TOWARDS REALISING INTEGRATED RIVER MANAGEMENT IN MALAYSIA

Presented by:

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Department Irrigation and Drainage Malaysia
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INTRODUCTION
Comprises two distinct bodies of land
- 3 Federal Territories and 13 States
Total land area – 329,750 km²
A multi-racial, multi-cultural country
Climate - warm and humid
Annual average rainfall
- Peninsular Malaysia 2,500 mm
- Sabah 3,000 mm
- Sarawak 3,500 mm
Water Resources In Malaysia

Based on Review of National Water Resource Study 2000-2050

- Annual Rainfall: 2940 mm (971 billion m³)
- Surface Runoff: 494 billion m³ (50.9%)
- Evapo-transpiration: 413 billion m³ (42.5%)
- Groundwater: 64 billion m³ (6.6%)
RIVERS – A GIFT OF GOD
Beautiful River

Melaka River
Beautiful River

Sarawak River

Tekala River, Ulu Langat
Beautiful River
Beginning of Civilisation

Kuala Lumpur
River Function

- Water Supply/Hydro power
- Agriculture
- Business Focal point
- Benefit to people living near river
DEVELOPMENT AND RIVER ENVIRONMENT
Industry Sector In Malaysia

- Industry sector – going up to 46% of GDP, and
- Agricultural sector – falling to 13%
Any kind of development has impact on river.
Johor to ration water if dry spell continues

2010/02/16

KLUANG: Johor is bracing for the possibility of water rationing in the main catchment areas if the current dry spell continues.

Kluang is already hit as levels at water catchments and processing stations in Sungai Sembrong Timur and Barat are fast dropping.

As of yesterday, the water supply at Sungai Sembrong Timur reached 15 million litres per day (mlpd), down from the normal level of 20mlpd.
Main Problem

Water, water, water everywhere

Flood Prone Area = 26,700 sq. km (8%)
Loss=RM1,815m (2007)
Figure 2.1  Malaysia: River Water Quality Trend (2005 - 2012)
BRINGING NATURE BACK TO RIVERS
IRBM Components

- **Enforcement**
  - RBOs, DOE, LAs, Land Office

- **Institution**
  - National Water Resources Council, IRBM Committee, RBOs

- **Legislation**

- **Public Awareness**
  - Love Our River Campaign, Environment Awareness Campaign, Seminars, Workshops, Study Visit, Poster, Manual, Guidelines, etc

- **Finance**
  - 5 Years Development Plan, O & M allocation, Polluters'/User Pay Principles, Privatisation

- **Planning**
  - Integrated River Basin Mgmt (IRBM) Plan, Land Zoning

- **Curative**
  - Flood mitigation, River maintenance & rehabilitation Water quality improvement - Bioremediation, Effective Micro Organism, Activated carbon etc

- **Preventive**
  - River conservancy, Storm Water Mgmt Manual(MASMA), Erosion & Sediment Control Plan(ESCP), Gross Pollutant Trap(GPT), Food, Oil & Grease Trap(FOG), Guidelines, Gazette River Reserve
“The process of coordinating conservation, management and development of water, land and related resources across sectors within a given river basin, in order to maximize the economic and social benefits derived from water resources in an equitable manner while preserving and, where necessary, restoring freshwater ecosystems.”

(Adapted from Integrated Water Resources Management, Global Water Partnership Technical, Advisory Committee Background Papers, No. 4, 2000)
Take stock and look back

• DID has been promoting IRBM since 1990’s,
• We take stock in 2008 and look back what has been done. DID is lacking of;
  • i. Number of river basin must have a clear river basin definition,
  • ii. National Water Resources Policy not available,
  • iii. Comprehensive Water Resources not ready,
  • iv. DID has the task to manage water resources but has not been given the mandate as an institution to manage water resources.
Definition of River Basin

• “River” means a body of inland water flowing for the most part on the surface of the land but which may flow underground for part of its course.

