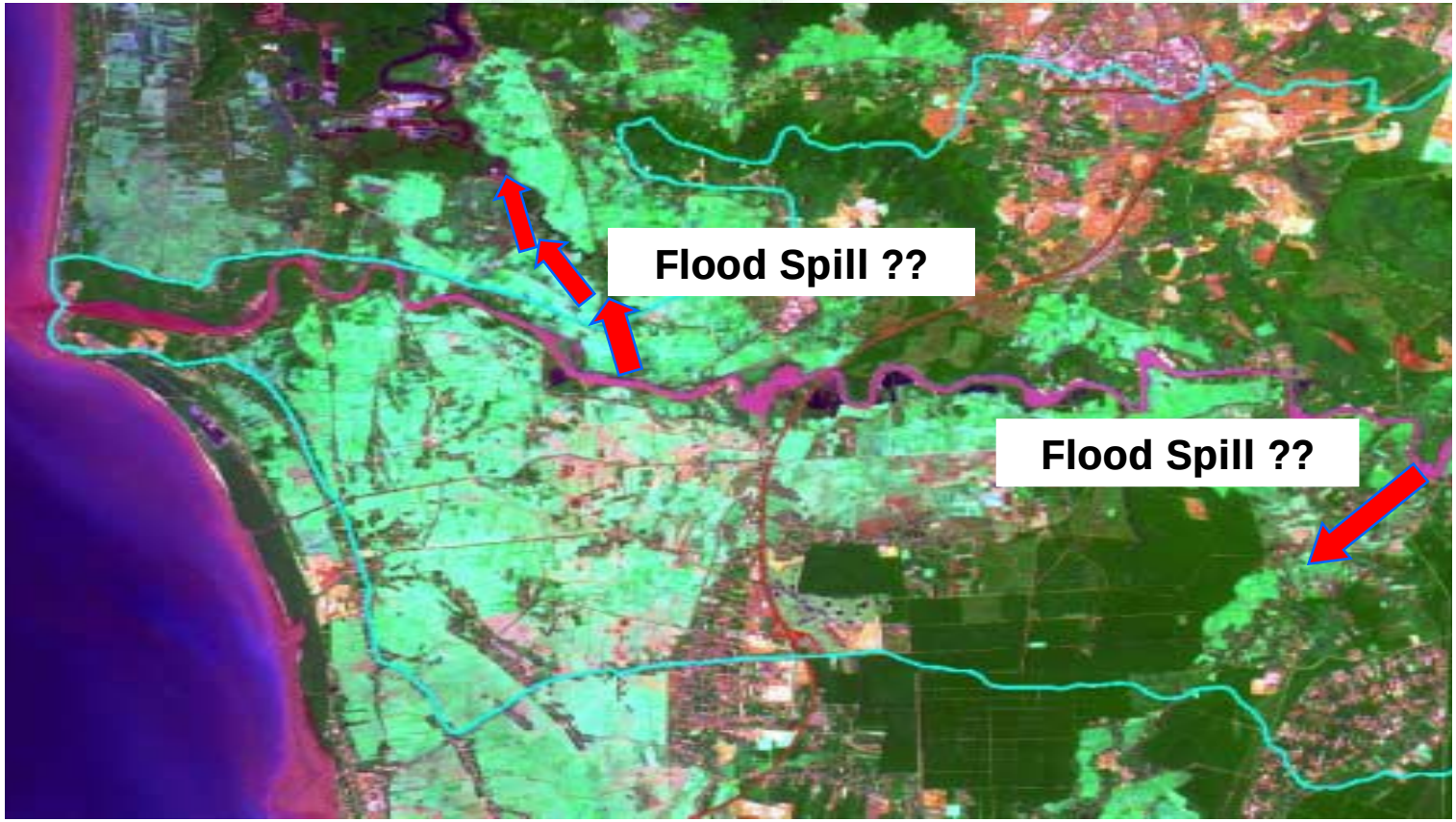
ISSUES

Risk Management

- **What is appropriate level of protection?**
  - **in**
  - **ies**

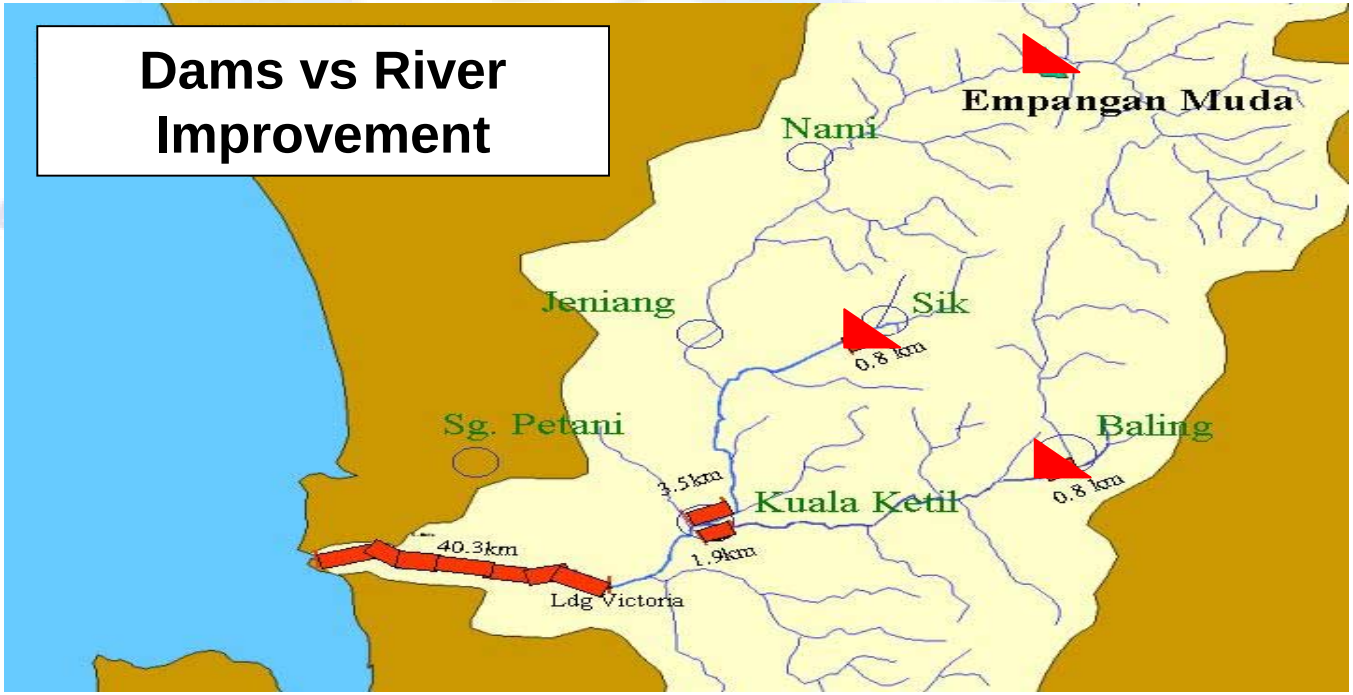
Risk Management

- **What is appropriate level of protection?**
- **Sharing the risk → deliberate failure section**



Risk Management

- **What is appropriate level of protection?**
- **Sharing the risk → deliberate failure section**
- **Sharing the burden → upstream vs downstream**



Risk Management

- What is appropriate level of protection?
- Sharing the risk → deliberate failure section
- Sharing the burden → upstream vs downstream
- Flood Insurance - Industry not well developed, floods considered as “Act of God”

Floods in Malaysia

Jan 2004

Cars covered by mud and silt at a basement car park in Kuala Lumpur following Tuesday's fl

Cars pulled out clean-up contin

by theSun team

and garbage washed onto the that they had lost v

Standard car policy excludes flood cover

KUALA LUMPUR, Thurs. — The standard private car policy does not include coverage for loss or damage as a result of floods, said General Insurance Association of Malaysia executive director Lim Chia Fook.

"However, car owners have the option to extend their policy to cover loss or damage due to floods," he said today.

Approval is subject to certain criteria.

"The underwriter will weigh the risks involved like whether the car owner resides or works in a flood-prone area. If yes, the risks in insuring the vehicle are higher."

Motorists are advised to contact their insurers for further details.

