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Market Opportunities for Decentralized Wastewater Treatment Systems in South-East Asia

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The views and opinions expressed in this report are those of the authors and do not necessarily reflect official views of the ESCAP Secretariat

This is final version of the Study has been issued after proof reading and without a formal editing

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Acronyms

ADB	Asian Development Bank
ASEAN	Association of South-East Asia Nations
BCR	Benefit-Cost Ratio
BORDA	Bremen Overseas Research & Development Association
CBA	Cost-Benefit Analysis
DEWATS	Decentralized Wastewater Treatment Systems
GDP	Gross Domestic Product
MDG	Millennium Development Goals
LDC	Least Developed Countries
JMP	Joint Monitoring Programme (WHO, UNICEF)
OECD	Organisation for Economic Co-operation and Development
PPP	Public-Private Partnerships
ROI	Return on investment
SEA	Southeast Asia
SME	Small and medium-sized enterprises
UDDT	Urine-diverting Dry Toilet
WHO	World Health Organization
WSP	Water and Sanitation Program

Glossary

System - a system is a set of elements that interact to achieve some purpose. System is a group of interacting, interrelated, or interdependent elements forming a complex whole. A system is almost always defined with respect to a specific purpose within a larger system.

Systemic - means affecting most or all of a system rather than a small portion of the system and affecting the general behavior of the entire system.

Systems Thinking - focuses on recognizing the interconnections between the parts of a system and synthesizing them into a unified view of the whole. This is a way of understanding reality that emphasizes the relationships among a system's parts, rather than the parts themselves.

Open System - a system which is open to its environment such that there are recognisable inputs to the system and outputs to the environment

Climate Change – Climate change refers to a statistically significant variation in either the mean state of the climate or in variability, persisting for an extended period. Climate change may be due to natural internal processes or external forces such as solar variance, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.

Climate System – The climate system is the highly complex system consisting of five major components: the atmosphere, the hydrosphere, the cryosphere, the land surface and the biosphere, and the interactions between them.

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Executive Summary

This overview of the market opportunities on decentralized wastewater management of South-East Asia (SEA) highlights some findings that can assist policy makers of targeted countries to make advancement towards improving sanitation services in their countries and the region as a whole, and to follow renewed commitment towards ensuring safe water and sanitation services, such as:

Most of financing of wastewater treatment come from donors and households themselves:

Appropriate policies and strategic government investments could spark the private sector as strong financial contributor through the Inclusive bill for water supply & wastewater treatment

DEWATS are affordable and add the great value to conventional centralized treatment systems:

Furthermore, DEWATS benefits through a flattened long-term investment in construction, where expansion possibilities respond to actual timely and on site demand. Old systems characterize through the need of high investments for construction, while means of expansion remain very rigid, which poses great challenges for communities.

DEWATS provide potential investment and market opportunities:

These lie in the different segments of the DEWAT value chain - demand stimulation, construction of DEWATS, collection & transport of waste, and treatment & reuse. Value can be generated by focusing on strategies to enhance demand from households and businesses, sustainable (micro-) financing schemes for households, incentives for proper conduct of waste collection, and regulations & standards for waste treatment and resource recovery technologies (in DEWAT construction and service provision).

DEWATS has a big potential to profit from a wide range of financing opportunities:

DEWATS's high connectivity and its dispersed value chain increases the number of stakeholders involved as well as the potential of market opportunities, thus generating the possibility to diversify funds to gain financial sustainability. Financing mechanisms can range from trust funds, private investments, industry taxes, generated household revenues, reuse and recovery of resources, bonded water provision and water treatment bills to indirect benefits to BDP from health and environmental improvement, social impact bonds, etc.

Investment in DEWATS improves the Benefit-Cost Ratio of socio-economic terms:

Policy-makers can bring health benefits by ensuring the discharge of treated water to the ecosystems (rivers, canals, lakes), therefore brings water resources benefits and contributes to the well-being to their people (communities, households) by regulating sanitation market.

Financial models and sustainable financing schemes:

could be adapted depending the level of pollution, ability or willingness to pay, and the regarding payment method to recover costs (tariffs, taxes, etc.) by actors. Identifying Industry, SMEs and households as the main players on the wastewater treatment market. A sustainable financial framework provides that industry is regulated with environmental and green taxes to compensate for costs of pollution and negative effects on third parties, while household demand has to be reinforced by guaranteeing supply and quality, financial incentives, marketing of DEWATS.

1. Introduction

Conventional practices of wastewater management and sanitation services are primarily financed through public funding (i.e. taxes) and supported by government regulations, while investments to wastewater treatment do not provide an immediate return on investment (ROI) in monetary terms.

