FOR PARTICIPANTS ONLY

24 March 2015

ENGLISH ONLY

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
In collaboration with
UNITED NATIONS HUMAN SETTLEMENT PROGRAMME and
ASIAN INSTITUTE OF TECHNOLOGY

Regional Policy Workshop
on Wastewater Management and Sanitation in South-East Asia
2 and 3 April 2015, UNCC, Bangkok, Thailand

Background Policy Study on Wastewater Management and Sanitation in Cambodia, Lao People's Democratic Republic (PDR) and Socialist Republic (SR) of Viet Nam

---

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

This is final version of the Study has been issued without a formal editing

Table of Contents

Tables

Figures

Boxes

Acknowledgements

The background policy study on wastewater management and sanitation in three targeted countries of South East Asia is prepared by ESWRS/EDD/ESCAP with substantial inputs from the national UN-Habitat team, and peer reviewed by the participants of the Regional Policy Workshop of Stakeholders on DEWATS, with inputs from BORDA, RRC.AP of AIT, Governments of three target countries in May-June 2014.

This policy study lays the basis for the DEWATS Policy Guidance Manual, which would be finalized in 2014 after three national workshops, scheduled in September-October 2014 with support of UN-Habitat and would be formally finalised by ESCAP.

ESWRS/EDD/ESCAP expresses gratitude for all participants of the regional workshop for active discussions and inputs, that are also captured within the way forward in the proceedings of the workshop and the joint ESCAP-UN-Habitat project work plan, saved at: http://www.unescap.org/resources/workshop-proceedings-regional-policy-workshop-stakeholders-decentralized-waste-water and http://www.unescap.org/resources/project-work-plan-chart-regional-policy-workshop-stakeholders-decentralized-waste-water

Special thanks to the following Contributors and Peers:

Mr. Gabriel Regallet, Consultant, ESCAP
Ms. Suzanne Green, Intern, ESCAP

UN-Habitat team:
Mr. Avi Sarkar, Regional Coordinator
Ms. Huong Pham Thi Thu, Viet Nam
Mr. Sok Vanna, Cambodia
Ms. Buahom Sengkhamyong, Lao PDR

Cambodia: Department of Sub-National Public Infrastructure and Engineering
Lao PDR: Ministry of Public Works & Transport, Department of Housing and Urban Planning
Viet Nam: Ministry of Natural Resources and Environment (MoNRE)

BORDA:
Mr. Alex Viwat Campbell, Mekong Countries Coordinator (Cambodia, Laos & Myanmar) BORDA
BORDA Cambodia
BORDA Lao PDR
BORDA Viet Nam

Regional Resource Center for Asia and the Pacific of Asian Institute of Technology:
Dr. Ram Lal Verma, Programme Officer, RRC.AP at AIT
Mr. Guilberto Borogan, Senior Programme Officer, RRC.AP at AIT
Ms. Suwimol Wattanawiroon, RRC.AP at AIT

Executive Summary

The Background Policy Study (here: Study) on Wastewater Management and Sanitation in Cambodia, Lao PDR and Socialist Republic of Viet Nam (here Viet Nam) seeks to address the following three primary goals: (a) revisiting the policies, strategies, institutional and financial framework of the three countries; (b) reviewing barriers and drivers of sustainable sanitation services (SSS), and, (c) suggesting solutions and options for reform. Decentralized Wastewater Treatment Systems (DEWATS) are presented as one potential solution to sanitation issues in developing areas due to their low cost, modular structure, and potential for resource recovery and community empowerment.

Effective management of sanitation and wastewater is a growing challenge particularly in dense urban settlements of the three countries. Access to improved sanitation in urban areas is relatively high (78 per cent, on average, for the three countries), but sanitation coverage in secondary towns rates are observed as low as 10 per cent. However, less than 6 per cent of waste is adequately treated, even in areas where septage is collected in a sanitary fashion, such as through piped systems or in septic tanks. On-site sanitation often is inadequate in dense settlements and slum areas, thus requiring intermediate and complementary solutions. In fact, open defecation is still practiced in many low income and peri-urban areas despite remarkable progress over the last ten years.

According to a 2012 Water and Sanitation Program (WSP) study, the economic impact of inadequate sanitation in the three focus countries is vast and increasing (USD 1.42 billion per year), with total health-related economic costs accounting to more than USD 564 million per year. But returns on sanitation investments are also high. According to the World Health Organization (WHO) and World Bank studies, each USD 1 invested on urban sanitation has the potential to have a return of between USD 2 and USD 34.

