Towards Sustainable Urban Water Management in Asia and the Pacific

Liveable cities

The infrastructure we build today will shape the way we produce and consume for decades to come.

Workshop on Water and Green Growth
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Coverage

- Urbanization trend – World and Asia-Pacific region
- Economic development and resource consumption
- Water availability in the region
- Water management
- Safe water and sanitation
- Managing urban water: change the way
- ESCAP’s work on urban water management
Urbanization trend

- **World urban population**: 746m (30% of total) in 1950, 3.9b (54% of total) in 2014
- 6.4b (66% of total) in 2050 – with 90% rise in Asia & Africa; Every month world urban pop. grows by 5m.

- **Asia-Pacific urban population**: 1.96 b (48% of total) in 2014; Population rise (1990-2014) nearly 1 billion and 2014: 53% of world urban pop. lives in the region
- Urban population passes the 50% threshold in 2018
- 3.2b (64% of total) in 2050; Estimated 3.6m people arrive in Asia-Pacific’s cities every month

- **2014**: 17/28 world’s megacities in Asia & Pacific, 2025: 22/28 world’s megacities and 7/10 of the world’s largest cities,
- 18 out of 30 world’s largest urban agglomerations are in the region; Growth rates are highest in peri-urban areas: core urban area ‘shrinking’
- **Smaller cities (<500,000 people)** occupy more share of urban population (54.4%)
- **2009**: slum population (more than 500m)-30% of total urban population and in 1990, it was 50 % ....

Source: Derived from UN World Urbanization Prospects, the 2011 revision data.
Economic development & resources consumption

• The Asia Pacific region: one of the fastest growing regions in the world since the 1970s. (with more than 4% average growth rate)
  • The region’s real GDP was $3 trillion -> $16 trillion (1970->2012)

• Urbanization and economic growth are deeply interlinked: Cities are driving the region’s economy, producing around 80 % of GDP;
• **High material consumption and intensity (almost 3 times that of rest of the world) in the region**

• Cities are responsible for 67% of the energy consumption and
  • they are source of 70% of GHG emissions;
• They are driving climate change & are frequent disproportionately exposed to extreme weather related events: floods & droughts.
Water availability in Asia and the Pacific

- Water - vital for human lives and for natural ecosystem, play important role for economic development (energy, food and other goods and services) and MDGs goals (esp. 1, 7), and renewable
- Less availability of water resources per capita in the region (fallen by a fifth since 1997 to 4,815 m³ in 2012)

Annual per capita availability of water resources, world regions and Asian and Pacific subregions, 2011

Source: UNESCAP Statistical Yearbook 2013
Water management

- The growing population and rapid urbanization, economic development (less resource efficient/unsustainable pattern) have increased pressure on water resources in the region.
- Poor management of water resources – less per capita availability (2nd lowest-APR).
- Urban water demand competing among sectors, e.g., agriculture/industry.
- Over extraction of water/ Increased withdrawal of groundwater, largely in secondary cities (extraction rate is more than 50% of recharge rate).
- Poorly managed wastewater: only 15–20% of all wastewater generated in the region receives some level of treatment before discharged into water resources.
- Total volume of wastewater produced in urban areas is estimated at 150–250 million m3 per day. This wastewater is either discharged directly into open water bodies or leaches into the subsoil. In many fast-growing cities (small and medium-sized cities with populations of less than 500,000), wastewater infrastructure is non-existent, inadequate or outdated.
- Change in Rainfall patterns and increased floods and droughts – results of climate change/increased greenhouse gases emission.
Water and sanitation

UN Secretary-General said

"Urbanization brings opportunities for more efficient water management and improved access to drinking water and sanitation. At the same time, problems are often magnified in cities, and are currently outpacing our ability to devise solutions."

Ban Ki-moon, UN Secretary General

Research shows US$1 invested in water and sanitation returns US$7 of economic benefit

- **Access to improved water sources**
  - risen from 73% in 1990 to 92% in 2012 (94 to 97% in urban area, 62 to 87% in rural area)

- **Access to improved sanitation**
  - still relatively low at just 59% in 2012 from 36% in 1990 (rural areas: 46%)
  - people living in urban areas is 75%

- **27% of the urban dwellers in the developing world does not have access to piped water at home**
Managing urban water: change the way

- Prevent water resource degradation, ensure safe water supply and sanitation service, improve resilience to climate change

- Eco-efficient water infrastructure: ‘an integrated approach in water infrastructure development to achieve ecological & economic efficiency’

- Eco-efficient water infrastructure requires a shift in policies, from piecemeal to integrated, and a shift in infrastructure design, from centralized single-purpose to decentralized and multipurpose

- Urban planning and infrastructure planning needs to integrate water supply, rainwater harvesting, storm water management & wastewater treatment and recycling and flood control measures
Eco-efficient Infrastructure

Eco-efficiency

The dominant paradigm of centralized infrastructure development depended on exploitation of natural resources.

⇒ unsustainable

A fundamental shift in the management and use of resources is required.

⇒ Eco-efficiency

Eco-efficiency = economic efficiency + ecological efficiency

It means creating more goods and services with ever less use of resources while creating less waste and pollution.
Eco-efficient Water Infrastructure

- Eco-efficient approach for Water Infrastructure - process to achieve the goals to (1) maximize water goods and services values; (2) optimize natural resources and (3) minimizing the environment impacts to ecosystem -3R principles (reduce, recycle, reuse).