No country has managed to finance its wastewater treatment practices from investments from the private sector or through tariffs. An Asian Development Bank (ADB) survey covering 27 countries revealed that only 24 percent of O&M costs for water and sanitation are met from tariffs (ADB, 2009).

There are, however, successful examples of investments from the private sector, within the middle-income countries, where the perceived risks of doing business are lower than in the least developed countries. For example, the reuse of wastewater has a high potential to recover parts of the investment costs. However, due to the high costs of the transportation services, most of the successful examples have been located in the areas with a close proximity to the industrial zones and large farms, where the large scale and volume of waste is an advantage. There is a need for more research in this area, particularly looking at the differences in investment costs between different countries and the potential market opportunities that exist linked to policy stimulus.

In this regard, the DEWATS can be seen to provide good market opportunities for households and small industries in urban and peri-urban areas where there is no access to centralized sanitation services, especially in climate risk zones. The market includes the different segments of the value chain, starting from the stimulation of demand and proceeding to the supply of hardware facilities (e.g. latrines and septic tanks), and the collection and transport of waste. It also includes opportunities to recover costs from reuse of wastewater.

The Cost-Benefit Analysis (CBA) can help policy makers to better target new investments and to focus on areas that generate the highest benefits, while maintaining cost-effectiveness. To add weight to this claim, the CBA from the World Bank studies shows the return on investments of different sanitation solutions for three selected countries, compared to other countries. The studies indicate that the return on investments can be as high as 10 USD per 1 USD of investment, but also as low as 10 US cents. This analysis can help policy makers to more effectively target new investments and to focus on areas that generate the most benefits and rely on the most cost-effective measures. The CBA and case studies/best practices on DEWATS documented in the WB report are collected from the worldwide practices and prepared based on the discussions from three national workshops on DEWATS conducted in Lao PDR (6-7 October 2014), Cambodia (27-28 October) and Viet Nam (22 December), as well as the regional workshop on dissemination of results of two pilots on DEWATS in peri-urban areas, delivered in Attapue Province, Lao PDR on 11 December 2014.

Based on the findings of this study, several policy recommendations are proposed for governments of SEA in the following areas:

- Carry out demand studies prior to designing an intervention;
- Solutions must be replicable and scalable;
- Encourage behavior change to increase demand;
- Design legislation that can be followed and enforced.

The purpose of this report is to assist policy-makers in decision making of SEA by providing:

- a better understanding of the market opportunities for Decentralised Wastewater Treatment Systems (DEWATS¹), with related enabling operational and political system market

¹ Please see ESCAP, UN-Habitat, AIT. (2015). Policy Guidance Manual on Wastewater Management and Sanitation, with a Special Emphasis on Decentralised Wastewater Treatment Systems in South-East Asia, for a definition of DEWATS

segmentation within the value chain; and benefits, analysis of the services costs and financing sources for sustainable sanitation services in the South-East Asian region;

- to provide policy advice on financial schemes that can enable DEWATS that are linked to a systems based approach in policy, planning and implementation of DEWATS which can contribute to designing cost effective and sustainable solutions that will eventually lead to universal access to safe water and sanitation;
- Ensure a step by step approach in enabling and implementing the Pro-Poor Public Private Partnership Approach for Sustainable Sanitation Services

2. Estimates of Wastewater Treatment and Sanitation Costs in the Region

There are several estimates regarding the global financing that is required to achieve universal access to sanitation. The World Health Organization (WHO) estimated the capital cost requirements to achieve universal access of sanitation to approximately USD 66 billion per year from 2011 to 2015 in non OECD countries (ESCAP, 2012). According to Camdessus (2003), the annual estimate for municipal wastewater treatment is USD 56 billion for the period of 2002 to 2025.

Other studies have arrived at similar estimates. Media Analytics estimated the total capital expenditure requirements universal access to sanitation at USD 83.5 billion per year in 2009 (OECD, 2010). As the current spending is approximately USD 30 billion annually, only about one third of the sanitation and wastewater management costs are currently being met (ESCAP, 2013).

For Asia, WHO estimates capital cost requirements of USD 12 billion per year from 2011 to 2015 to achieve the sanitation Millennium Development Goals (MDG) target and an additional USD 25 billion per year to achieve universal access of sanitation (ESCAP, 2012). Hence, the total is calculated at USD 37 billion per year, of which USD 23 billion is for urban areas and USD 14 billion is for rural areas. Table 1 below presents the capital cost requirements for some selected countries in Southeast Asia².

