



# *Lessons from Malaysian Sanitation Experience*



***Dorai Narayana***

*October 2018*

# ***MALAYSIA: 50 years ago***

# ***Today***



**Direct discharges**



**Bucket toilet**

**Polluted rivers**



**Crumbling STPs**



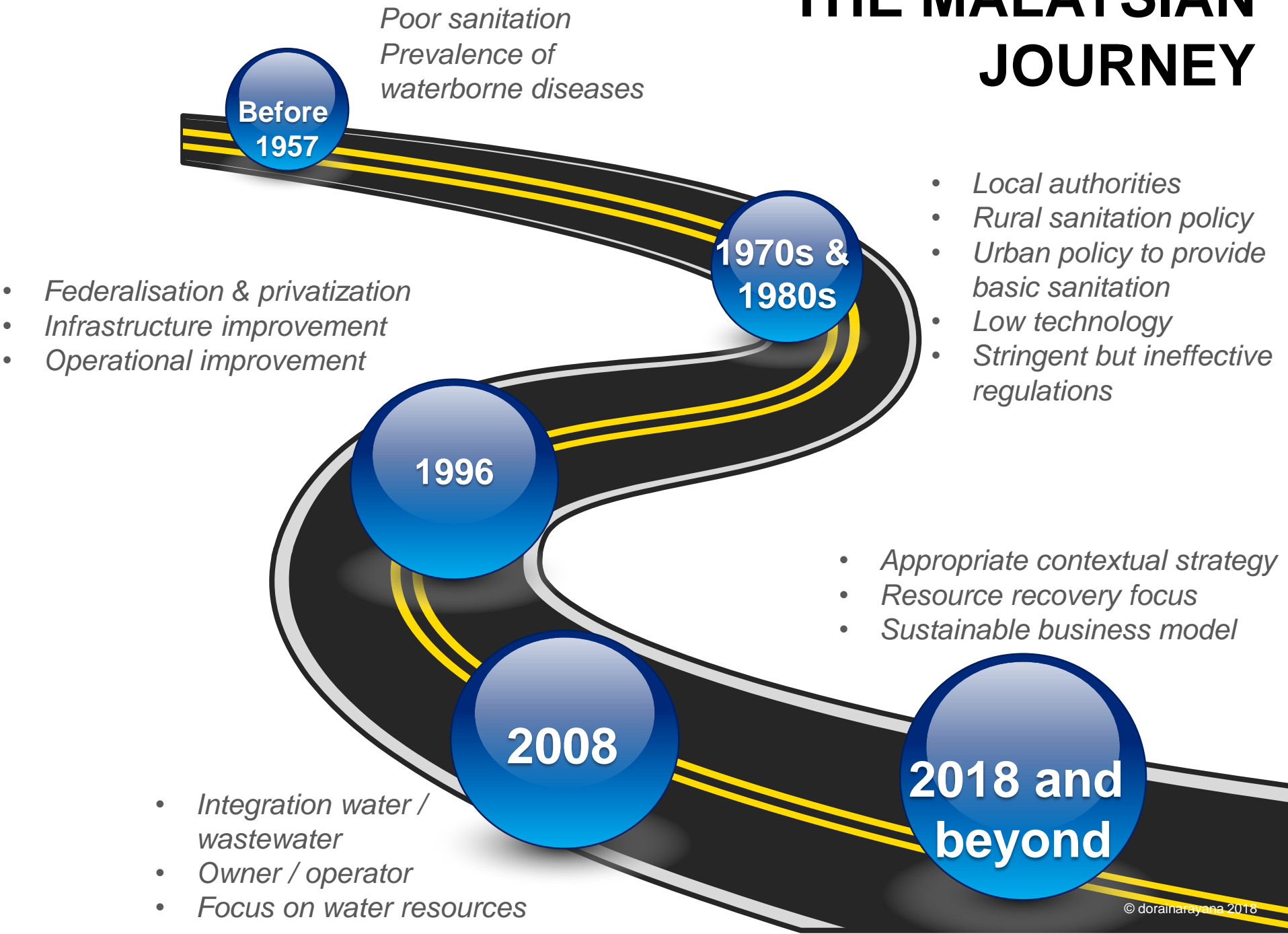
**Sewer overflows**

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



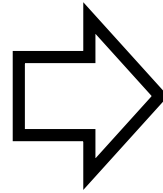
*Infrastructure*  
*Governance*  
*Legislative / regulatory*  
*Institutional*  
*Awareness*