• “River basin” means the area of land from which all surface runoff flows through a sequence of streams, rivers and, possibly, lakes into the sea at a single river mouth, estuary or delta (Adapted from EU Water Framework Directive 2000).
<table>
<thead>
<tr>
<th>Location</th>
<th>No. of River Basin</th>
<th>Major River Basin (&gt;80km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peninsular Malaysia</td>
<td>1,235</td>
<td>74</td>
</tr>
<tr>
<td>Sabah</td>
<td>1,468</td>
<td>75</td>
</tr>
<tr>
<td>Sarawak</td>
<td>283</td>
<td>40</td>
</tr>
<tr>
<td><strong>Jumlah</strong></td>
<td><strong>2,986</strong></td>
<td><strong>189</strong></td>
</tr>
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</tr>
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<tr>
<td>Sarawak</td>
<td>283</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>2,986</td>
<td>189</td>
</tr>
</tbody>
</table>
River Basin in Malaysia

Major river basin (189) – 95% of land area in Malaysia

Small river basin (2797) – 5% of land area in Malaysia
River Basin In Malaysia

- No of basin by category:
  - **Category 1** - river basin wholly within a state = 2,958
  - **Category 2** – river basin shared between states = 22
  - **Category 3** - river basin shared with other country = 6
The Drainage and Irrigation Department will formulate a master plan on land use in 150 river basins in the country, its director-general Datuk Keizirul 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.

Keizirul was speaking after witnessing Agriculture and Food Industry Assistant Minister Datuk Mannan Jakasa close the two-day Sungai Kinabatangan Expedition in Sukau on Saturday.
Objective of IRBM Plan
- Ensure Clean Water
- Ensure Sufficient Water
- Reduce Flood Risks
- Enhance Environmental Conservation
National Water Resources Policy

- ensuring that the demand for water for all user sectors is met in terms of quantity and quality for both man and nature.

- clear directions and strategies in water resources management to ensure water security and sustainability.

- serves as a platform in the streamlining of practices and approaches for the preparation of water resources conservation plan involving all the states of Malaysia.
<table>
<thead>
<tr>
<th>State/FT</th>
<th>Legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melaka, Perak, NSembilan, PPinang, FTKL</td>
<td>Act No 418 – Waters Act 1920(Rev 1989)</td>
</tr>
<tr>
<td>Perlis</td>
<td>Enct No 9 of 1357H(Perlis)</td>
</tr>
<tr>
<td>Terengganu</td>
<td>Enct No 2 of 1357H(Terengganu)</td>
</tr>
<tr>
<td>Kelantan</td>
<td>Enct No 18 of 1935</td>
</tr>
<tr>
<td>Johor</td>
<td>Enct No 66(Johor) 1921</td>
</tr>
<tr>
<td>FT Putrajaya, FT Labuan</td>
<td>None</td>
</tr>
</tbody>
</table>
# State Legislation Related to Water Resources

<table>
<thead>
<tr>
<th>State/FT</th>
<th>Legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarawak</td>
<td>Sarawak River Ordinance 1994</td>
</tr>
<tr>
<td>Sabah</td>
<td>Sabah Water Resources Enct 1998</td>
</tr>
<tr>
<td>Selangor</td>
<td>Selangor Waters Management Authority Enct No 2 of 1999</td>
</tr>
<tr>
<td>Kedah</td>
<td>Kedah Water Resources Enct 2007</td>
</tr>
<tr>
<td>Pahang</td>
<td>Pahang Water Resources Enct 2007</td>
</tr>
</tbody>
</table>
DID’s Roles

• Under the Ministerial Functions Act 1969 (Act 2), Ministers of the Federal Government Order 2009 (P.U.(A) 222), the Minister of NRE shall be charged with the responsibility for the following subjects:
  • Planning and development of flood and drought forecasting systems, management of hydrological data and information, and assessment and management of national water resources,
  • Planning and management of river basins,
DID’s Roles (cont’d)

- Planning and development of infrastructure as well as water management for crops and other agricultural needs.
- Planning and management of flood mitigation programmes,
- Development and management of coastal zones to reduce coastal erosion and sedimentation problems at river mouths,
- Managing and regulating the implementation of stormwater systems in town areas.
DID’s Roles (cont’d)

…..but no mandate given to DID

We are working on
  • drafting comprehensive Water Resources Law,
  • Institutional set up
IRBM INITIATIVES
5. MAIN PROGRAMME

