

# Wastewater Management in Cambodia

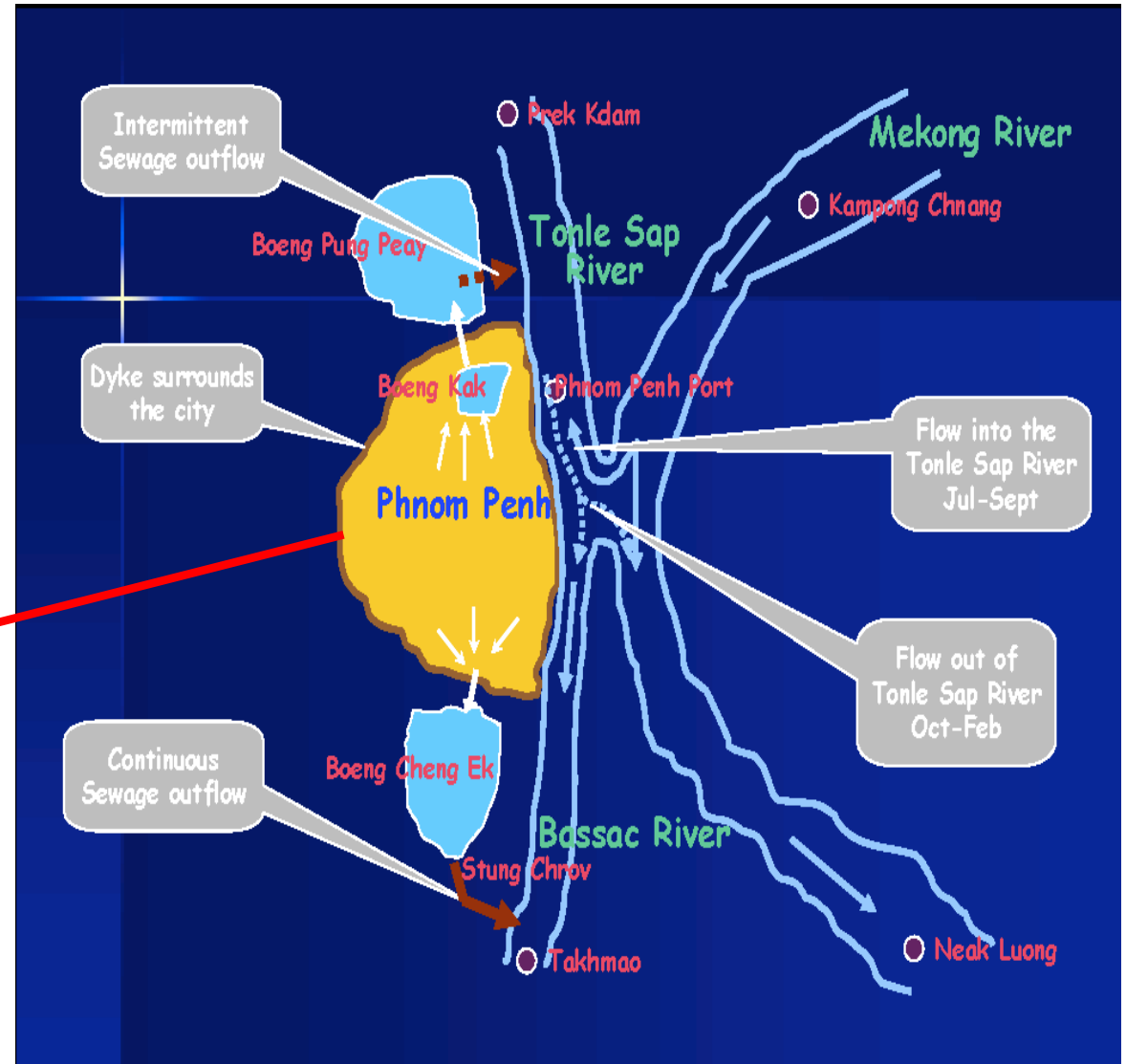