There are three key drivers of change that lead to improved urban sanitation services in the three selected countries: the disclosure of information about negative environmental impacts of poor sanitation services; citizen demand for better services and individual champions among policymakers and civic leadership, and effective regulations that are strictly enforced. Thus, the common barriers to sustainable urban sanitation services in the three countries can be clustered within four groups: policy and citizen's demand, technical services, institutional set-up, and financing services.

Cambodia

Strategies, Policies, Laws, Regulations: The draft "Water and Sanitation Law of the Kingdom of Cambodia" was released in 2004 and the "National Policy on Water Supply and Sanitation" was adopted by the Council of Ministers in 2003. The policy lays out the vision for the sector, and specifies the role of different agencies; two priorities have implications for DEWATS: (i) decentralizing decision-making on sanitation: communities shall choose the type and level of service based on the technical and financial aspects of service options; (ii) prioritizing services to the poor.

So far, neither the draft Water and Sanitation Law nor the National Policy defines the minimum technical or operating standards for the household sanitation. The policy on decentralization has not been fully implemented in practice and urban water supply and sanitation remain, essentially, under central government control with minimal involvement from local levels.

Institutional framework and coordination: The Ministry of Public Works and Transport (MPWT) is responsible for implementing urban sanitation projects and other urban services (ex. sewage/drainage pipes)**.** The MPWT's mandate covers preparation of plans, policies and investment programs, resource mobilization, setting of design and standards for construction and services, and coordination in the implementation of projects with the private sector. The Ministry of Rural Development is responsible on rural sanitation, while the Ministry of Environment (MoE) is responsible for setting water quality standards for effluents discharging into water bodies as well as monitoring and

regulation. However, in practice, MoE only monitors industrial on-site wastewater treatment facilities and does not monitor or regulate domestic or public wastewater.

Coordination of the urban Water, Sanitation and Hygiene (WASH) sector is done through the Technical Working Group (TWG) for the Infrastructure, chaired by MPWT and dealing mostly with urban water supply. The urban sanitation subsector does not have a similar platform. Private sector engagement, which is highly fragmented, is hampered by two factors: (a) cost recovery is highly uncertain since fees are low and irregularly collected; and (b) the land needed to build a treatment plant is difficult to obtain from the government.

At present there are now 23 demonstration and pilot projects of a small-scale sludge treatment in the villages, public and private facilities (e.g., schools, orphanages, hospitals, slaughterhouses) and small towns of Cambodia, that also include and are showing the value of public-private partnerships (PPP) for DEWATS facilities that could be adapted in peri-urban and low income areas. GRET and Bremen Overseas Research & Development Association (BORDA) have been in the forefront of such DEWATS demonstration in Cambodia for years. In its 24 major cities, only four have treatment plants (though only three are operational in Siem Reap, Sihanoukville and BTB), which are operated by wastewater management units of the Provincial Department of Public Works and Transport.

Financing: In 2006, an inter-ministerial prakas from the MPWT and Ministry of Economy and Finance issued a decision on Service Connection Fees and User fees for sewer collection and treatment. Block rates were introduced for different types of establishments. A household connection fee ranges from USD 10 to USD 40, and the monthly fee ranges from USD1 to USD4 which recovers only operations and maintenance (O&M) costs. Customers connected to central sewer systems are charged separately from the water bill.

Lao PDR

Strategies, Policies, Laws, Regulations: The draft Urban Wastewater Strategy and Investment Plan for 2015-2030 is currently under consideration by the Laotian Government. It comprises (a) institutional and legal reforms; (b) a strategy for improved access to sustainable wastewater through appropriate technologies; (c) capacity building and awareness raising at the central and local levels; and (d) financial sustainability. It calls for decentralized systems in Vientiane Capital City and secondary towns between 2016 to 2020, and centralized systems in Vientiane Capital City and Luang Prabang after 2020. The legal framework for sanitation and wastewater management is covered by various laws and regulations that often lack implementation decrees and enforcement. The government commits to start developing a policy towards mobilizing financing from consumers for sanitation development. This could be in the form of a surcharge equivalent to a certain percentage of the water bill.