CINTAILAH
SUNGAI
KITA

(LOVE OUR RIVERS
CAMPAIGN)

1993-2003

10 Tahun
(10 YEARS)

JABATAN PENGAIRAN DAN SALIRAN MALAYSIA
1. Adopted river:
   - Village category (*Kategori Jawatankuasa Kemajuan dan Keselamatan Kampong (JKKK)*)
   - School category
   - Tourist category

2. River watch

3. River expedition

4. Education and talk

5. River beautification

**Supporting Programme**

1. Symposium and seminar

2. River cleaning

3. River pollution treatment
Love Our River

Campaign Materials
One State One River Program (1S1R)

- Sg. Hiliran
- Sg. Papar
- Sg. Skudai
- Sg. Melaka
- Sg. Temiang
- Sg. Penchala
- Sg. Petani
- Sg. Pinang
- Sg. Kinta
- Sg. Galing
- Sg. Perlis
- Sg. Kinta
- Sg. Papar
- Sg. Melaka
- Sg. Temiang
- Sg. Penchala
- Sg. Petani
- Sg. Pinang
- Sg. Kinta
- Sg. Galing
- Sg. Perlis
1S1R is Mini IRBM

- 1 RIVER – Start with 1 River and its catchment
- 1 PLAN – Catchment Management Plan
- 1 MANAGEMENT – 1 Steering Committee

Objectives

- To ensure clean, living and vibrant rivers – Class IIB by 2015,
- To turn rivers and their environment into natural recreation areas,
- To ensure rivers are free from solid waste and flooding.
# River Water Quality

<table>
<thead>
<tr>
<th>No</th>
<th>State</th>
<th>River</th>
<th>Length (km)</th>
<th>Water Quality Index (WQI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Perak</td>
<td>Kinta</td>
<td>20</td>
<td>III</td>
</tr>
<tr>
<td>2</td>
<td>Kelantan</td>
<td>Pengkalan Chepa</td>
<td>10</td>
<td>II</td>
</tr>
<tr>
<td>3</td>
<td>Sabah</td>
<td>Papar</td>
<td>45</td>
<td>II</td>
</tr>
<tr>
<td>4</td>
<td>Johor</td>
<td>Skudai</td>
<td>52.8</td>
<td>III</td>
</tr>
<tr>
<td>5</td>
<td>Kedah</td>
<td>Petani</td>
<td>12</td>
<td>III</td>
</tr>
<tr>
<td>6</td>
<td>Melaka</td>
<td>Melaka</td>
<td>39</td>
<td>III</td>
</tr>
<tr>
<td>7</td>
<td>N. Sembilan</td>
<td>Temiang</td>
<td>9</td>
<td>II</td>
</tr>
<tr>
<td>8</td>
<td>Perlis</td>
<td>Perlis</td>
<td>9.5</td>
<td>III</td>
</tr>
<tr>
<td>9</td>
<td>P.Pinang</td>
<td>Pinang</td>
<td>3.1</td>
<td>IV</td>
</tr>
<tr>
<td>10</td>
<td>Sarawak</td>
<td>Miri</td>
<td>60</td>
<td>III</td>
</tr>
<tr>
<td>11</td>
<td>Selangor</td>
<td>Penchala</td>
<td>12</td>
<td>IV</td>
</tr>
<tr>
<td>12</td>
<td>Pahang</td>
<td>Galing</td>
<td>7</td>
<td>IV</td>
</tr>
<tr>
<td>13</td>
<td>Terengganu*</td>
<td>Hiliran</td>
<td>5.5</td>
<td>-</td>
</tr>
<tr>
<td>14</td>
<td>W.P. K.Lumpur</td>
<td>Penchala</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>15</td>
<td>Sarawak</td>
<td>Bintangor</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
It is a systematic, integrated, ‘sub-basin’ approach of solving 7 DID related problems in the whole district in a speedy, community friendly and effective way under the leadership of the District Engineer while receiving full support from DID State and DID Headquarters.
Strengthening the Management of River Basin Development
1. **Divide** district into several manageable sub-basins.

2. **Prioritize** sub-basins based on need and importance.