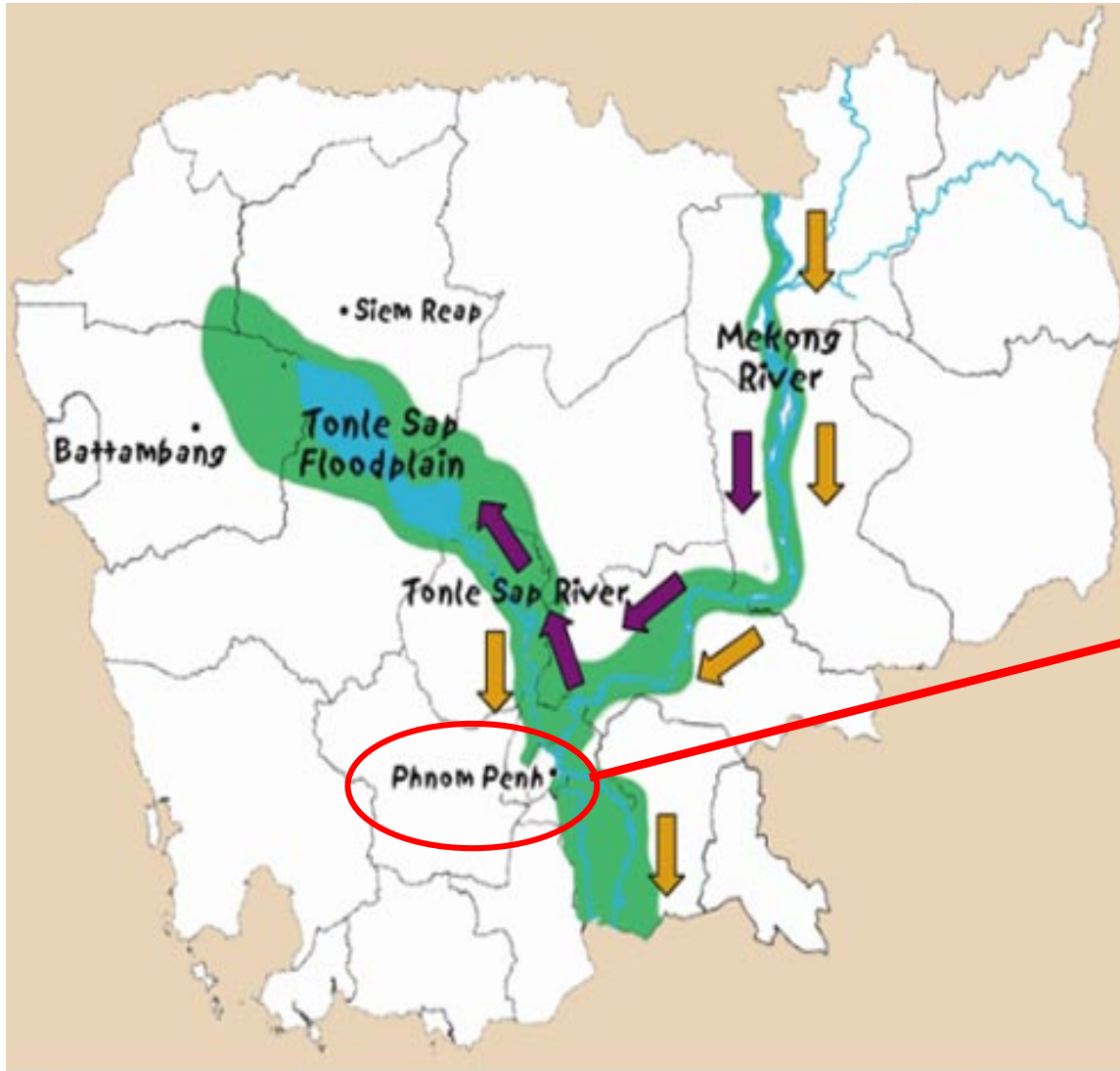
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Cambodia Representative

