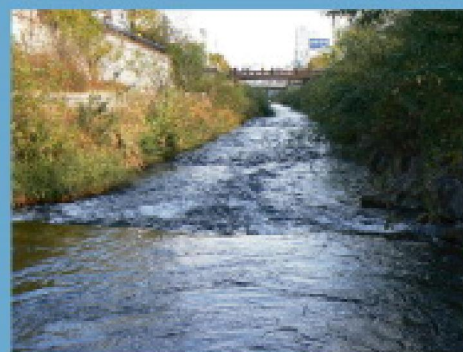
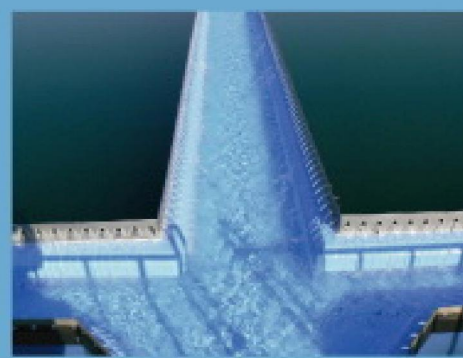


Development of Eco-Efficient Water Infrastructure for
Socio-Economic Development in Asia and the Pacific Region

**The Policy Brief and Recommendation for Decision
Makers on How to Integrate the Eco-efficiency
into New Five Years Development Plan
in Indonesia**



June 2011

May 2010

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1. Statements of Problems

a. Issues and Challenges (state overview of problems and issues, root causes of the problems, and policy implications of the problems)

By nature, Indonesia faces a big challenge in managing water resources since water is distributed uneven in term of time and spatial. Some areas have abundant annual rainfall while some others located in arid areas that are given limited amount. Ongoing economic development and rapid population growth in Indonesia over the last decades have led to increased demand for water resources while its availability tends to decrease due to water pollution, environment degradation, and degraded water infrastructures. This condition has threatened the sustainability of development in Indonesia and increased the potentials for adverse environmental impacts. More frequent water scarcity associated severe socio-economic impacts occur particularly in dry season whereas flood has become regular event during rainy season. The potential impacts of climate change may further diminish the resilience of water resources.

Realizing limited government budget available, it is time to consider matching with other source of funds such as community contribution as well as from private companies through corporate social responsibility or public private partnerships scheme. Government could not manage water by themselves and neither could communities or private entities, but all need the water at the end. Therefore government, communities, private entities and other stakeholders have to work together hand in hand for better water management. As addition, there should be a new approach that could give bigger impact or higher added value from the same input for investment and at the same time it gives less impact to the environment. One of the options is through policy intervention in water infrastructures development.

b. Objective of the Policy Brief

The objective of this document is to provide background paper for adopting the new policy approach on eco-efficient in water infrastructure development in Indonesia to address the above water issues and challenges for next 5 year development plan (2010-2014) and forward.

2. New Approaches to Problem Solving

a. What is eco-efficient?

In macro economic development it is well known about the green growth idea that put more emphasize on reducing environment impact. In project scale, it is adopted the sustainable development approach that considers economic feasibility, environment sustainability and social acceptance. Currently, the concept of sustainable development is downscaled become eco-efficient approach that focuses on the efficiency in economy and ecology. Previously the concept was developed and uses by business entities to get more profit and at the same time promote environment sound company. Many countries have adopted the concept for the development of water infrastructures.

b. Why and how the current approaches are failing?

This part shows some issues that illustrate the urgency and necessity to adopt new approach in developing water infrastructures. Eco-efficient could be the answer to those challenges.

The reliability of many water systems that are mostly dependent on single centralized sources of water is uncertain due to the combined pressures of population growth, variable climate and the potential for climate change. Population growth will continue to increase pressures on regional water resources. In addition, new settlements are increasingly remote from centralized services which compound declining natural resources with increasing infrastructure and conveyance costs. The ongoing sustainability of settlements is also further challenged by local and regional environmental impacts of traditional water infrastructure.

