KINGDOM OF CAMBODIA
NATION-RELIGION-KING

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Siem Reap, Cambodia

Domestic Wastewater Management System in Cambodia

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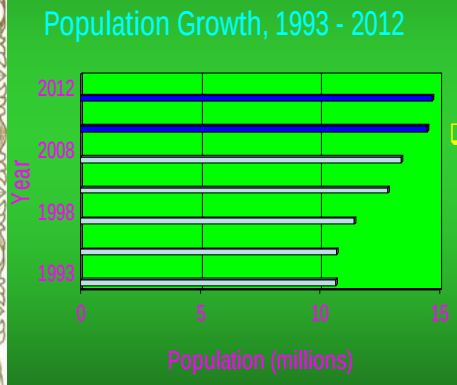
1.0 Introduction

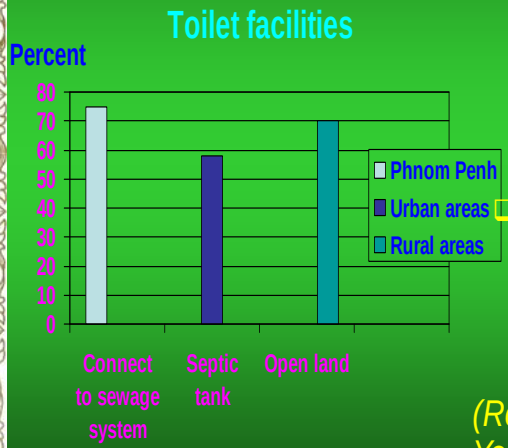
- Approximately 5/6 Cambodian territory is land and 1/6 is coastal.
- Phnom Penh is the Capital.
- 86% of Cambodia's land is located in the catchment of the Lower Mekong Basin.
- Mekong River – the world's 12th longest river system. It lengths across Cambodia for 468 km.
- Tonle Sap Great Lake is expanded from 2,500 km2 in dry season to 13,000 km2 in the wet season.

1.0 Introduction (cont.)



- Cambodia population is increased from year after year.
- It accounted around 13.4 million in 2008, and was projected to 14.7million in 2012 (NIS).
  - ☞Average growth rate was varied from 1.54 in 2008 to 1.52 in 2012.

1.0 Introduction (cont.)



- Toilet facility connected sewage system in Cambodia increased slightly.
  - 2004: 8%
  - 2009: 9.4%
- Toilet facility connected septic tank in urban are increased 41.9% in 2004, and 58.2% in 200

(Ref. to Cambodia statistical Yearbook, 2011- NIS)

1.0 Introduction (cont.)

- Sewage system plays a common role to collect together domestic wastewater, rainwater including treated industrial effluents prior to run-off to wetlands and/or receiving sources.

1.0 Introduction (cont.)

- Domestic wastewater and urban sewage are commonly collected by sewerage system and run off to drainage and retention pond/lake or wetland afterward for self purification (through natural treatment process), and finally runs off to the main watercourse.

1.0 Introduction (cont.)

- The Royal Government of Cambodia openly provides any participation and/or contribution from local authority, communities, especially investors to improve the management of small-scale sewage and sanitation.
  - ☞The Phnom Penh Authority particularly, in developing infrastructures, promotes and applies the 50-50 Principle based.
    - ➢50% of the total project cost will be paid by the Phnom Penh Municipal Authority, and the remaining 50% will be contributed by local communities.

2. Policy and Legal Framework

- The Goal No. 7 of CMDGs: *"Ensure environmental sustainability"* sets targets before the end 2015:
  - ☞Mainstreaming of good governance into the management of the environment and natural resources,
  - ☞80% of the urban population and 50% of the rural population should have access to safe water, and
  - ☞74% of the urban population and 30% of the rural population should have access to improved sanitation.