# Introduction to Cambodia



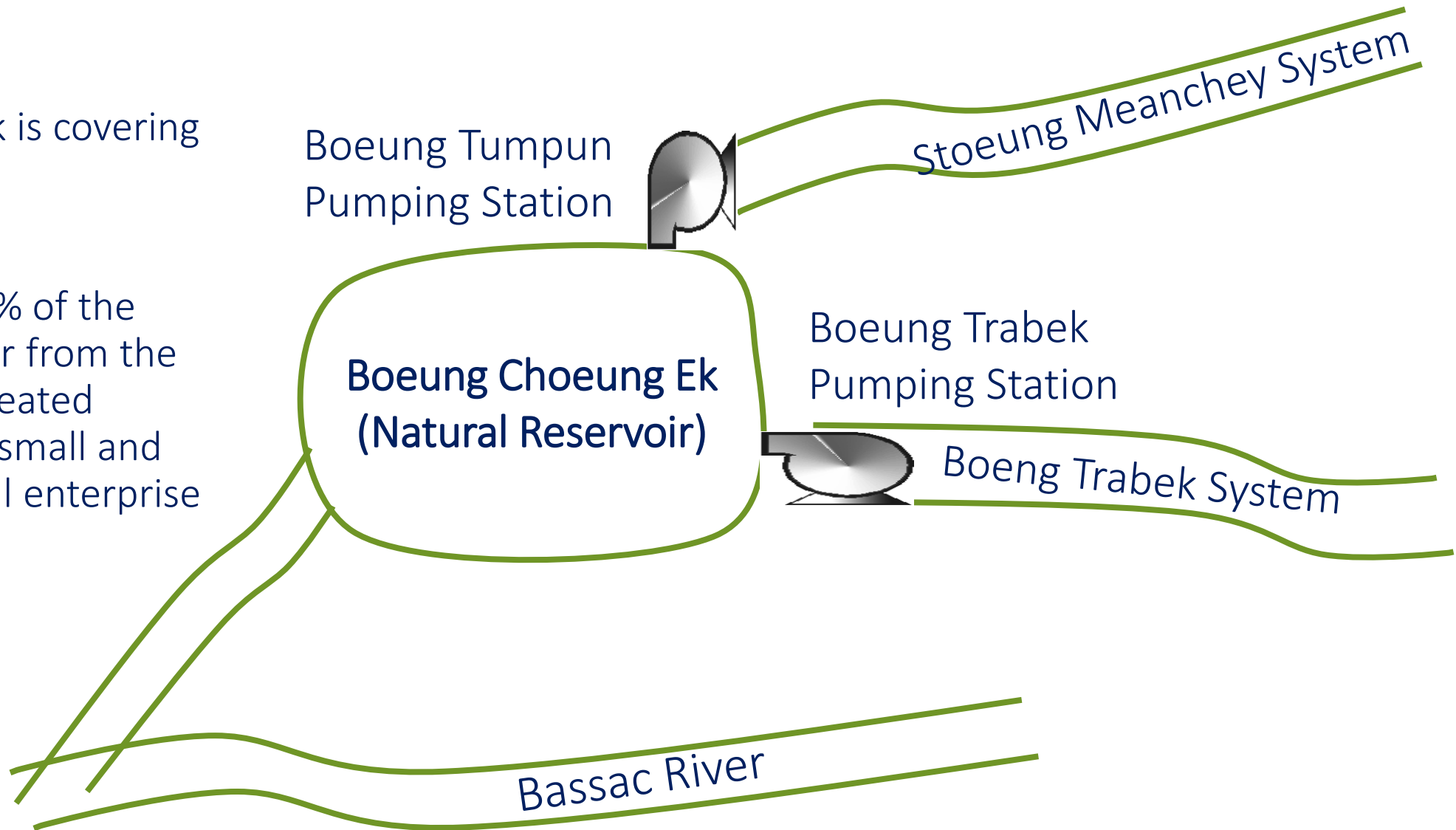
- Lao PDR to the North, Vietnam to the East, the Gulf of Thailand to the South, and Thailand to the West
- Land area 181 035 Km<sup>2</sup>
- Population: 15.7 million
- Capital city: Phnom Penh
- Population in capital city 2.6 million
- Total number of province and municipality: 25
- The main religion is Buddhism
- Currency: Riel

# Water flow in Cambodia



# Wastewater Discharge in Phnom Penh

- Boeung Choeung Ek is covering 3403 ha
- The lake receive 80% of the waste/sewage water from the city along with untreated effluent from 3000 small and large scale industrial enterprise