Institutional Framework and Coordination: There is a need to establish a government-led national technical working group (TWG) on water supply and sanitation. However, there are cooperation arrangements between the government and external support agencies to facilitate implementation of DEWATS in the country. So far, most DEWATS programmes using pro-poor approaches, and partnerships with public and private sector NGOs and CBOs, have been promoted and implemented through external funding institutions (NGOs, multi and bilaterals). BORDA and GRET are among the few NGOs that have forged links with Lao institutions to push forward DEWATS.

Financing: At present the country has no operational urban sewerage system or wastewater collection, treatment and disposal systems**.** Sanitation facilities in urban areas are mainly on-site, built by households and composed of pour flush toilets with infiltration pits, although septic tanks are also used. However the design and construction of septic tanks is unregulated and septic tanks are not regularly de-sludged. Sludge disposal is not regulated and often emptied untreated directly into public drains or the urban environment. Storm water drainage in most urban areas consists of roadside drains leading ultimately to natural streams and rivers.

Practically no investments have been made by the government in sewerage and wastewater treatment plants. Based on the urban wastewater strategy and investment plan for 2009 to 2020, total *urban wastewater investments would require about US$103 million,* which would include institutional support and capacity building (0.7%), facilities for Vientiane city (27%), secondary towns (20%), provincial capitals (17%), district centers (35%), and emerging small towns (0.3%)

Socialist Republic of Viet Nam (here Viet Nam)

Strategies, policies, laws and regulations: Over the past 20 years, the Government of Viet Nam has made considerable efforts to develop urban sanitation policies, legislations and regulations and to invest in urban sanitation including wastewater treatment systems. A comprehensive legal framework in environmental sanitation, including urban wastewater management, currently exists in Viet Nam but there are overlaps and gaps. There is a lack of clarity and overlapping of responsibilities between Ministry of Natural Resources and Environment (MONRE) and the water supply companies in terms of establishing and collecting wastewater fees. The policy to increase urban sanitation is in place, but issues remain with providing sanitation services in a sustainable way. To address the situation, a unified sanitation strategy (U3SAP) had been developed with high-level impetus for accelerated delivery of sanitation services in both urban and rural areas. Despite of these initiatives, urban sanitation continues to face critical issues, such as:

- Although 60 per cent of households dispose of wastewater to a public system, much of this is directed informally to the drainage system and only 10 per cent is treated;
- While 90 per cent of households dispose of wastewater to septic tanks, only 4 per cent of septage is treated;
- The focus of wastewater expenditure to date has been in constructing centralized treatment facilities, but this has not always been accompanied by appropriate collection systems;
- Decentralized systems are mostly developed and operated through a community-based approach and not brought to scale.

Decree 88 and its revised draft version require cities to prepare wastewater plans. However, sanitation planning is often not integrated into an urban development master plan. Regulations and specific technical guidelines for the planning, consultation and appraisal of urban sanitation development projects are still lacking.

Institutional Framework and Coordination: In Vietnamese urban areas, domestic wastewater drainage and treatment responsibilities belong to the Municipalities' authorities through their public-private companies. No city in Viet Nam has yet developed a clear strategy for Fecal Sludge Management (FSM), implemented an acceptable treatment technology, or regulated the design and construction of septic tanks for the household sanitation. Currently there is no coordinated government-donor dialogue on sector programming and financing at a high level and there is inadequate coordination among government agencies at central and local levels. There appear to be few incentives provided to encourage private sector investment in the wastewater business, although there is a policy of encouraging private sector participation in urban infrastructure

Financing: A pro-poor-specific strategy is vital to sustainable sanitation services (SSS) delivery. During the period 1995-2009, Official Development Assistance (ODA) commitments (including loans and grants) to finance drainage and sewerage projects totaled US$2.1 billion or an average of about US$150 million per year. However little has actually been done to achieve cost recovery. The majority of local authorities seem willing to continue to subsidize operations.

