Lessons from Malaysian Sanitation Experience

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MALAYSIA: 50 years ago

Direct discharges

Polluted rivers

Crumbling STPs

Sewer overflows

Diseases: cholera, dysentery
Weak management
Poor infrastructure condition
Legal / regulatory / institutional shortcomings
Awareness lacking
Capacity in Govt / private sector weak

Today

Infrastructure
Governance
Legislative / regulatory
Institutional
Awareness

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THE MALAYSIAN JOURNEY

Before 1957
- Federalisation & privatization
- Infrastructure improvement
- Operational improvement

Poor sanitation
Prevalence of waterborne diseases

1970s & 1980s
- Local authorities
- Rural sanitation policy
- Urban policy to provide basic sanitation
- Low technology
- Stringent but ineffective regulations

1996
- Appropriate contextual strategy
- Resource recovery focus
- Sustainable business model

2008
- Integration water / wastewater
- Owner / operator
- Focus on water resources

2018 and beyond

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• Basic health first: toilets & containment
• Water resource pollution next: proper containment, emptying, treating, grey water
• Quick and uniform improvements through Centralised control
GOVERNANCE & INSTITUTIONAL

1. Policy / Strategy
2. Regulate Sewerage Services

MINISTRY OF ENERGY, GREEN TECHNOLOGY & WATER

MINISTRY OF FINANCE

1. Sewerage Services
2. Septic tank services

MINISTRY OF NATURAL RESOURCES & ENVIRONMENT

Regulate Effluent Discharge

SEPARATE REGULATORS FOR SERVICES AND EFFLUENT QUALITY
GOVERNANCE & INSTITUTIONAL

- Policy & targets
- Economic regulation
- Protect customers and ensure sustainability of operator

- Government Capital Projects
- Funding / Asset
- Operate / Provide services

SEPARATE REGULATION / OWNERSHIP / OPERATIONS
OVERALL SANITATION GOVERNANCE

GOVT CAPEX

DEVELOPER CAPEX

MINISTRY OF WATER

Regulate Services, technical, economic

MINISTRY OF ENVIRONMENT

Regulate Effluent Discharges

GOVT

DEVELOPER

Facilty Licensee
Funding / provide assets

Permit holder
Desludging, Construction

Class Licensee
Operate private sewerage facility

Facilty Licensee
Funding / provide assets

Permit holder
Desludging, Construction

IndahWater
Operator Sewerage (Public Sewerage Systems)
Septic tank services

 Lease
CLEAR ROLES
Effluent discharge standards

• 1974 EQA: Stringent / absolute: largely ignored
• Based on location:
  • Standard A: Upstream of drinking water intake
  • Standard B: Downstream of drinking water intake
• 2009: Time based Categories
• Licence to contravene
• Self regulation through design, operational procedure, accredited operator / audit sampling
• Appropriate contextualised standards
Combination of sanitation / sewerage systems:
- connected to sewer,
- decentralised
- community system
- septic tank
- pits

ON SITE SYSTEMS WILL REMAIN AND MUST BE MANAGED.
SEWAGE TREATMENT TECHNOLOGIES IN USE

- Extended Aeration
- Imhoff Tank
- RBC
- SBR
- Oxidation Ditch
- Biosoil
- Aerated Lagoon
- Oxidation Pond
- Biofilter
INCREMENITAL INTRODUCTION OF TECHNOLOGIES
(with co-treatment)
Tankered sludge

Co Treatment of sludge / sewage

GOOD OPTION WHERE STPs EXIST OR ARE BEING PLANNED, WHEN DONE PROPERLY
OPERATIONAL ISSUES AND STRATEGIES

Operational Issues arising from:

- Stringent effluent Standard / Enforcement
- Growing number of decentralised STPs)
- High O&M cost
- Aging assets
- Lack of standardisation
- Theft / vandalism
- Disruption due to Illegal discharges
- Logistics and resources
- Sludge treatment & disposal facilities / sites

Solutions:

- Manned vs automated
- Outsourcing
- Refurbishment/rationalisation
- Early warning systems
- Electronic security systems
- Routine maintenance & housekeeping
- Preventive and predictive maintenance
- Engagement with regulators
- Risk management and asset management
- Sludge Strategy; treatment & disposal area
- Gradual upgrading sludge systems: co-treatment, trenching, dedicated sites
- Acquiring new tankers
- Scheduled desludging
## TARIFF RATE FOR IST SERVICES

### Commercial Basic Charge

<table>
<thead>
<tr>
<th>Brand</th>
<th>Annual value of premise (RM)</th>
<th>Basic charge per month IST</th>
<th>Basic charge per month Connected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 - 2,000</td>
<td>7.00</td>
<td>8.00</td>
</tr>
<tr>
<td>2</td>
<td>2,001 - 5,000</td>
<td>8.00</td>
<td>14.00</td>
</tr>
<tr>
<td>3</td>
<td>5,001 - 10,000</td>
<td>14.00</td>
<td>20.00</td>
</tr>
<tr>
<td>4</td>
<td>10,001 - 20,000</td>
<td>19.00</td>
<td>26.00</td>
</tr>
<tr>
<td>5</td>
<td>20,001 - 30,000</td>
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<td>29.00</td>
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<tr>
<td>6</td>
<td>30,001 - 40,000</td>
<td>23.00</td>
<td>32.00</td>
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<tr>
<td>7</td>
<td>40,001 - 50,000</td>
<td>25.00</td>
<td>35.00</td>
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<tr>
<td>8</td>
<td>50,001 - 60,000</td>
<td>27.00</td>
<td>38.00</td>
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<tr>
<td>9</td>
<td>60,001 - 70,000</td>
<td>29.00</td>
<td>41.00</td>
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<tr>
<td>10</td>
<td>70,001 - 80,000</td>
<td>31.00</td>
<td>44.00</td>
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<tr>
<td>11</td>
<td>80,001 - 90,000</td>
<td>33.00</td>
<td>47.00</td>
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<tr>
<td>12</td>
<td>90,001 - 100,000</td>
<td>35.00</td>
<td>50.00</td>
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<tr>
<td>13</td>
<td>100,001 - 200,000</td>
<td>120.00</td>
<td>180.00</td>
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<td>14</td>
<td>200,001 - 400,000</td>
<td>330.00</td>
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<td>400,001 - 600,000</td>
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<td>522.00</td>
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<td>600,001 - 800,000</td>
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<td>1,980.00</td>
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<td>17</td>
<td>800,001 - 1,000,000</td>
<td>1,440.00</td>
<td>2,160.00</td>
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<td>1,000,001 - 3,000,000</td>
<td>2,880.00</td>
<td>4,320.00</td>
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<td>19</td>
<td>3,000,001 - 5,000,000</td>
<td>5,400.00</td>
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<td>21</td>
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### Commercial Excess Water Charge