Centralized water supplies that were reliant on extractions from rivers, storage in dams and conveyance to settlements via extensive pipe systems have shown its limitations to address all water issues. Centralized paradigm for supply of water, and wastewater and storm water disposal has remained largely unchanged in Indonesia for decades, which reliance is highly susceptible to population growth and the impacts of drought and climate change.

Against these backgrounds, eco-efficient approaches to water infrastructure could supplement traditional centralized approaches to water cycle management with interventions at multiple scales from household to city to region, and provide the necessary adaptation of water resource strategies to the potential impacts of climate change. It is also possible that eco-efficient water infrastructure can be provided as an alternative to traditional approaches to water cycle management.

Out of the box thinking in the development of water infrastructures could add more value and resulting more benefit either for economy or environment. The urgent necessity to use water extremely efficient urges new way in managing water at the same time as conserve surface and groundwater. Energy scarcity will lead the importance to have alternative renewable energy such as water. Eco-efficient would address all those issues with a different approach.

c. Need for Eco-efficient Approaches

- Eco efficiency is to improve the efficiency in the context of economy and ecosystem
- Eco-efficient water infrastructure has been defined as an integrated approach to ecological and economic efficiency that aims to maximize the value of water related services, optimize use of natural resources and minimize impacts on ecosystems.
- This represents a paradigm change of water resource management from apparent market based efficiency dominated by water monopolies to a more holistic strategy based on multiple objectives and scales within the framework of protecting ecosystem services and human welfare.

3. Expected Benefits of Eco-efficient Approaches

a. Good practices

In fact, eco-efficient concept is not a new practice in Indonesia. Indonesia has conducted some activities that employ eco-efficiency concept for years but it has not been well conceptualized yet. The activities and the lessons learnt are :

1. System of Rice Intensification (SRI) that is higher production of rice with less water usage
2. Micro-Hydro to utilize water power in a small river, water fall or irrigation canal to spin turbines and produce electricity
3. Coastal Protection with mangrove as a green belt
4. Biopori holes to increase infiltration capacity
5. Rain Water Harvesting in house hold level
6. Small scale / field reservoir to reuse stored rainfall for agriculture irrigation in dry season
7. Retention pond in wide area such as apartment/condominium, hotel, etc.
8. Biogas that being produced from the domestic and livestock waste (from feces)

b. Tangible Benefit – sustainable development (environment & budget efficiency)

1. To provide the development paradigm in water sector through change of mindsets to meet the changing environment globally and locally as well as to achieve the national water vision and sustainable development.
 - ✓ Viewing water infrastructure through an eco-efficient lens can reveal hidden costs and unexploited opportunities. Better information supports better decisions, which can lead to competitive advantage
2. Viewing hidden costs and benefits of managing environment impacts and improvements can result in more informed decision-making and strategic planning
3. To provide the decision making philosophy for working with complex systems and environments along with multiple criteria for policy formulation, decision making, implementation and evaluation related to water resource management and water infrastructure
4. To increase productivity by developing and applying innovative planning and design for infrastructure, facilities and products
5. To increase the national revenue, and reduce costs, risk and liability
 - ✓ Optimizing the use of materials and resources, minimizing waste, and offering recycling services provide cost savings opportunities, increase national revenue and even opens new markets
 - ✓ by improving environmental performance by reducing toxic emissions, and increasing the recovery and reuse of "waste" material
 - ✓ through eco-efficient engineering and design to reduce water/energy/material intensity for water resource development, (e.g. Water sensitive urban design of Australia)
 - ✓ through the integrated planning with other infrastructures for synergy effects and reduction of overlapping investments

- ✓ Implementing recycling programs, improving water infrastructure efficiency and land management processes will increase the national revenue and improves the country's image while reducing operational costs.
 - 6. To enhance the nation's visibility and nation brand image of Indonesia as eco-country
 - 7. To enhance citizen's morale and pride as living in eco-country
- c. Expected Outcomes for Adopting Eco-efficient Approaches of Water Infrastructure**
1. To integrate the eco efficient approaches into national development planning process including midterm national development plan as new development paradigm in water infrastructure
 2. To invest in capacity building for planning and technology for eco efficient water infrastructure development
 3. To enhance the awareness, educating and understanding of eco efficient approach for water infrastructure
 4. To apply the eco efficiency into prioritized pilot programs to demonstrate its effectiveness.