# THE MALAYSIAN JOURNEY



# FEDERALISATION & PRIVATISATION

SANITATION / SEWERAGE  
MANAGEMENT UNDER LOCAL  
AUTHITIES



FEDERALISATION &  
PRIVATISATION



1994



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

# GOVERNANCE & INSTITUTIONAL



MINISTRY OF ENERGY,  
GREEN TECHNOLOGY  
& WATER

MINISTRY OF  
FINANCE

MINISTRY OF NATURAL  
RESOURCES &  
ENVIRONMENT



1. Policy / Strategy .
2. Regulate Sewerage Services



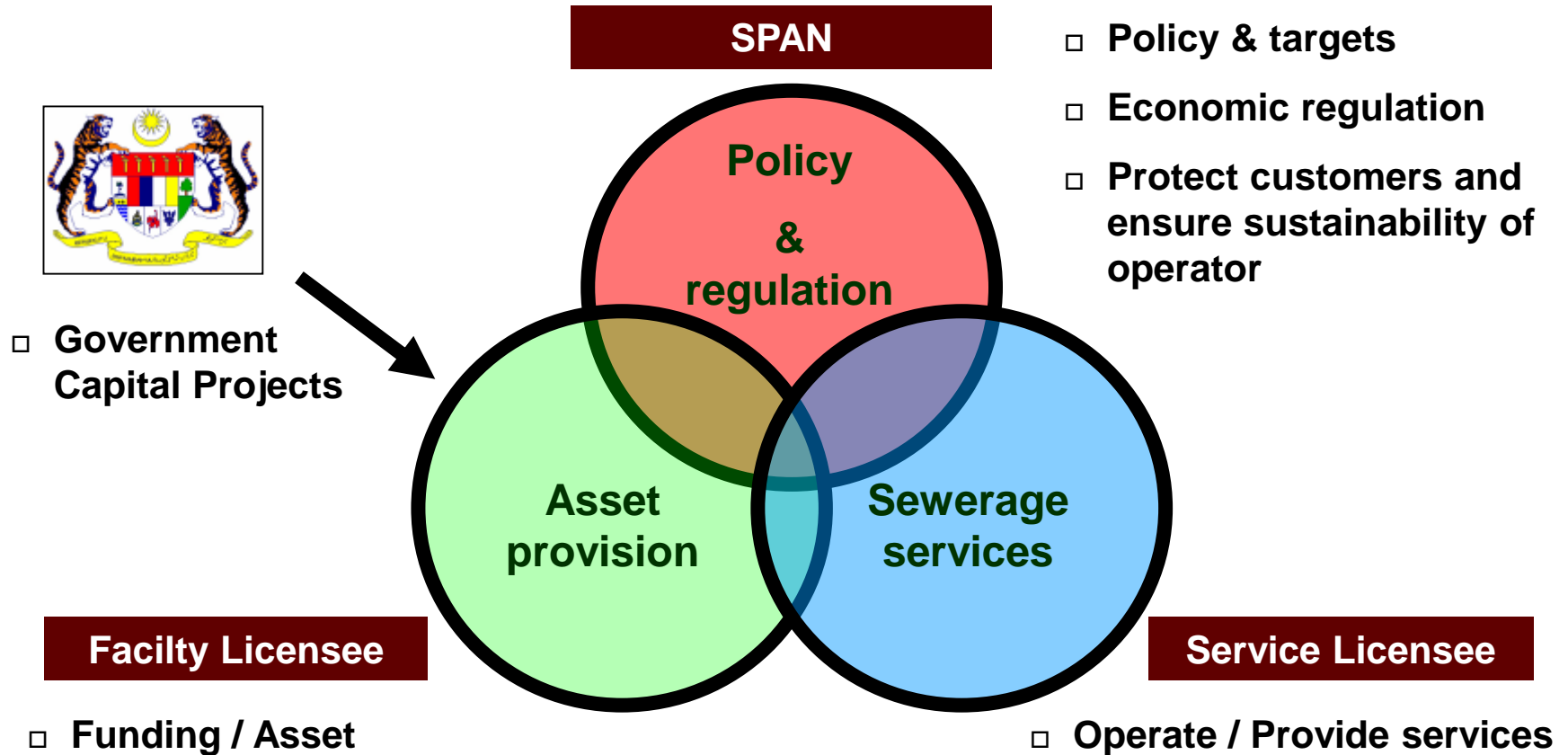
1. Sewerage Services
2. Septic tank services