<table>
<thead>
<tr>
<th></th>
<th>IST (RM)</th>
<th>Connected (RM)</th>
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</thead>
<tbody>
<tr>
<td>Water Usage</td>
<td>Excess Charge</td>
<td>Excess Charge</td>
</tr>
<tr>
<td>Up To 100 m³</td>
<td>No Charge</td>
<td>No Charge</td>
</tr>
<tr>
<td>More Than 100 m³ but less than 200 m³</td>
<td>30 sen per / m³</td>
<td>30 sen per / m³</td>
</tr>
<tr>
<td>More Than 200 m³</td>
<td>45 sen per / m³</td>
<td>45 sen per / m³</td>
</tr>
</tbody>
</table>

### Government Premises

<table>
<thead>
<tr>
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<th>IST (RM)</th>
<th>Connected (RM)</th>
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</thead>
<tbody>
<tr>
<td>Basic Charge</td>
<td>25.00</td>
<td>40.00</td>
</tr>
<tr>
<td>Water Usage</td>
<td>Excess Charge</td>
<td>Excess Charge</td>
</tr>
<tr>
<td>Up To 100 m³</td>
<td>No Charge</td>
<td>No Charge</td>
</tr>
<tr>
<td>More Than 100 m³ but less than 200 m³</td>
<td>45 sen per / m³</td>
<td>45 sen per / m³</td>
</tr>
<tr>
<td>More Than 200 m³</td>
<td>95 sen per / m³</td>
<td>95 sen per / m³</td>
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### Industrial

<table>
<thead>
<tr>
<th></th>
<th>IST (RM)</th>
<th>Connected (RM)</th>
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</thead>
<tbody>
<tr>
<td>Charge per head</td>
<td>2.00</td>
<td>2.50</td>
</tr>
<tr>
<td>Minimum Charge</td>
<td>20.00</td>
<td>25.00</td>
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</tbody>
</table>

### Domestic

<table>
<thead>
<tr>
<th>Premises Type</th>
<th>IST (RM)</th>
<th>Connected (RM)</th>
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</thead>
<tbody>
<tr>
<td>Low Cost</td>
<td>2.00</td>
<td>2.00</td>
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**CROSS SUBSIDY**

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REGULATORY FRAMEWORK

Section 45: Plans and specifications for the construction of sewerage systems and septic tanks require the approval of the Commission.

Section 174: Commission may register certifying agencies for the purpose of approving the plans and specifications for the Commission.

GOOD INFRASTRUCTURE THROUGH CONTROL OF APPROVAL PROCEDURES

Source: SPAN
DESLUDGING

Service model

PRIOR TO 2008
• Scheduled Emptying: by Indah water / outsourced
• Monthly tariff RM 6
• 30% success

POST 2008
• Liberalisation
• Owner may call any permit holder (incl Indah Water)
• One off charges RM 230 – 300
• Sludge must be brought to Indah Water facility for treatment

NEW PROPOSAL
• Indah Water to schedule
• Outsource emptying / transport to permit holders
• Sludge must be brought to Indah Water facility for treatment
• Volumetric tariff based on water consumption

SCHEDULED DESLUDGING IS DIFFICULT AND SUCCESS RATE MUST BE ESTIMATED CORRECTLY
UTILITY: SCHEDULING / BILLING / COLLECTION / TREATMENT
PRIVATE OPERATORS: EMPTYING AND TRANSPORT
Fee & Service not directly linked

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DIRECT IMPACT OF REGULAR DESLUDGING ON RIVER POLLUTION
TYPE OF DESLUDGING SERVICES

• **Scheduled** *(Septic tanks, customers)*

• **Demand**
  - Request by customer other than scheduled.

• **Responsive**
  - *(non-std septic tanks, private STP, non-customer)*
DEDICATED SLUDGE FACILITIES

TREATMENT FACILITIES WITHIN SHORT DISTANCE OF ALL AREAS

Source: IWK
IWK 2017
Key Reasons for successes

- Driver – federal government: political push
- Policy, Legislative (law & regulations)
- Defined responsibilities
- Investment & infrastructure improvements: funding focus
- Guidelines, Operating instructions for management
- Appropriate technologies & gradual upgrading
- Economics: tariff, charges, subsidy
- Awareness, education & communications
- Training & capacity building: people & skills
Neglected issues

• State & Local Governments left out
• Water / sewerage management separated
• Model based on full cost recovery from polluter - Community not ready to pay
• Flawed financial model – CAPEX / OPEX
• Political will to sustain – tariff review
• Asset aging, risks, rising expectations
• Tariff recovery mechanisms
• Desludging, sludge disposal issues
• Resource recovery issues

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Thank you