# Boeung Trabek Sewage System





# Stoeung Meanchey Sewage System

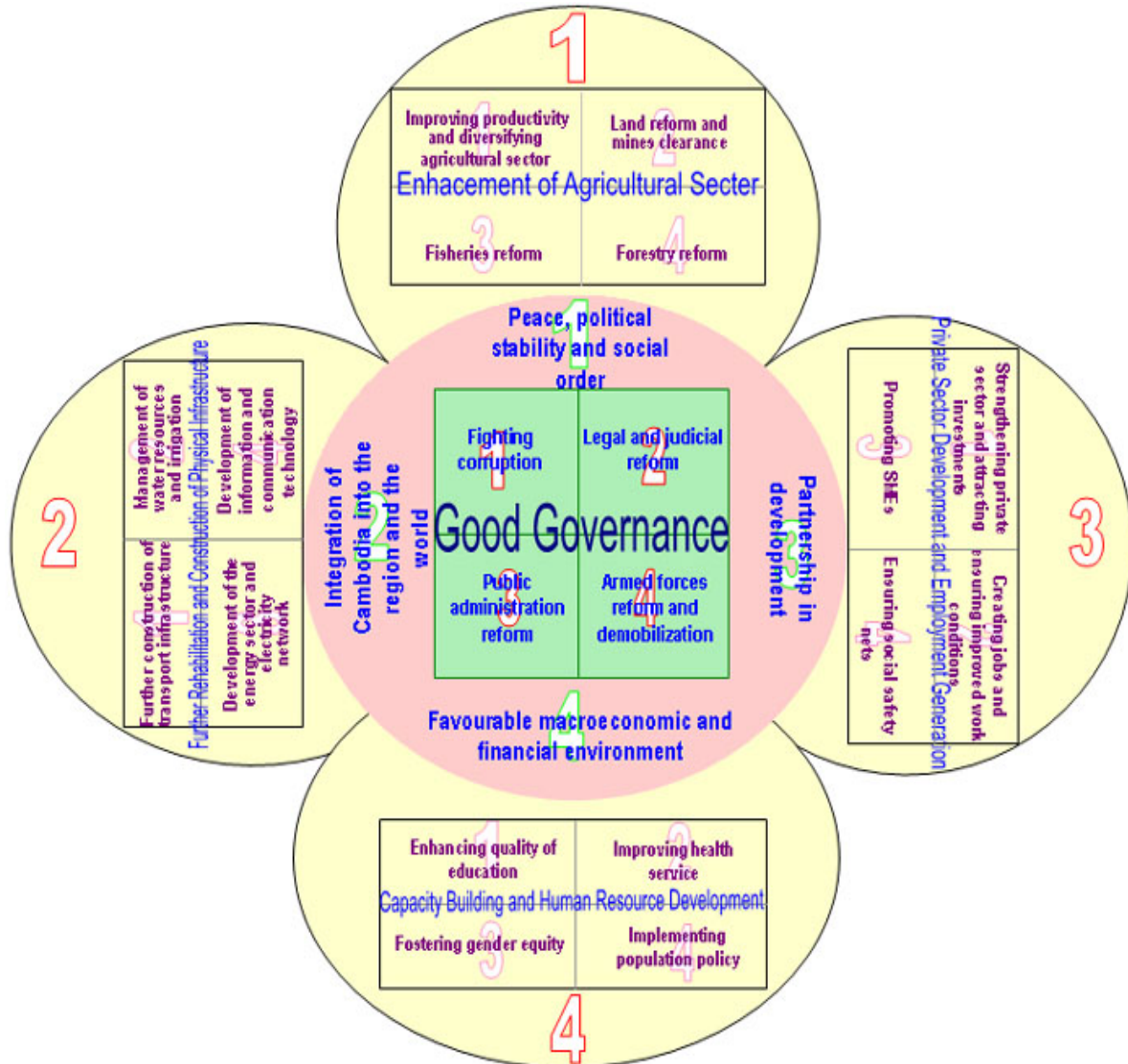




# Boeung Choeng Ek




# Strategy and Goal



- The Government of Cambodia has adopted the Millennium Development Goal (MGD) target for water supply and sanitation, specifying that by 2015, 80% of the urban population and 50% of rural population should access to safe water.
- 74% of urban population and 30% of the rural population should have access to improved sanitation.



# Institution involved with wastewater management in Cambodia

Key Ministries	Key scheme
Ministry of Economic and Finance	<ul style="list-style-type: none"> <li>- Allocating Budgets</li> </ul>
Ministry of Environment	<ul style="list-style-type: none"> <li>- Environmental planning; monitoring of effluent discharged to sewage system</li> <li>- Involve with Master Plans</li> </ul>
Ministry of Public Works and Transport	<ul style="list-style-type: none"> <li>- Developing scientific national policy concerning all public works construction</li> <li>- Involve with Master Plan</li> </ul>
Ministry of Interior and Municipalities	<ul style="list-style-type: none"> <li>- Involve with Master Plan</li> <li>- Operation and maintenance wastewater treatment system</li> </ul>
Multilateral involved with water & sanitation in Cambodia	

# Relevant Environmental Law and Regulation in Cambodia

No	Law and sub-decree	Objectives
1	1993 Royal Degree on Creation and Designation of Protected Areas	Protect the environment, manage natural resources, conserve biological diversity and ensure sustainable development in the national system of protected areas.
2	1996 Law on Environmental Protection and Natural Resource Management	Protect, manage and enhance the environment, and to promote socioeconomic development in a sustainable way.
3	1999 Sub-Decree No.27 on Water Pollution Control	Determine water pollution in order to prevent and mitigate water pollution in public waters, and thus ensures human health and conservation of biodiversity.