Regulate Effluent  
Discharge

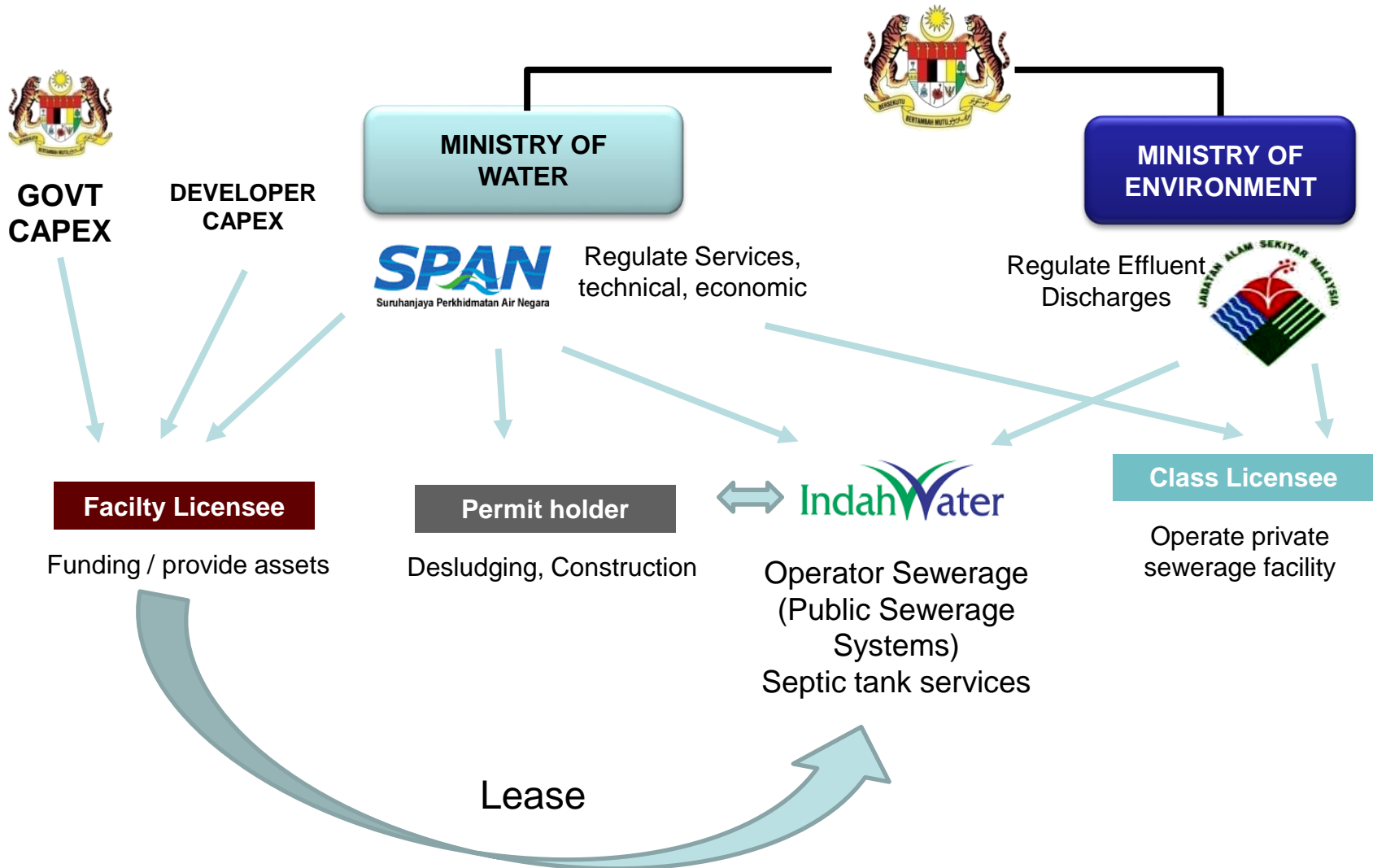
**SEPARATE REGULATORS FOR  
SERVICES AND EFFLUENT QUALITY**

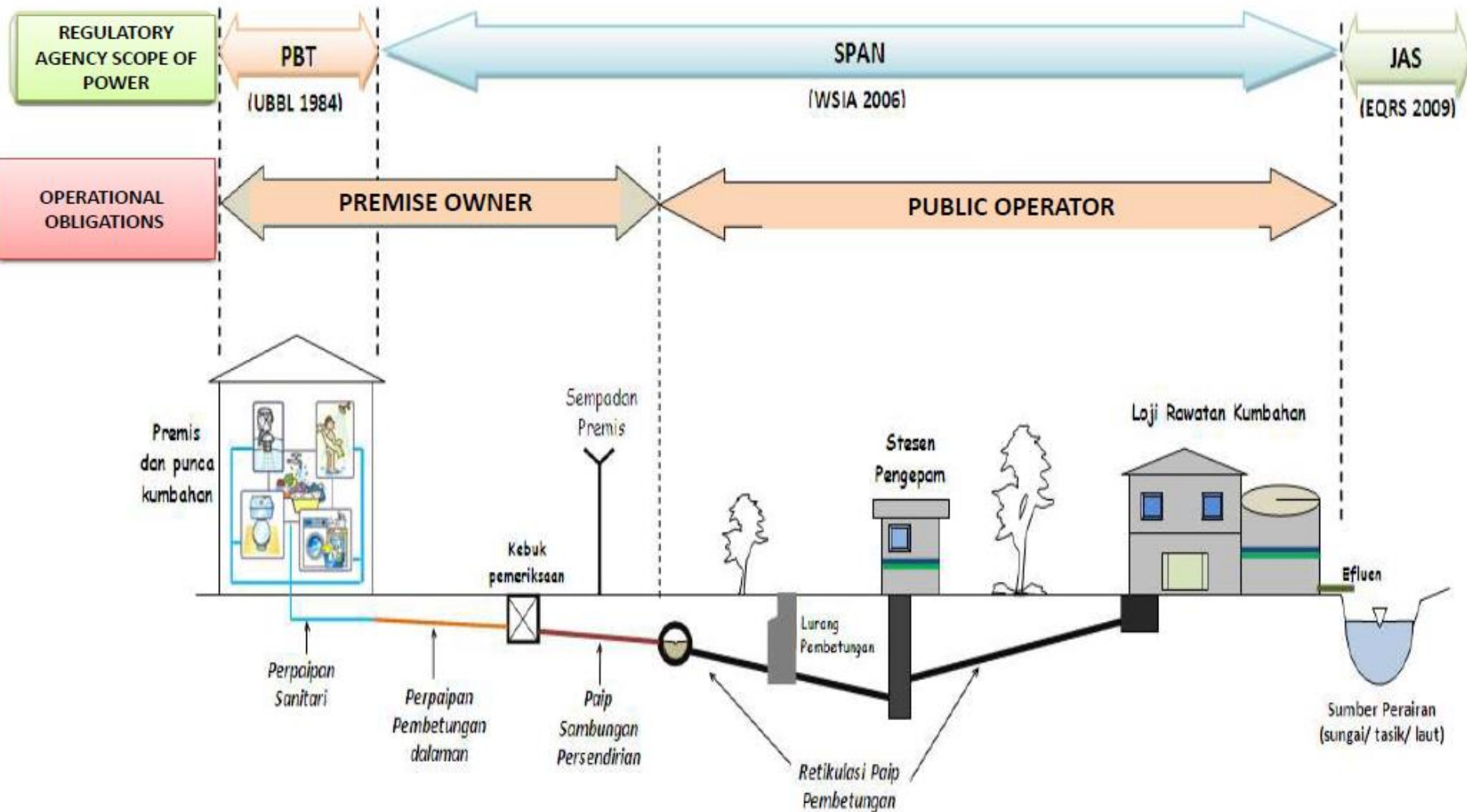
# GOVERNANCE & INSTITUTIONAL



**SEPARATE REGULATION / OWNERSHIP  
/ OPERATIONS**

# OVERALL SANITATION GOVERNANCE





**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

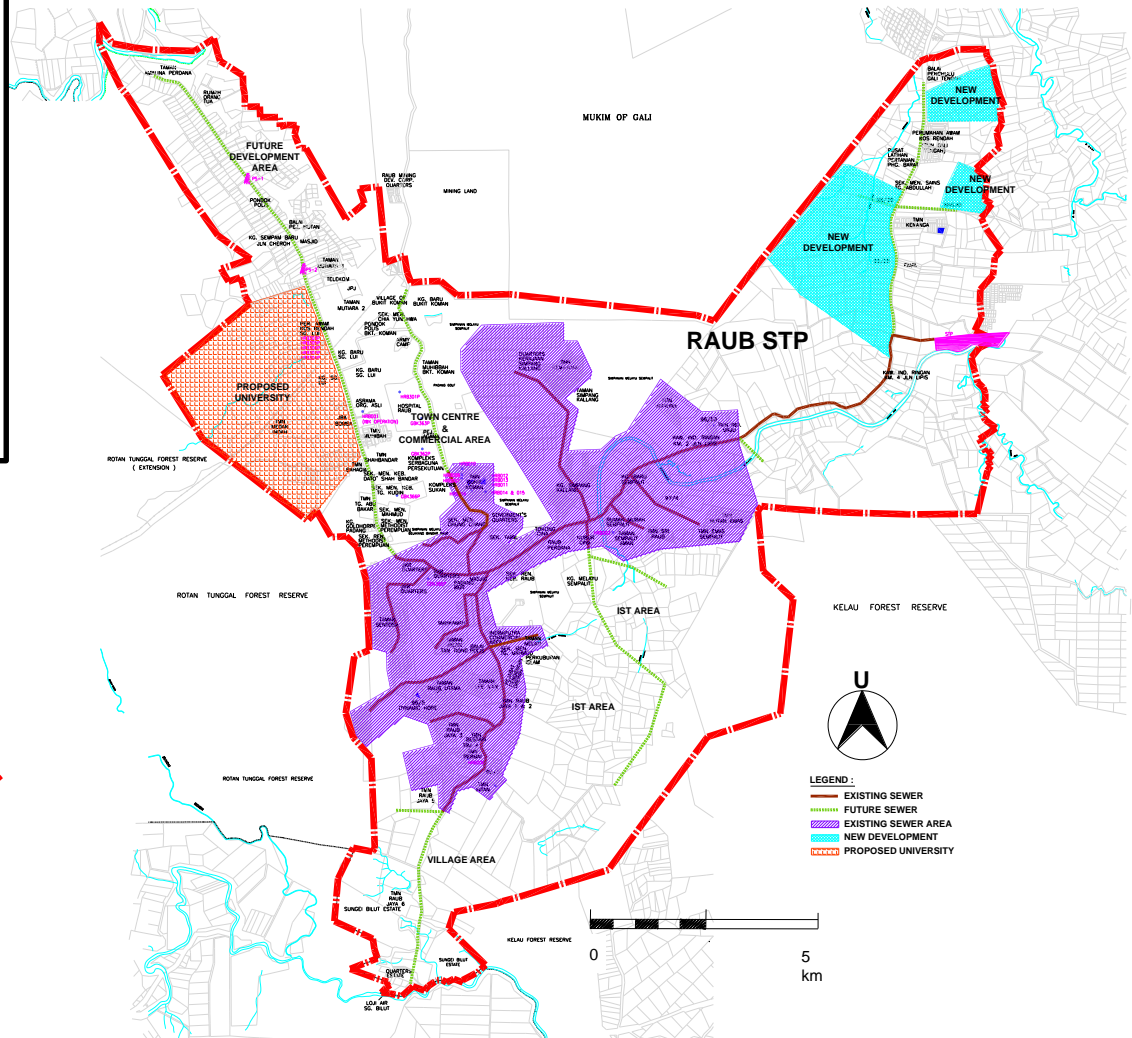


# WASTEWATER SYSTEMS & TECHNOLOGIES

**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

# WASTEWATER SYSTEMS & TECHNOLOGIES



TRENCHING



DRYING BEDS

INCREMENTAL  
IMPROVEMENT IN SLUDGE  
TECHNOLOGIES



GEO BAGS



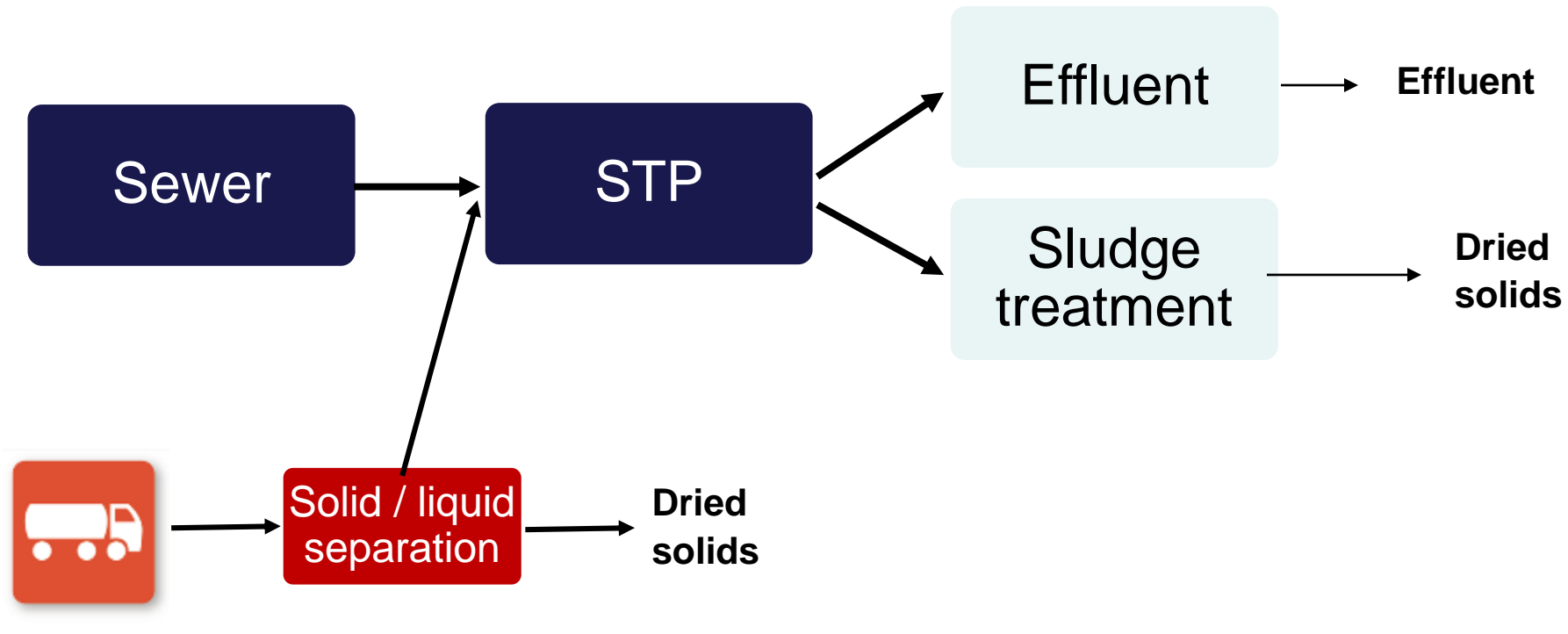
MECHANISED DEWATERING



CENTRAL SLUDGE TREATMENT  
FACILITY

***INCREMENTAL INTRODUCTION OF TECHNOLOGIES***  
***(with co-treatment)***

# WASTEWATER SYSTEMS & TECHNOLOGIES



Tanker sludge

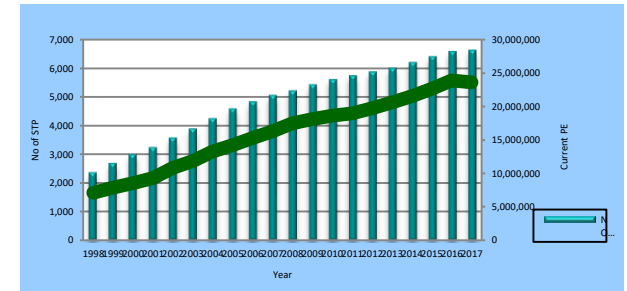
## Co Treatment of sludge / sewage

***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

## Commercial Basic Charge

| Brand | Annual value of premise (RM) | Basic charge per month IST | Basic charge per month Connected |
|-------|------------------------------|----------------------------|----------------------------------|
| 1     | 0 - 2,000                    | 7.00                       | 8.00                             |