4. Policy Recommendations: Eco-efficient Water Infrastructure Development in Indonesia

The Eco efficient Water Infrastructure Development in Indonesia is recommended to adopt the eco-efficient as new policy in the development of water infrastructures in the medium-term national development plan (RPJMN) 2010-2014 as a legal basis for implementation considering the necessity and urgency in facing current water related problems and challenges.

At this early stage, it will be more effective to focus on the provision of raw water supply and flood management measurements. Since the degradation of watershed, the flood and drought occur more frequent every year in almost every place in Indonesia. It is imperative to provide sufficient water storage to store water in rainy season and reuse during dry season. The storage does not necessarily have to be large-scale dams, but it could be small-scale field reservoirs or rain harvesting in household level. The small reservoirs at the same time contribute in increasing the groundwater recharge and decreasing the peak water discharge that might reduce flood. Furthermore, the policy will reduce social impacts and also it will be manageable by the community to ensure its sustainability. Treated domestic wastewater could also be reused as an alternative source of raw water for irrigation.

5. Strategy and Actions for Integration of Eco-efficiency

a. Required Actions and Measures for Integration of Eco-efficiency

The variables of the eco-efficiency indicators are classified into 5 categories for evaluation as following based on products/services and environmental influences related to water sector.

a) Status of water availability and water infrastructure, such as:

Population, Precipitation, Evaporation-transpiration, Stream flow, Runoff ratio, Available water resources, Hydropower per capita, River reaches (length and basin area) managed by central government, River reaches (length and basin area) managed

by local governments, Percentage of the river segments that have improved channel, cross-section and embankments, Water supply and wastewater treatment plants (location, capacity, treatment type, etc)

b) Production and consumption patterns of freshwater, such as:

Regional freshwater consumption by sectors, Regional groundwater consumption by sectors, Natural mineral water consumption, Domestic product by sectors (agriculture, mining, manufacturing industry), Hydropower energy production (MWh)

c) Agricultural products and sources of environmental loads, such as:

Area of cultivated land, Farm population, Livestock (heads), Agricultural products, Land use area, Wastewater discharge by industries, Night soil generation and treatment, Livestock wastewater, Consumption of chemical fertilizers, Consumption of pesticides, River and reservoir water quality by parameters (temperature, pH, DO, COD, BOD, SS, T-N, T-P, E-COLI and heavy metals)

d) Damages from water-caused natural disaster

Flood damage (persons suffered, total damaged property and casualties, flooded area, and damaged farm area) from storms and floods. Drought damage (people's suffered, total damaged property, drought area)

e) Urban water supply and sanitation

Serviced population, Water supply capacity - liters per capita per day, Sewage treatment serviced population, Polluted water treatment serviced population, Annual water for charging and charges, Water production cost, Sewage water for charging and charges, Treatment cost.

b. Strategies for adopting Eco Efficiency

1. Adopted to policy (RPJM)

It is a long-term process to develop eco efficient in water infrastructure; long-term plan is needed to ensure the achievement of national goals. In Indonesia, it is then needed to adopt the eco efficient approach to the National Long-term and Medium-term development plan. At local level, the plan needs to incorporate existing local and traditional values since these values often contain the same philosophy of eco efficient with regards of the use of natural resources in general.

The key elements of a policy framework to develop eco efficiency on infrastructure are:

- Integrate infrastructure in the overall national sustainable development framework;
- Integrate sustainability concepts into policies sector;
- When possible integrate among sectors (e.g. land-use planning and transport);
- Internalize externalities: identify externalities and integrate them in policies sector and at project level;
- Raise awareness at all levels (politicians, investors, public – private, government, higher education sectors);
- Develop sustainability indicators to assess policies/projects and monitor (eco-efficiency).