# Relevant Environmental Law and Regulation in Cambodia

No	Law and sub-decree	Objectives
4	1999 Sub-Decree No.72 on Environmental Impact Assessment	Determine environmental impact assessment on private and public projects and activities, which are reviewed and assessed by the Ministry of Environment before the Royal Government's approval; determine type and size of proposed, existing projects and activities of both private and public sectors which are subjected to EIA; promote public participation in EIA process and public hearings in the process of project approval.
5	1999 Sub-Decree on Solid Waste Management	Regulate solid waste management to ensure the protection of human health and the conservation of biodiversity.
6	2007, 29 June Law on Water Resource Management in Kingdom of Cambodia	For managing and monitor the use of Water Resources on Land, under ground and in the Climate.

# Effluent Standard for Pollution Sources Discharged Water to Public Water Area/Sewer

No	Parameters	Unit	Allowable limited for pollutant substances discharged to	
			Protected public water area	Public water area and sewer
1	Temperature	°C	< 45	< 45
2	pH		6-9	5-9
3	BOD5 (5 days at 200 °C)	mg/l	< 30	< 80
4	COD	mg/l	< 50	< 100
5	Total Suspended Solids	mg/l	< 50	< 80
6	Total Dissolved Solids	mg/l	< 1000	< 2000
7	Grease and Oil	mg/l	< 5	< 15



# Previous and On-Going Projects

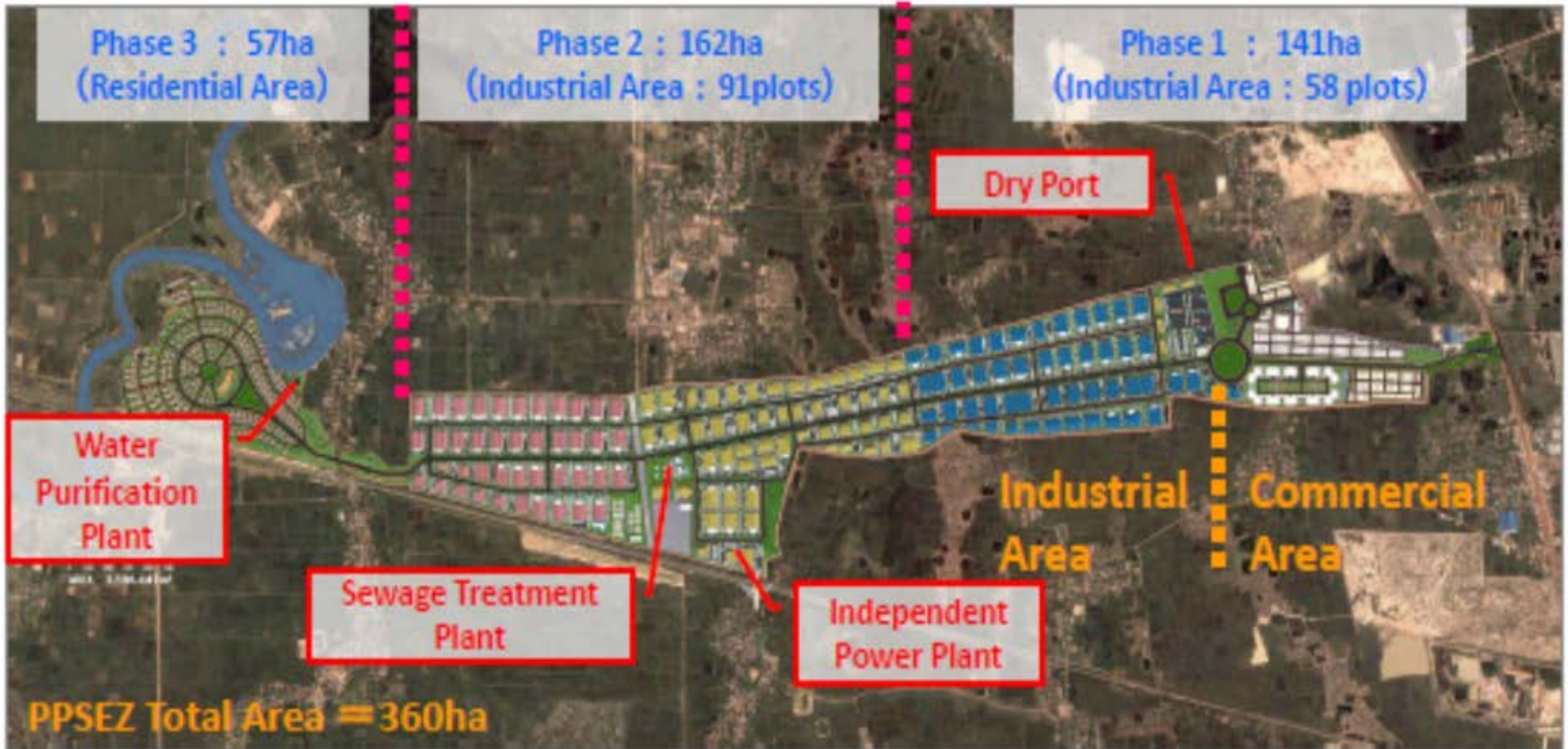
No	Project Name	Funding Agency	Loan Amount for Civil Works only	Loan Agreement	Completion Year
1	Emergency Rehabilitation Project for Water Supply and Sanitation in Battambang	EU	Grant (N/A)	1992	1994
2	Provincial Towns Improvement Project, (Part C: Wastewater Management System, and part D: Local Governance and Resource Mobilization in Sihanouk Ville	ADB Loan No. 1725 CAM (SF)& 2013-CAM (SF)	USD 11.19 M	2000	2007
3	Mekong Tourism Development Project, Part A1: Siem Reap Wastewater Management System	ADB Loan No.1969-CAM (SF)	USD 14.37 M	2003	2009
4	Siem Reap Urban Development Project Drainage & Wastewater Master Plan	AFD, French	Grant, USD 4M	2008	2009
5	Siem Reap Sewerage System and Improvement of Siem Reap River	Korean Eximbank	USD 26 M	2011	2014