| 2     | 2,001 - 5,000                | 8.00                       | 14.00                            |
| 3     | 5,001 - 10,000               | 14.00                      | 20.00                            |
| 4     | 10,001 - 20,000              | 19.00                      | 26.00                            |
| 5     | 20,001 - 30,000              | 21.00                      | 29.00                            |
| 6     | 30,001 - 40,000              | 23.00                      | 32.00                            |
| 7     | 40,001 - 50,000              | 25.00                      | 35.00                            |
| 8     | 50,001 - 60,000              | 27.00                      | 38.00                            |
| 9     | 60,001 - 70,000              | 29.00                      | 41.00                            |
| 10    | 70,001 - 80,000              | 31.00                      | 44.00                            |
| 11    | 80,001 - 90,000              | 33.00                      | 47.00                            |
| 12    | 90,001 - 100,000             | 35.00                      | 50.00                            |
| 13    | 100,001 - 200,000            | 120.00                     | 180.00                           |
| 14    | 200,001 - 400,000            | 330.00                     | 495.00                           |
| 15    | 400,001 - 600,000            | 348.00                     | 522.00                           |
| 16    | 600,001 - 800,000            | 1,320.00                   | 1,980.00                         |
| 17    | 800,001 - 1,000,000          | 1,440.00                   | 2,160.00                         |
| 18    | 1,000,001 - 3,000,000        | 2,880.00                   | 4,320.00                         |
| 19    | 3,000,001 - 5,000,000        | 5,400.00                   | 8,800.00                         |
| 20    |                              |                            |                                  |
| 21    |                              |                            |                                  |

## Commercial Excess Water Charge

|   | IST (RM)        | Connected (RM)  |
|---|-----------------|-----------------|
| Water Usage                             | Excess Charge   | Excess Charge   |
| Up To 100 m3                            | No Charge       | No Charge       |
| More Than 100 m3 but less than 200 m3 / | 30 sen per / m3 | 30 sen per / m3 |
| More Than 200 m3                        | 45 sen per / m3 | 45 sen per / m3 |

## Government Premises

|   | IST (RM)        | Connected (RM)  |