The Way Forward

The following elements are common for three countries and need to be considered during implementation to achieve positive progress in wastewater management and sanitation services:

- Assessment of lessons learnt from the past wastewater management and sanitation practices in each country and analysis of pre-conditions for the successful and efficient DEWATS experiences and its expansion at scale;
- National visioning of DEWATS and the implementation strategies through established participatory planning activities at national level, integrating the DEWATS with national strategic planning documents (ex on waste management, on IWRM, on green growth, etc.);
- Ensure institutional set up at national and regional level, such as the Pro-Poor Public-Private Partnerships for Sustainable Sanitation Services (5 P for 3 S), to address the resource recovery and enabling a sanitation value chain, coupled with capacity building of supply chain interveners;
- Creation of the demand, including from the poor, for sustainable sanitation services, by facilitating implementation of DEWATS in addition to centralized systems;
- Strengthen the capacities of all entrepreneurs, interveners, linking DEWATS to existing networks/initiatives/programmes in South East Asia and creating a regional platform for dialogue, knowledge management and innovation, in particular within three target countries;
- Enhancing innovative financing and financial viability of sanitation facilities with Output-Based Aid and Impact Investment (ESCAP, 2013, Discussion Paper on Development Financing for Tangible Results: A Paradigm Shift to Impact Investing and Outcome Models) by improving affordability through smoothing and subsidizing sanitation expenditures and by using OBA, outcome-based financing models and other financing mechanisms (e.g., microcredit, revolving funds).

Chapter 1: Water Security and Sustainable Sanitation for All

This Chapter highlights the need for a policy study in Cambodia, Lao PDR and Viet Nam in the framework of the Millennium Development Goals (MDG) and the Global Vision on Post-2015 Development Goal. It shows that those countries have made the most remarkable progress in SE Asia towards reducing open defecation and improving sanitation for urban citizens. The three countries play an active role in the East Asia Ministerial Conferences on Sanitation and Hygiene (EASAN) process that set high goals and is indicative of the increasing attention and political commitment afforded to sanitation in the region.

a) The need for a policy study

During the last three decades, the countries of South East Asia have experienced the rapid economic growth, and a high proportion of this growth originates from the cities. By 2011, the population of the Asian and Pacific regions without access to safe and drinking water was halved from 1990 levels, but the sanitation-related component of the target is still far from being achieved.[1] According to the report of WHO-UNICEF of 2010, 10.3 million people in Cambodia, 2.9 million people in Lao PDR, and nearly 21.8 million people in Viet Nam did not have access to improved sanitation.[2] The lack of sanitation and wastewater treatment systems leads to fecal contamination of freshwater sources, endangering the health of the population at large. WHO reports[3] that diarrheal disease is cited as the second leading contributor to the global disease burden causing a loss of 72.8 million disability adjusted life years (DALYs). Improving sanitation and hygiene are front line actions that can prevent diarrheal and other water related (including water borne and water-washed) diseases. In addition, studies conducted by the World Bank Water and Sanitation Program[4] show that Cambodia, Lao PDR and Viet Nam PR suffer an annual economic loss of $450 million, $193 million and $780 million respectively. These losses are accounted for by direct health impacts, costs for accessing clean drinking water, additional time to access unimproved sanitation and tourism losses.

Improved sanitation and wastewater management is crucial to maintain water security. It can bring significant benefits to poor communities, particularly women, and ensure the health of eco-systems and local population. Lack of awareness amongst policymakers and the relatively high costs of sewage collection and treatment often deter investments. The proportion of urban population will double from close to 25 per cent in 1980 to over 50 per cent in 2020. Although access to sanitation in urban areas in the region is above 70 per cent in most countries, service provision beyond access remains an issue: collection and treatment of wastewater and septage is low and sanitation operations are not yet institutionally and financially sustainable.

ESCAP and UN-Habitat are jointly implementing the project on "Strengthening capacity of policymakers in South-East Asia to promote policies and developing plans for improved wastewater treatment and reuse in urban and peri-urban areas". The project is seeking solutions to address the critical problem of discharge of untreated wastewater to the environment in rapidly growing urban and peri-urban areas of South East Asia (SEA). The current Background Policy Study on Wastewater Management and Sanitation in Cambodia, Lao PDR and Viet Nam (herewith -the Study) is aimed at: (a) revisiting strategies, policies, institutional and financial framework in the three countries; (b) addressing barriers and drivers for sustainable sanitation services (3S); and (c) suggesting solutions and options for reforms aimed at sustainable delivery of sanitation services, as well as the achievement of the country's MDGs for sanitation. The Study also highlights adequate policy and sustainable practices from the SEA region and worldwide. The Study has compiled the sourced information and

[1] ESCAP, 2013, Statistical Yearbook
[2] WHO-UNICEF Joint Monitoring Report: Progress on Sanitation and Drinking Water 2010 update in 2008
[3] WHO, 2008, The global burden of disease: 2004 update. Geneva, World Health Organization
[4] WSP, 2009, Economic Impacts of Sanitation in South East Asia. Jakarta

data from the existing literature and from the documents and materials provided by ESCAP and UN-Habitat teams in the three countries.
The Study consists from five chapters. The first Chapter provides an overview of the current level and quality of access to urban sanitation in the three countries as well as trends and initiatives toward Post-2015 Development Agenda related to sanitation.