3. **Assign** TA/Technicians to be responsible for each sub-basin, accountable directly to the District Engineer.
4 Apply the DEEP (Describe, Explain, Elaborate, Prescribe) management tool for each sub-basin.

5 Implement the solution in 3 phases: short term (less than 6 months), medium term (6 months to 2 years) and long term (more than 2 years).
Output of this program

1. District Profile Report – information gathering.
2. Action Plan Report – for each sub-basin
Specific Projects
River Of Life (RoL) – Klang River
RoL Project- Transforming Klang River into a vibrant and liveable waterfront with high economic value

**River Cleaning**
- Clean and improve the 110km stretch along the Klang River basin from current Class III-V to Class IIB by 2020.
- Covers the municipal areas of:
  - Selayang (MPS)
  - Ampang Jaya (MPAJ)
  - Kuala Lumpur (DBKL)

**River Beautification**
- Masterplanning and beautification works will be carried out along a 10.7km stretch along the Klang and Gombak river corridor
- Significant landmarks in the area include Dataran Merdeka, Bangunan Sultan Abdul Samad and Masjid Jamek

**Land Development**
- Cleaning and beautification works will spur economic investments into the areas immediately surrounding the river corridor
- Potential government land will be identified and tendered out to private developers through competitive bidding
12 Key Initiatives Are Identified To Effectively Address Pollution And Flooding of Klang River

<table>
<thead>
<tr>
<th>Key Initiative</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Upgrading existing sewerage facilities is the most impactful and important initiative to reduce Klang river pollution</td>
</tr>
<tr>
<td>2</td>
<td>Existing regional sewage treatment plants must be expanded to cater for future growth</td>
</tr>
<tr>
<td>3</td>
<td>Wastewater treatment plants need to be installed at 5 wet markets to decrease rubbish and pollutants</td>
</tr>
<tr>
<td>4</td>
<td>Install additional gross pollutant traps will improve the river aesthetics and water quality</td>
</tr>
<tr>
<td>5</td>
<td>Utilise retention pond to remove pollutants1 from sewage and sullage</td>
</tr>
<tr>
<td>6</td>
<td>Relocation of squatters will significantly reduce sewage, sullage, and rubbish in the Klang river</td>
</tr>
<tr>
<td>7</td>
<td>Implement the Drainage and Stormwater Management Master Plan to upgrade drainage systems</td>
</tr>
<tr>
<td>8</td>
<td>Systematic hydrological study and rehabilitation of the river are needed for flow control</td>
</tr>
<tr>
<td>9</td>
<td>Promote, enforce, and manage river cleanliness and health – erosion from urban development</td>
</tr>
<tr>
<td>10</td>
<td>Promote, enforce, and manage river cleanliness and health – restaurants, workshops, and other commercial outlets</td>
</tr>
<tr>
<td>11</td>
<td>Promote, enforce, and manage river cleanliness and health – industries that generate wastewater/ effluent</td>
</tr>
<tr>
<td>12</td>
<td>Promote, enforce, and manage river cleanliness – general rubbish disposal</td>
</tr>
</tbody>
</table>

SOURCE: Lab analysis
Masterplanner 4
Melaka River Cleaning and Beautification Project, Parcel 2

- River water quality improvement
- Beautifying and preserving the river corridor.
- Malacca River as one of the main tourism attraction.
- alternative public transport routes through the river (Water Taxi)
Melaka River—Clean And Beautiful

Before
05/10/2002

After
17/05/2003
Melaka River – Clean And Beautiful
CONCLUSION
IRBM is essential to ensure sustainability of river and river environment.
THANK YOU
Conclusion

With rapid urbanisation and industrialisation, problems and issues related to rivers and the river environment are expected to intensify. Integrated management is essential because users within the river basin are interdependent. Upstream activities will have some impact to the downstream inhabitants, the management of land will affect the water resources, and vice versa.
Besides integrating land and water issues, basin level management is critical in managing the relationships between quantity and quality between upstream and downstream interest. The relationship is due to the close connection between hydrological, ecological, and social processes. Corresponding institutional and legal changes are needed, coupled with and effective administrative framework. Above all, political will and commitment is vital to ensure success.