2. Advocacy and Awareness: Stakeholder socialization

- Develop the media strategy including website, TV program and newspaper and other locally adopted media, as a mechanism for awareness raising, capacity building,

knowledge sharing. Media campaign aims at creating positive image, triggering feedbacks from related groups with the same concern, and generating bigger impacts so that more people would know and be aware of both the eco efficient approach and its implementation.

- Facilitate partnerships and networking in the region through sharing knowledge, experiences, technologies and lessons learnt.
- Conduct capacity building of the stakeholders, if necessary.

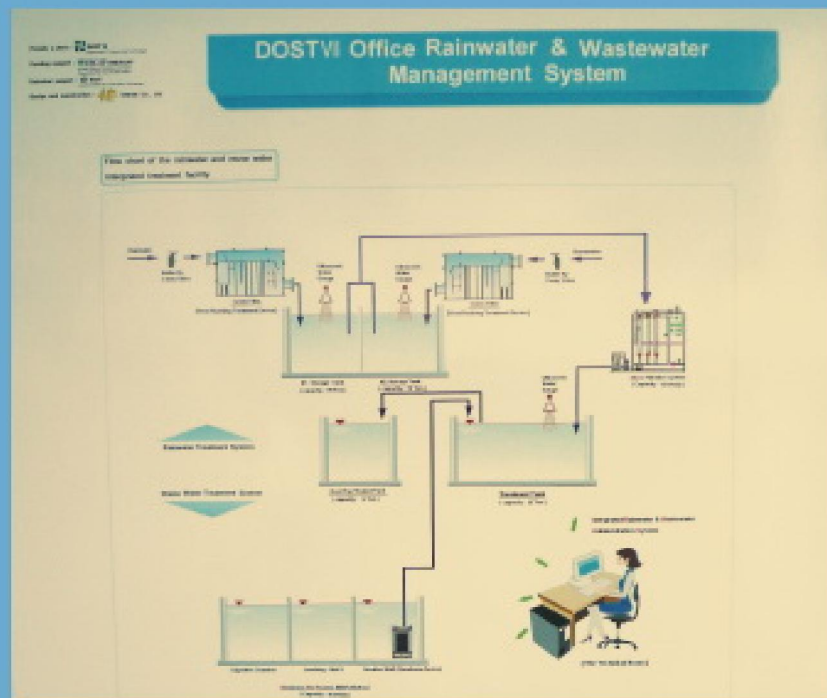
3. Capacity buildings for government officials

Government officials plays important role on integration of eco efficiency. Their performance somehow can be used as one of indicator for successful implementation of eco efficiency policy. In order to improve the performance of government officials and match with the requirement of eco efficiency policy then capacity building is needed.

The capacity building includes but not limited to national training but also international training and comparative study for government officials. Government officials usually are busy with routine work- paper work and administrative matters so they run the business as usual. International training or comparative study will open their mind, improve their knowledge and give them a wake up call on what is going on in the outside world. Sometime small innovation could bring significant impact to the output of the works. A serial focused group discussion or policy dialogue is also one of the tools to build government official's capacity, as eco-efficiency does not require high technology and big investment but more on the new way and inovative of thinking. Technical assistance for formulating and conceptualizing the eco-efficient concept and action plan would really help considering that limited resources are available at the moment.

4. Pilot projects

Pilot project is needed to set out example as to how policy is implemented into realistic actions. Pilot project is intended to exercise tools and methods created as interpretation of policy. A replicable model as to how an eco efficient approach is implemented is expected as the result of pilot project. Pilot projects should be started not with totally new project but with something that has already done before in many years but in much better plan and concept. Some ideas of pilot projects for eco-efficient approach in water management are domestic wastewater reuse for paddy field irrigation, biogas plant to reduce waste to the river, constructed wetland to treat polluted water, develop small-scale field reservoirs to reduce flood, introducing system of rice intensification in groundwater irrigated areas, etc.



Discussion Paper



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