|---|-----------------|-----------------|
| Basic Charge                            | 25.00           | 40.00           |
| Water Usage                             | Excess Charge   | Excess Charge   |
| Up To 100 m3                            | No Charge       | No Charge       |
| More Than 100 m3 but less than 200 m3 / | 45 sen per / m3 | 45 sen per / m3 |
| More Than 200 m3                        | 95 sen per / m3 | 95 sen per / m3 |

## Industrial

|                 | IST (RM) | Connected (RM) |
|-----------------|----------|----------------|
| Charge per head | 2.00     | 2.50           |
| Minimum Charge  | 20.00    | 25.00          |

## Domestic

| Premises Type | IST (RM) | Connected (RM) |
|---------------|----------|----------------|
| Low Cost      | 2.00     | 2.00           |
|               |          | 00             |
|               |          | 00             |

# CROSS SUBSIDY

# REGULATORY FRAMEWORK



Regulator

**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**



SPAN Certifying Agency (CA)

# DESLUDGING

## *Service model*

### POST 2008

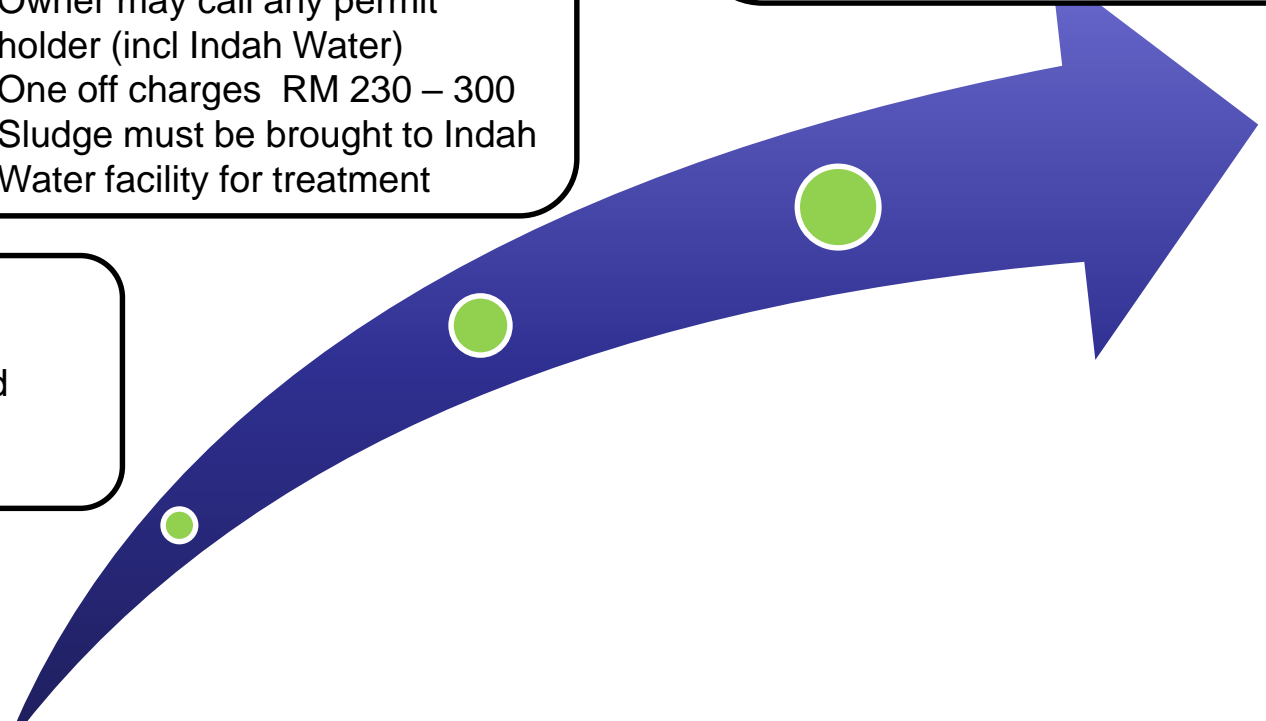
- Liberalisation
- Owner may call any permit holder (incl Indah Water)
- One off charges RM 230 – 300
- Sludge must be brought to Indah Water facility for treatment