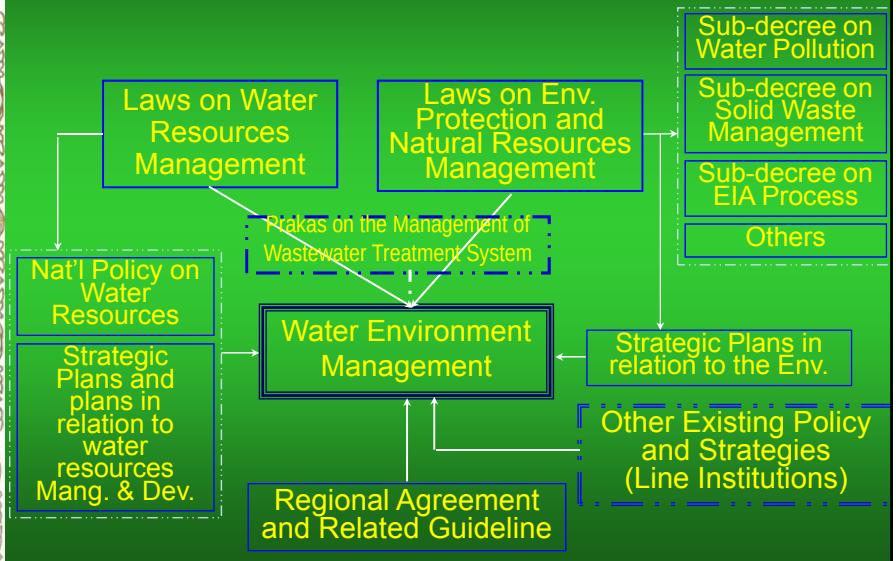
2. Policy and Legal Framework (cont.)

- Rectangular Strategy – Phase II, Rectangle II, Side 2 (Water Resources and Irrigation System Management),
  - Priority to the rehabilitation, construction, maintenance of irrigation system and related infrastructures.
  - Rights of access of people to clean water supply to ensure food safety and better livelihoods in accordance with CMDGs, and preserve the ecosystem of unpolluted water and clean environment.

2. Policy and Legal Framework (cont.)

- Toward the environment and natural resources management and protection, NSDP Update 2009 – 2013 addresses the priority of:
  - Ensuring sustainable use of natural resources, and ecology system and water environment will not be polluted, through implementing measures of EIA to all existing and proposed development projects, including environmental pollution control.
  - Developing legislations of environmental quality management, EIA, chemical substance management, including the review and amendment of Law on Environmental Protection and Natural Resources Management.
  - To promote the implementation of 3R in order to reduce waste and to recycle for reuse export.

2. Policy and Legal Framework (cont.)



2. Policy and Legal Framework (cont.)

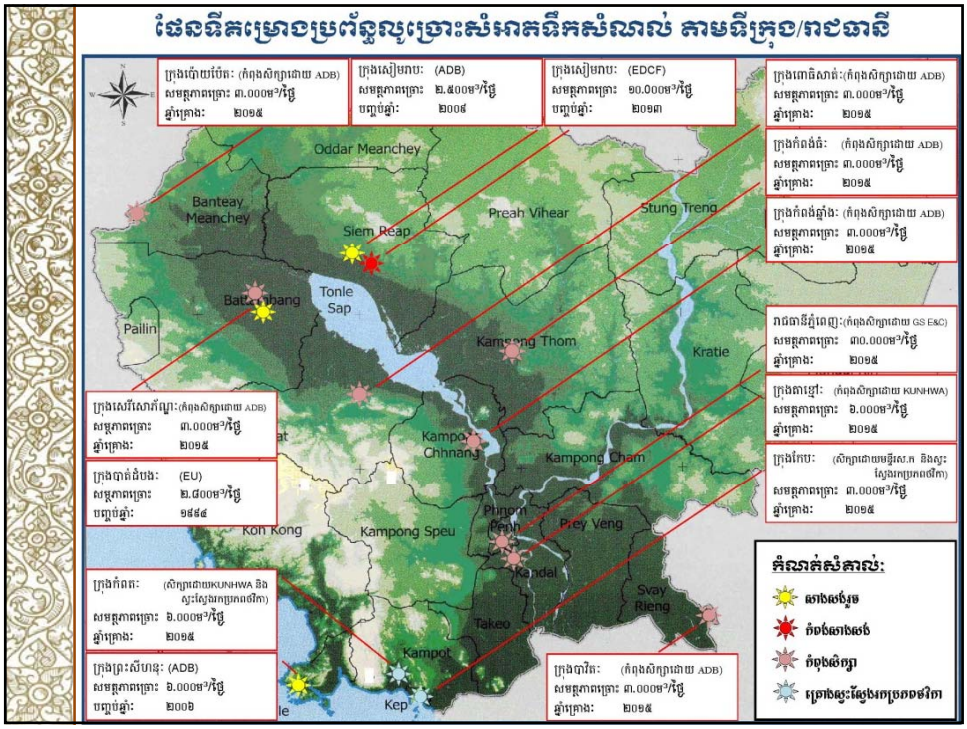
- Several legislations in relation to the environment are being drafted, e.g. Environmental quality management law; EIA law; Chemical management law.
- Existing policies and legal frameworks – all are matched to the Rio+20's outcomes in relation to water sector, these include:
  - Access to water and sanitation
  - IWRM
  - Water cooperation
  - Water in the green economy

3. Domestic Wastewater Management in Cambodia

- Cities and provinces of Cambodia, commonly, have neither had a central wastewater treatment plant, nor enough treatment system.
  - Except three main provinces, namely, Battambang, Siem Reap and Sihanoukville, have the central domestic wastewater treatment plant, and these are being operated.
  - A central domestic wastewater treatment plant, however, is being taken into consideration in some provinces and cities (being studied and/or constructed).