### Physical Infrastructure
- Dams, water supply & sewage treatment facilities, aqueducts, sewers

### Non-physical Infrastructure
- Laws, regulations, regulatory programs, government bureaus, civil society groups, stakeholder dialogues

### E/E Water Infrastructure
- An optimal level of water utilization & a less burden to limited water resources

Source: Seungho Lee, 2008
Integrated Urban Water Management

From Hoban and Wong, 2006
Integrated Urban Water Management (IUWM)

• Is a practice of managing freshwater, wastewater, and storm water as links within the resource management structure, using an urban area as the unit of management.

• Improve water supply and consumption efficiency
• Ensure adequate water quality for drinking water as well as wastewater treatment through the use of ESTs and preventive management practices
• Improve economic efficiency of services to sustain operations and investments for water, wastewater, and storm water management
• Utilise alternative water sources, including rainwater, and reclaimed and treated water
• Engage communities to reflect their needs and knowledge for water management
• Establish and implement policies and strategies to facilitate the above activities
• Support capacity development of personnel and institutions that are engaged in IUWM
ESCAP’s work on urban water management

- ESCAP has been working to address the current and emerging challenges of urban water by enhancing regional/national and local capacities of developing countries to promote eco-efficient urban water infrastructure in the region,

  - through application of integrated rainwater and storm water management systems;

  - application of integrated community-based water and decentralized wastewater treatment systems;

  - development of other eco-efficient urban water infrastructure including policy/strategy documents, low-cost green and resilience building/school designs; and

  - through regional fora addressing the challenges of urban flood management in the context of climate change.
Recently Completed Project on Eco-efficient Water Infrastructure

1. Project Title: Application of community-based integrated water supply and wastewater treatment systems to improve resilience to climate change

- Major target countries: Indonesia, the Philippines, and also other regional countries;

- Target groups: Policymakers of key Ministries involved in environment, science & technology, water and urban development issues, local government officials, relevant communities & national stakeholders;

- Project duration: 2011 – 2013;
Activities & outcome

Main activities:

- Development of the national Roadmap on eco-efficient water infrastructure
- Installation of the pilot integrated water/wastewater treatment systems (community-based)
- Organization of national advocacy workshops
- Organization of a regional workshop

Project results:
Enhanced capacity of policy makers to formulate and apply policy options that (i) improve the quality of growth; (ii) help achieve IADGs and MDGs in the area of water resources management
Philippines

**Activities organized/results achieved**

I. Development of the national Roadmap
   - In collaboration with National Economic Development Authority (NEDA), ‘Philippine Eco-Efficient Water Infrastructure Strategic Roadmap’ has been developed.
   - InfraCom (Infrastructure Committee of the NEDA board) agreed to mainstream the eco-efficient concept in all relevant agencies and directed NEDA to disseminate the Roadmap to concerned water-related agencies.

II. Installation of the pilot demonstration systems
   - The integrated storm water and wastewater treatment system has been installed at Philippine Science School, Cebu, Philippines.
   - The rainwater harvesting system has been under construction at Zapatera Elementary School, Cebu, Philippines.

III. Organization of national workshops
   - In collaboration with NEDA, the national workshop to enhance awareness of key stakeholders on the Roadmap was held in Nov, 2012.
   - In collaboration with Department of Science and Technology Region 7 (DOST 7), the national advocacy workshop to disseminate lessons learned and outcomes of the pilot systems was held in September, 2013.
Indonesia

• Activities organized/results achieved

I. Development of the national Roadmap
   - In collaboration with Ministry of National Development Planning (BAPPENAS), ‘Strategic Roadmap to implement Eco-Sustainable Water Infrastructure in Indonesia’ has been developed
   - BAPPENAS agreed to take ownership and implement the Roadmap for the period (2015-2019) following the development of its roadmap (2013-2014) based on our report.

II. Installation of the pilot demonstration systems
   - The rainwater harvesting system for water supply has been installed at a dormitory building of the Pasundan University Campus, Bandung, Indonesia
   - The community-based wastewater treatment system has been under construction at a tributary of Chikapundung River, Bandung, Indonesia

III. Organization of a national workshop
   - In collaboration with Bandung City Government, the advocacy workshop to disseminate lessons learned and outcomes of the pilot systems was invited to be held on 21 Nov as one session of Bandung City’s Water Festival
Organization of Regional Workshop

Regional workshop on eco-efficient water infrastructure towards sustainable urban development and green economy

- held on 12-13 December 2013 in Bangkok, Thailand.

- The overall objective: to share achievements and exchange experiences and replicate practices in eco-efficient water management, as well as develop next steps in the context of green economy and sustainable urban development.

- The target groups: government officials from the region (LDCs, LLDCs), experts on integrated water resources/eco-efficient water infrastructure and so on.
Recently completed project (2) – Pilot Implementation of Low Carbon Green Growth Roadmap for Asia and the Pacific

The Asia-Pacific region is rapidly urbanizing. While this transformation is benefitting many economies, it has placed enormous pressure on natural resources and the urban environment. In large part this is a result of inefficiencies and exploitation of resources without necessary attention to limits or costs. If the region is to benefit from its urban future, however, it must shift towards eco-efficient and climate resilient models underpinned by the need to build more sustainable, equitable and resilient cities.

The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) has implemented a project titled “Pilot Implementation of Low Carbon Green Growth Roadmap for Asia and the Pacific” with the aim to enhance capacity of developing countries on policy development for eco-efficient resource management and sustainable and resilient urban infrastructure development in the region. The project was funded by the Government of the Republic of Korea through Korea-ESCAP Cooperation Fund (KECAP).
Pilot Eco-efficient urban water infrastructure in Kathmandu
Thank you very much!!

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For details of our work on Managing Urban Water, please visit at http://www.unescap.org/resources/managing-urban-water