### PRIOR TO 2008

- Scheduled Emptying: by Indah water / outsourced
- Monthly tariff RM 6
- 30% success

### 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



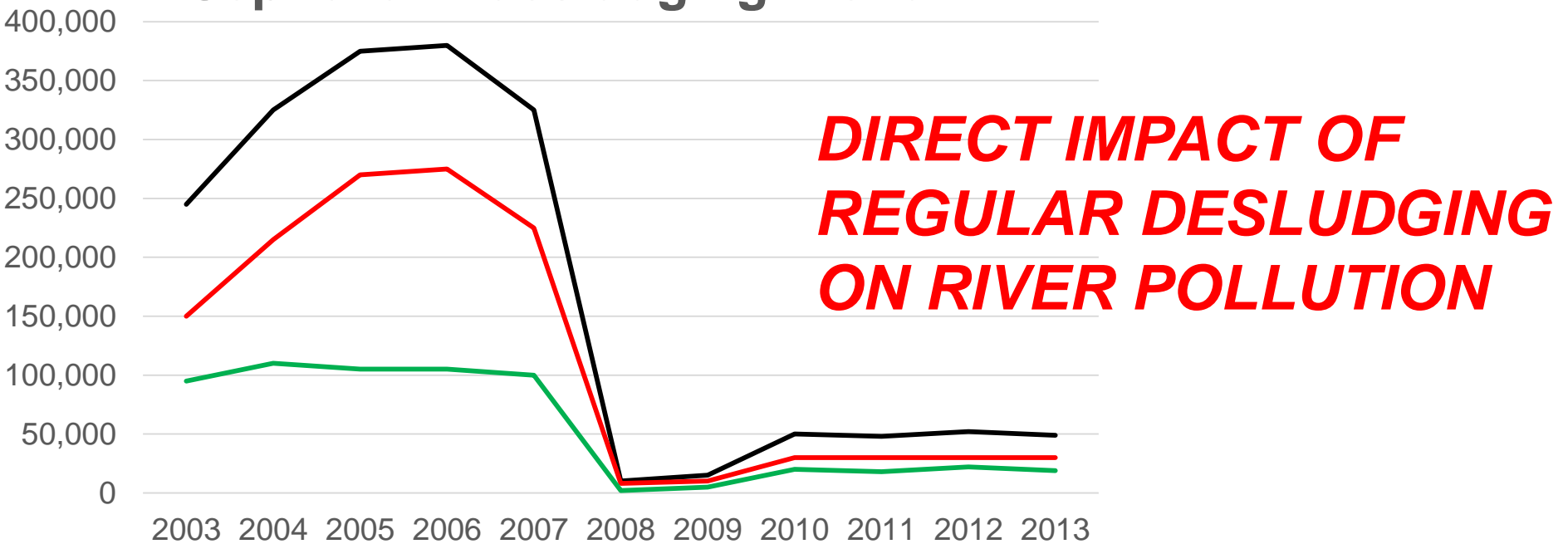
**SCHEDULED DESLUDGING IS DIFFICULT AND SUCCESS RATE MUST BE ESTIMATED CORRECTLY**

**UTILITY : SCHEDULING / BILLING / COLLECTION / TREATMENT**

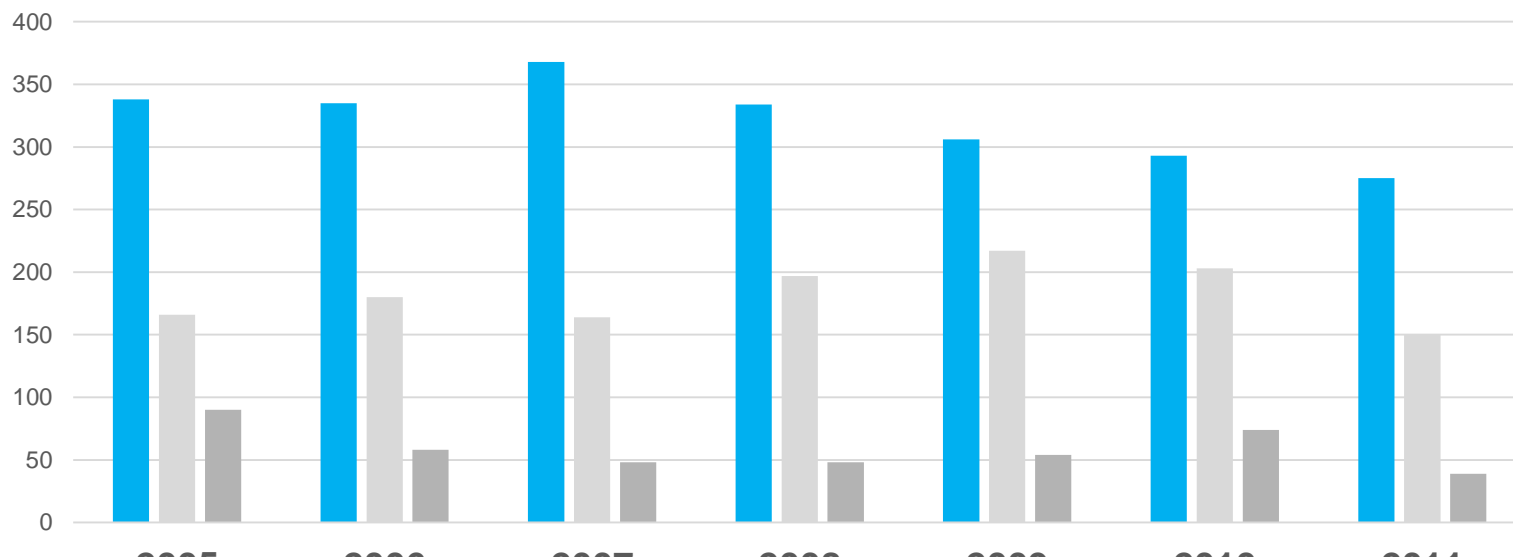
**PRIVATE OPERATORS: EMPTYING AND TRANSPORT**