3. Domestic Wastewater Management in Cambodia (cont.)

- Purposes of constructing and operating sewerage system aim to:
  - Improvement of public health/sanitation
  - Improvement of living environment
  - Conservation of water environment
  - Efficient use of treated wastewater, sludge, etc.
  - Construction of desirable water recycling environment
  - Flooding measures



3. Domestic Wastewater Management in Cambodia (cont.)

- Wastewater treatment process is based stabilization pond system: anaerobic pond, facultative pond and maturation pond.
  - ☞ It is designed for:
    - BOD removal rate – 95%
    - Coliform removal rate – 99%
    - Temperature – 24°C

Siem Reap Waste Stabilization Pond System

Sihanoukville Waste Stabilization Pond System

3. Domestic Wastewater Management in Cambodia (cont.)

- Flow and treated domestic wastewater quality are regularly measured to abide by the national water quality standard in public water areas for bio-diversity conservation, prior to discharge into receiving sources.
- The analysis parameters are: BOD, COD, SS, DO, pH, TN, TP and temperature.

3. Domestic Wastewater Management in Cambodia (cont.)

- In Cambodia, the management of domestic wastewater commonly so-called the cross sectoral issue (MLMUPC, MPWT, MoE, MoWRAM).
  - MLMUPC is engaged a technical permission towards construction including septic tank and sewage pipe.
  - MPWT has a mandate to construct, operate and maintenance the sewerage and drainage system.
  - To abide by the existing environmental legislations, MoE officers conduct routine monitoring water quality (monthly) at public water areas and do a self-analysis – those are being received treated wastewater (e.g. by natural treatment process) in order to avoiding any serious impacts to water environment.

3. Domestic Wastewater Management in Cambodia (cont.)

- Officers of MoWRAM, based on the Law on Water Resources Management, and the Water Quality Monitoring Network (MRC Program) conduct watercourse monitoring (in terms of quantity and quality) in Cambodia.
  - Water samplings are taken monthly at primary and secondary stations and analyzed at MoWRM's LAB.

4. Gaps and Opportunities in Domestic Wastewater Management

Gaps	Strength and Opportunities
▪ Most sewerage and drainage system were constructed in French colonial (wreckage, block, disconnected, etc.). ▪ Some urban areas do not have enough sewerage system. ▪ There is not a sewerage and drainage sector master plan for the towns or country, including a particular legal tools (policy/strategy)	▪ Environmental law and related Sub-decrees can be used (e.g. Sub-decree on Water Pollution Control; Sub-decree on EIA Process). ▪ Several legislations in relation to water environment management including the Prakas on the management of wastewater treatment system

4. Gaps and Opportunities in Domestic Wastewater Management (cont.)

Gaps	Opportunities
▪Inadequacy of human and financial resources for O&M and management of sewerage system. - Collecting fee (wastewater treatment service) is imbalance to the expenditure of O&M and management the treatment plant.	▪Domestic wastewater treatment is recognized to be necessary and supported by relevant government institutions, including local authorities (Government priority)

4. Gaps and Opportunities in Domestic Wastewater Management (cont.)

Gaps	Opportunities
▪Limit participation from stakeholders, especially communities (less interest) in the sound management of domestic wastewater due to some reasons.	▪A proper domestic wastewater management is one of indicator for the clean city contest (2012 – 2015).

5. Conclusion

- Developing master plan and constructing sewerage and drainage system for urban area and towns throughout the country is prioritized responding to the Goal No. 7 of CMDG and Rectangular Strategy - Phase II.
- Encouraging and promoting the Public Private Partnership, meanwhile the national budget is limited.
- Financial mechanism/mobilization for operating, maintaining and managing domestic wastewater treatment system, including capacity building and institutional strengthening – these should be high priority.

5. Conclusion (cont.)

- Developing a particular legislation including policy and strategy for domestic and industrial wastewater management and its implementation – it's a priority plan.
- Technical cooperation, experience exchange and networking with other countries in the region/globe should be improved.

Thank you so much…