## Previous and On-Going Projects (Cont-)

No	Project Name	Funding Agency	Loan Amount for Civil Works only	Loan Agreement	Completion Year
6	GMS: Southern Economic Corridor Town Development	ADB	USD 55 M	2014	2018
7	Integrated Urban Environmental Management in the Tonle Sap Basin	ADB	USD 52 M	2016	2021
8	GMS: Second Corridor Town Development	ADB	USD 38 M	2016	2020
9	Provincial Water Supply & Sanitation Project	ADB	USD 30 M	2017	2022



# Phnom Penh Special Economic Zone (PPSEZ)



# PPSEZ Wastewater Management



1. Wastewater (primary treatment by factory)
2. Primary pond
3. Lagoon
4. Settling pond
5. Final pond
6. Discharge to public river

**Capacity: 4500 m<sup>3</sup> per day for Phase 1**



# Sihanouk Ville Wastewater Management



- Wastewater treatment plant was constructed in 2005. Currently, operated under the administration of department of public works and transport.
- Sewage collection system: 65.80 Km
  - 7.34 Km of trunk
  - 6.12 Km of collector sewer line
  - 42.166 Km of main lateral
  - 10.1 Km branch lateral lines for 3,344 service connections
- The system covers an area about 221.5 ha and services about 30,000 people partly in Sangkat 1, 2 and 4 plus 1200 m<sup>3</sup>/day wastewater from brewery (CAMBREW).

# Siem Reap Wastewater Management



- Wastewater treatment plant was constructed in 2007 under ADB loan and completed in 2009. Currently, operated under the administration of department of public works and transport.
- The treatment plant operated by natural gravity flow. The systems have 6 different pond:
  - Two anaerobic pond
  - Two facultative pond
  - Two large maturation pond which size is 120,000 m<sup>2</sup>
- The treatment capacity is 3000 m<sup>3</sup> per day, cover area 264 ha.



# Issues and Challenges

- The present situation of sewerage and drainage is flooding during the raining season.
- Rapid town development especially building infrastructure
- There is no sewerage and drainage sector master plan for the town or country
- Inadequate human resources, empowerment and financial resource for operation and maintenance of the sewer system

# Necessary Countermeasures

- Strengthening of legislation and laws for wastewater management for the empowerment and enforcement
- Master plan for the wastewater management and related basic infrastructure of each urban area and town is urgently required
- Encouragement of private to participate
- People awareness to importance of wastewater management

**Thank You for Your Attention !!!**