The second Chapter examines common issues and challenges of sustainable sanitation services in the three countries.

The third, fourth and fifth Chapters identify the current policy, institutional, financial framework for each target country, factors that hinder progress, as well as factors need to be in place to trigger a different way of doing business in the sector and may ultimately lead to transformational changes.

The sixth Chapter proposes solutions and recommendations on how those countries can upgrade and up-scale urban sanitation services.

b) MDG 7 and a Global Vision on Post-2015 Development Goals

The importance of sanitation is articulated in the MDGs, specifically in the MDG-7 target 10, of reducing by one half the proportions of people without sustainable access to basic sanitation (as measured by the access to improved sanitation). Sustainability in this context pertains both to the functional aspects of sanitation technologies and the long-term viability of individual and collective efforts to provide for sanitation facilities. Improved sanitation facilities, according to the WHO Global Health Observatory, include connections to public sewers or septic systems, pour-flush latrines, simple pit latrines or ventilated, improved pit latrines – but not public or open latrines. In the SEA region, Cambodia, Lao PDR and Viet Nam made the most remarkable progress in reducing open defecation rates from 84% to 58%, 69% to 32% and 40% to 3% respectively between 1990 and 2011.[5] The 2013 WHO-UNICEF Joint Monitoring Program (JMP) also highlights good progress in the three countries in urban sanitation coverage as shown in Table 1.

Table 1:Access to sanitation facilities

	Year	Population (% urban)	Urban Population (%)			Nation as a Whole (%)	
			Improved	Unimproved		Improved	Unimproved
				Shared	Unimproved		
Cambodia	1990	9 532 (16)	36	5	9	9	6
	2000	12 447 (19)	50	7	6	18	5
	2011	14 305 (20)	76	10	1	33	3
Lao	1990	4 192 (15)	--	--	--	--	--
	2000	5 317 (22)	65	4	8	28	9
	2011	6 288 (34)	87	5	2	62	4
Viet Nam	1990	67 102 (20)	64	4	8	37	21
	2000	78 758 (24)	78	4	7	55	20
	2011	88 792 (31)	93	5	2	75	18
SEA	1990	445 361(32)	69	9	9	47	16
	2000	523 831 (38)	74	10	6	59	11
	2011	600 025 (45)	81	10	2	71	5

[5] http://apps.who.int/iris/bitstream/10665/81245/1/9789241505390_eng.pdf

In order to define the role of sanitation in the Post-2015 development agenda, the World We Want 2015 Water Thematic Consultation, facilitated under the umbrella of UN-Water, co-led by UN DESA and UNICEF, issued the following key recommendations as for goal setting:[6]

- The world must aim for universal access to safe and sustainable water, sanitation and hygiene services;
- Ground and surface water should be monitored and governed sustainably and in an integrated manner to satisfy human needs while respecting ecosystem requirements;
- All used water and wastewater should be collected and treated before it is returned to nature and managed under principles of pollution prevention and reuse.

The UN-Water SDG advocates strong support for the creation of a standalone water goal because addressing the complex interactions between competing water-related needs requires an integrated approach better served if all those aspects are kept together in one SDG (United Nations Sustainable Development Knowledge Platform, 2013, p. 6—See Box 1). The UN-Water SDG paper proposes a framework for a global goal on water in which the overarching goal of 'securing sustainable water for all' (applicable to both developed and developing countries) has been divided into five manageable and interconnected target areas: (i) universal access to safe drinking water, sanitation and hygiene; (ii) sustainable use and development of water resources; (iii) equitable, participatory and accountable water governance strengthened in all countries; (iv) improved water quality and wastewater management; and (v) resilience to water-related disasters (UN-Water, n.d.).