***Fee & Service not directly linked***

## Septic tank desludging trend



## River water quality trend

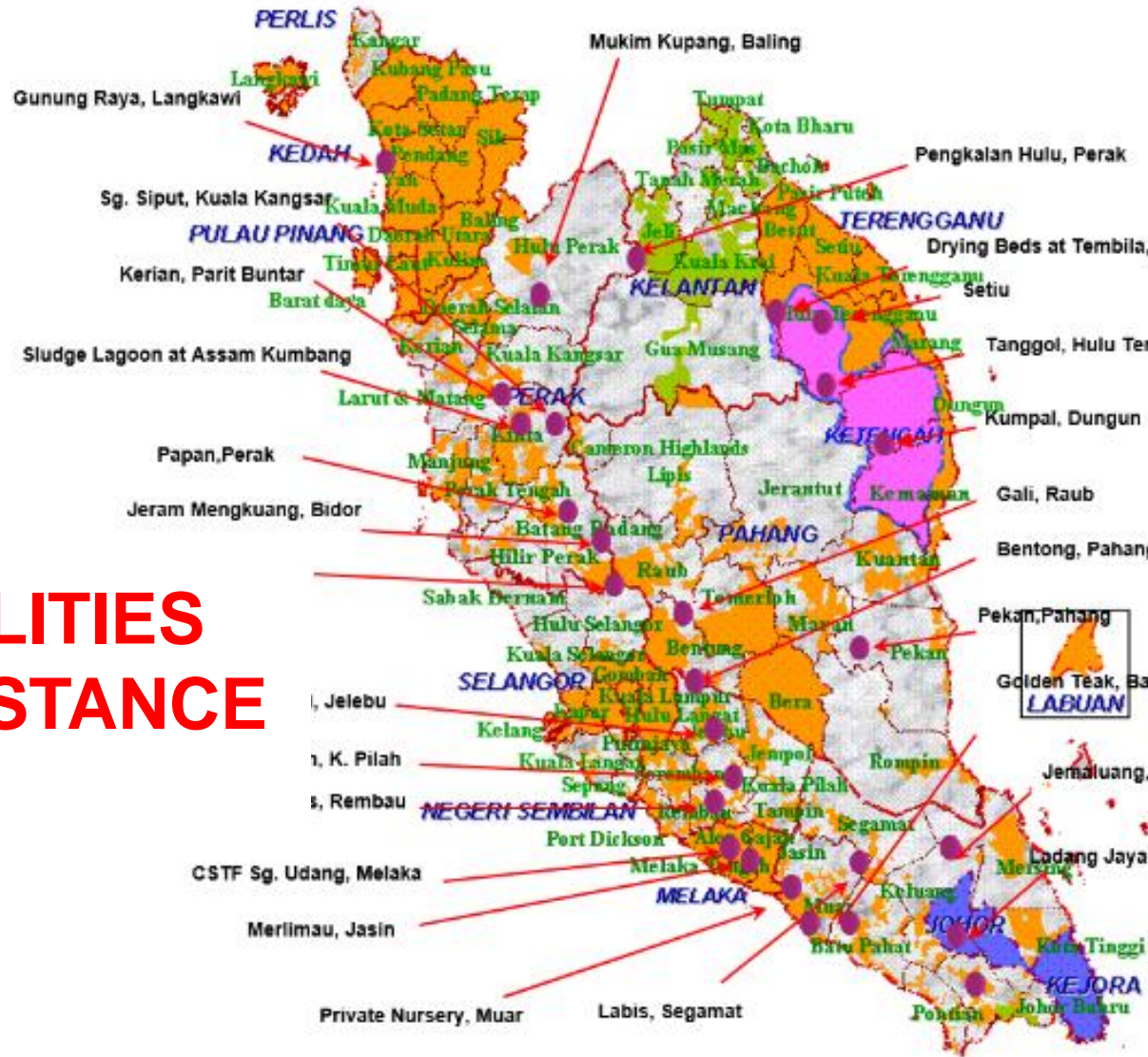


# TYPE OF DESLUDGING SERVICES

- **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



# **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

***Thank you***