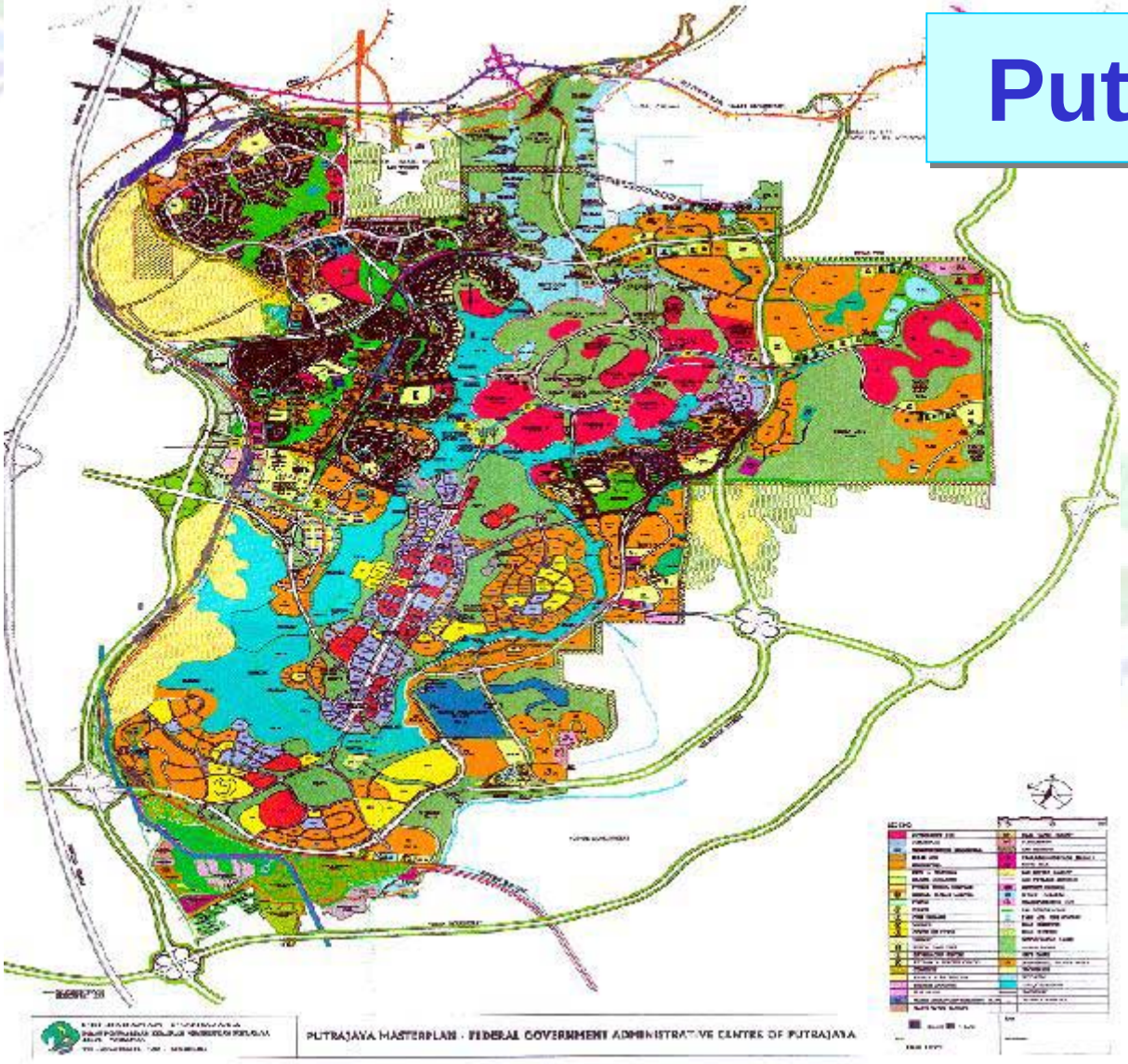
Risk Management

- What is appropriate level of protection?
- Sharing the risk → deliberate failure section
- Sharing the burden → upstream vs downstream
- Flood Insurance - floods act of God
- Flood Risk mapping - advised against publishing

Other Issues

- More environment friendly options - use of wetlands

Putrajaya



Use of Lake as Detention Basin and Wetlands for Water Quality Improvement

Other Issues

- **More environment friendly options - use of wetlands**
- **Need for better Governance, Transparency, Stakeholders' participation**

Other Issues

- More environment friendly options - use of wetlands
- Need for better Governance, Transparency, Stakeholders' participation
- Financing issues - "Private Funding Initiatives", BOT, Cost sharing, Cost recovery

Other Issues

- More environment friendly options - use of wetlands
- Need for better Governance, Transparency, Stakeholders' participation
- Financing issues - "Private Funding Initiatives", BOT, Cost sharing, Cost recovery
- Social issues - Resettlement, Compensation

CONCLUSION

CONCLUSION

- Malaysia rich in water resources
- Most significant natural hazard is water related → floods
- Rapid development and widespread urbanisation main cause of urban flooding
- Both curative and preventive measures needed
- Ultimate aim to manage floods to an acceptable level, and in a sustainable manner → UNESCO-CHARM needed