Box 1. SDG Focus area 6: Water and Sanitation

Water is an indispensable life sustaining natural resource. For a water-secure world, the whole water cycle has to be taken into consideration to tackle water-related challenges including water scarcity and drought, pollution, water borne diseases, and water related disasters, loss of freshwater biodiversity and spread of invasive alien species in water bodies. Ensuring access to safe drinking water and sanitation systems for all is necessary in all households, schools, health facilities, workplaces and refugee camps. Some areas that could be considered include: providing adequate facilities and infrastructure, both built and natural, for safe drinking water and sanitation systems in rural and urban areas, including for bulk conveyance and storage of freshwater in rivers, lakes, reservoirs, canals and aquifers; improving water-use efficiency; extending wastewater treatment, recycling and reuse; enhancing effective water governance including catchment area based integrated water resources management and appropriate trans-boundary co-operation; protecting and restoring water-linked ecosystems like mountains, watersheds and wetlands; bringing freshwater use in line with supply; investing in water harvesting technologies; eliminating the pollution of and dumping of toxic materials in water bodies, and protecting aquifers; elimination of invasive alien species in water bodies; reducing risks and impacts of water-related disasters. Interlinkages to other focus areas include: poverty eradication, food security, education, health, economic growth, industrialization, energy, sustainable cities, resilience of ecosystems and biodiversity.

Source: http://sustainabledevelopment.un.org/focussdgs.html

With the first target, everyone, including schools and health centres, has access to WASH. The second target leads to freshwater withdrawals in line with sustainable water availability, increased water productivity and integrated water management in every country. The third target aims to promote an enabling environment such that institutional structures relevant to water are effective and that its administrative systems function for the benefit of society as a whole. The fourth target aims at treating wastewater and reusing it safely in compliance with regional water quality standards. Finally, the fifth target plans to reduce mortality and economic loss in front of the impacts of water-related disasters. In short, each target would lead respectively to healthy people, increased prosperity, equitable societies, protected ecosystems and resilient communities.

[6] http://www.unwater.org/downloads/Final9Aug2013_WATER_THEMATIC_CONSULTATION_REPORT.pdf

This approach would connect these issues through the hydrological cycle, address systemic issues, and avoid difficulties being swept under the rug (UNDESA, 2012, p. iii)[7]. It could catalyse needed synergies between the protection of nature through wastewater management and access to WASH, thereby advancing both environmental and social development (UNDESA, 2013, p. x).[8] Healthy freshwater systems improve the reliability, quantity and quality of water for drinking, cooking, irrigation and other uses. Conversely, well-planned sanitation programs protect freshwater ecosystems. Joint advocacy programs can maximize community participation, save funds, build synergies, and amplify the combined voice (Post 2015 Water Thematic Consultation, 2013, p. 15).

c) Regional leadership and commitment towards wastewater revolution at the 2nd APWS and specifics for Cambodia, Lao PDR, Viet Nam

The regional Green Growth policy for Asia and the Pacific was welcomed at the fifth Ministerial Conference on Environment and Development (MCED-6), and further the regional action plan was developed and launched at the Rio+20 Conference on Sustainable Development. It highlights the set of policy tools and calls for making reforms within visible and invisible infrastructure and, in particular, to focus on eco-efficient water infrastructure and changing the way water and waste water resources are managed by developing an integrated and decentralized system (ref: Section 2.3.5).

In parallel to the MDG-drawn targets and SDG setting for the next period, there are also commitments made by governments at the sub-regional level, in particular the East Asia Ministerial Conference on Sanitation and hygiene (EASAN) process. These ministerial-level conferences set high goals and are indicative of the increasing attention and political commitment afforded to sanitation in the region.

At the regional level, the Second Asia-Pacific Water Summit that took place in Thailand, on 19-20 May 2013, on the theme of "Water Security and Water-related Disaster Challenges: Leadership and Commitment," issued the Chiang Mai Declaration[9] that reiterates the importance of water for human security, environment, and economy by outlining specific recommendations on regional solutions and policy frameworks such as, *inter alia*: prioritizing water and sanitation and integrated water resource management (IWRM) in national agendas; the need for a paradigm shift from "waste water" to "used water;" water demand management; capacity building of local authorities; knowledge sharing; community engagement; including disaster risk reduction and water issues in the post-2015 agenda; enhancing regional and international cooperation. The Chiang Mai Declaration invites the Asia-Pacific Water Forum to mobilize initiatives to support the recommendations and consider establishing an Asian Water Information System. Strengthening further commitments to the wastewater revolution[10] in the Asia-Pacific region also requires putting greater emphasis on resource recovery in wastewater management, and the adoption of the appropriate centralized and decentralized management systems in urban and rural settlements.