Table 1: The costs of achieving the MDG sanitation target and universal sanitation access in the South-East Asia³

Country	Capital Cost to reach MDG (in million USD)			Additional Capital Cost to reach Universal Coverage (in million USD)		
	Rural	Urban	Total	Rural	Urban	Total
Viet Nam	0	0	0	1,103	803	1,993
Lao PDR	55	0	55	306	56	362
Cambodia	710	4	714	1,023	196	1,219
Thailand	0	85	85	0	655	655
Indonesia	1,372	961	2,333	2,097	2,585	4,682
Philippines	17	239	256	431	1,489	1,920
Myanmar	0	0	0	453	302	755

² For the full list see Annex III in Development Financing – The Case of Sanitation in Asia, ESCAP, 2013

³ Note: Data presented are generated from WHO and UNICEF(2012) and ESCAP (2012)

In summary, we can see that Viet Nam, Lao PDR, and Cambodia are all on track for reaching the MDG for sanitation in urban areas and would need to make more efforts to ensure universal coverage. For rural areas only Viet Nam has reached the MDG goal for sanitation, but to achieve universal coverage both Viet Nam and Cambodia needs to invest an additional USD 1 billion, respectively.

Based on these observations, to reach the target of universal coverage, governments should increase investments on wastewater treatment, especially in financing decentralised wastewater treatment systems (DEWATS). At present, governments have mostly invested into centralised treatment facilities, while investments of decentralised systems have largely been financed by donors and households. Figure 1 presents the sources of current financing in Viet Nam, Lao PDR and Cambodia.

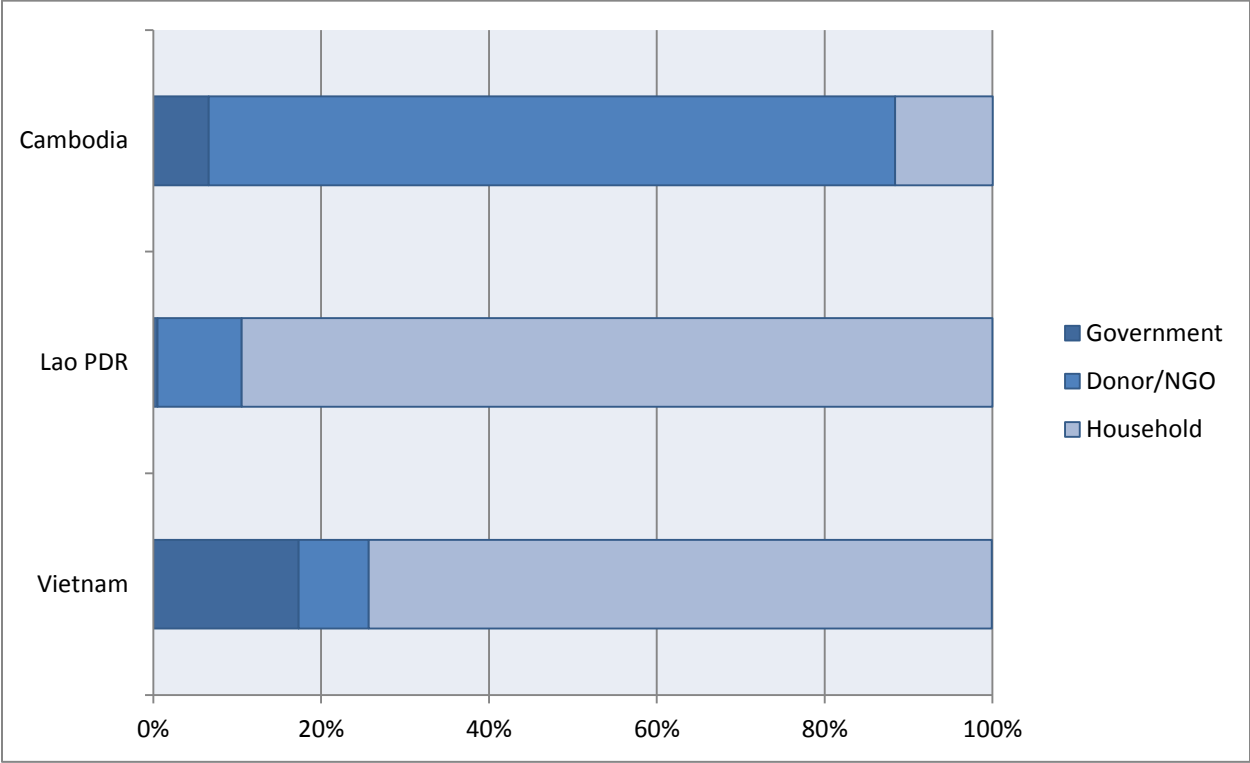


Figure 1: Sources of financing for sanitation and wastewater treatment⁴

More investments into wastewater treatment would also be welcomed from the private sector⁵. Most private sector investments for wastewater treatment are currently found in middle-income

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