Through a region-wide project on Promoting an Asia-Pacific Wastewater Management Revolution, ADB aims to raise the region's capacity for managing wastewater through improved knowledge, better technologies, increased financing, and stronger advocacy. This was one of the key solutions to meet the region's health and environmental sustainability goals that came out of the 2nd ADB and Partners Sanitation Dialogue.

[7] UNDESA, 2012. Sustainable Development for the 21st Century Back to our Common Future (2012) UN DESA
[8] UNDESA, 2013. World Economic and Social Survey, Sustainable Development Challenges (2013) UN DESA E/2013/50/Rev. 1 ST/ESA/344
[9] http://www.worldwatercouncil.org/fileadmin/world_water_council/documents/2013/2013-05-21-APWS2013_outcomes_document.pdf
[10] ADB , 2011, Wastewater Management and Sanitation in Asia and the Pacific http://www.adb.org/features/promoting-wastewater-revolution-asia-adbs-plans-progress-and-initiatives

Chapter 2: Common Issues and Challenges of Sustainable Sanitation Services in the Three Countries

This chapter highlights the urban growth challenge, particularly in the secondary urban towns in the Mekong economic corridors, and the overall costs of inaction amounting to US $1.421 billion per year for the three countries. The chapter describes the key drivers of change and common barriers that lead to, or hinder, improved sustainable urban sanitation services.

2.1 The urban growth challenge, social, economic and environmental costs of inaction

Effective management of sanitation and wastewater is a growing challenge in dense urban settlements of the three countries.[11] Rapidly increasing urbanization along with rising settlement densities in low-income urban and peri-urban areas highlights the need for sanitation technologies and management systems that are reliable and affordable, and which lower the pollution load on local water sources. As shown in Table 1, access to improved sanitation in urban areas is high (around 78 per cent on average for the three countries). These figures, however, mask a skewed distribution; the coverage rates for secondary towns can be as low as 10% for sanitation and 16% for water supply.[12] Also, adequate collection and treatment rates are significantly lower (See Box 2), as less than six per cent of septage[13] or wastewater[14] reaches a properly functioning treatment plant.[15] On-site sanitation is often inappropriate in the denser settlements and slum areas, thus requiring intermediate and complementary solutions. Further, open defecation is still practiced in many low income and peri-urban areas, despite remarkable progress over the last ten years. This increases health risks, affects individual dignity, and puts an inequitable burden on the poor. Safety, especially for women, is also an issue associated with open defecation.

Box 2: Treatment of wastewater in urban areas of Viet Nam, Cambodia and Lao PDR:

Viet Nam is one of a growing list of countries in the region where open defecation in urban areas has been eliminated. Making use of combined systems, Viet Nam has a relatively high sewerage connection rate (60 per cent) compared to Cambodia and Lao. However, even after a number of years of concerted effort, only 10 per cent of urban wastewater is safely treated. Septic tanks and on site facilities not connected to sewers serve the remaining 40 per cent of the population. Only 4 per cent of the septage is safely treated and disposed. **In Cambodia,** 15 per cent of the urban population is still practicing open defecation[16]. Based on the 2008 Census, of the total number of households with improved sanitation in urban and rural areas, 43 per cent use septic tanks, 40 per cent are connected to combined drainage-sewerage networks, and 15 per cent use pit latrines. 82 per cent of households in urban areas have access to a toilet facility within the premises. Country- wide, urban sanitation facilities consist of only two small sets of oxidation ponds (Sihanoukville and Siem Reap). Phnom Penh has natural lagoons that receive wastewater from the drainage system but are shrinking due to urban expansion, reducing the efficacy of wastewater treatment.[17] For the most part, domestic wastewater is either directly discharged to the subsoil, or discharged to open drainage channels. Direct discharge of untreated wastewater to the sub-soil pollutes the groundwater from which the community draws water.

In Lao PDR, current wastewater handling in most urban areas entails on-site disposal system of human waste and blackwater, either without treatment or with poorly functioning treatment. Wastewater facilities

[11] ESCAP Statistical Yearbook 2013
[12] UN-Habitat, 2008, Mekong River Water and Sanitation Initiative
[13] Solid waste from septic tanks that includes fecal coliform
[14] Wastewater that is contaminated with human feces
[15] World Bank, 2013, East Asia Urban Sanitation Review
[16] JMP 2011
[17] Cambodia Water Supply and Sanitation Sector Assessment, ADB, 2009

(latrines, septic tanks) tend to be poorly maintained and with an insufficient drainage system. Untreated blackwater from households is often emptied directly into public drains or the urban environment (roadside, paddy fields, wetlands, etc.). Stormwater drainage in most urban areas consists of roadside drains leading ultimately to natural streams and rivers. Drains are generally not adequately interconnected[18].

Secondary urban towns in the economic corridors[19] will face equally, if not more serious, threats compared to other secondary towns in this region; rapid population growth will result in additional demand of water, wastewater management, energy, and settlement areas. The economic corridors will be catalyst to rapid urbanization, which may result in many secondary urban centres in the region beginning to face the problems of environmental degradation, poor management of public transport, wastewater, violence and natural disasters. All of these elements have the potential to undermine the centres' competitiveness, their attractiveness as living space, and their opportunities to attract investments and receive bank loans.

While there is a consensus that lack of access to improved sanitation has a variety of impacts, there is often a lack of evidence to affirm that poor sanitation imposes a significant burden on society. This, in turn, hampers the implementation of the required investments in the sanitation sector. In response, the "Sanitation Impact" study[20], initiated by the World Bank Water and Sanitation Program, generated sound evidence on the negative impacts of existing sanitation conditions and the potential benefits of improvements in sanitation and hygiene in Cambodia, Lao PDR and Viet Nam. Results of the economic impacts of sanitation are summarized in Table 2.

Table 2: Economic impacts of sanitation according to World Bank study

Country	Costs	Economic returns
Cambodia **Population: 13.8 M (2008)**	Poor sanitation leads to economic losses of US$448 million per year, translating to a per capita loss of approximately US$32. Poor sanitation, including hygiene, causes at least 9.5 million disease episodes (97% are diarrheal diseases) and more than 10,000 premature deaths annually (2005). The total health-related economic cost is more than US$187 million per year.[21] The economic losses are equivalent to 7.2% of Cambodia's GDP in 2005. This amount is roughly equivalent to the contribution of Cambodia's fishery sector to the GDP, or twice the forestry sector's contribution. While these economic costs are not all tangible, the immediate money 'in the hand' losses (financial losses) amount to about US $160 million per year, which is roughly 2.5% of the GDP, equivalent to nearly US$12per capita	Economic returns are potentially high—in excess of US$2 return per dollar invested—especially in rural areas where low-cost on-site solutions are feasible. Economic efficiency of improved sanitation and sustainable behavior changes results can be optimized by improving program performance through cost-effective implementation and close monitoring of project costs and impacts. Improved hygiene and sanitation conditions in institutions, public places and tourist sites are important to attract more businesses and tourists to Cambodia.

[18] Presentation of Khamthavy Thaiphachanh, Ministry of Public Works and Transport, Conference on Sewerage and Wastewater Treatment in Southeast Asia, 10-13 Oct. 2011

[19] Economic corridors are being developed along transport routes of the six Grand Mekong countries to link infrastructure with production and trade. These corridors are developed through planned and systematic project, policy and institutional interventions.

[20] WSP, http://www.wsp.org/content/east-asia-economic-impacts-sanitation

[21] By summing the cost of health care, productivity and premature death

Lao PDR **Population: 5.62 M (2005)**	In 2006, Lao PDR lost an estimated US$193 million due to poor sanitation and hygiene, equivalent to approximately 5.6% of GDP which translates into a per capita loss of US$34.40 per year. Of the impacts evaluated, health contributes 60% to the overall economic costs estimated in the study, followed by 18% for accessing clean drinking water, 13% for additional time to access unimproved sanitation, and 9% due to tourism losses. Poor sanitation, including hygiene, causes at least 3 million disease episodes and 6,000 premature deaths annually. The total health-related economic cost is more than US$115 million per year. The associated economic cost of polluted water attributed to poor sanitation exceeds US$35 million per year. This excludes accessing clean water for non-drinking purposes, as well as loss of productive value for fisheries and agriculture due to polluted water. Poor sanitation also contributes US$25 million losses per year due to additional time required to access unimproved sanitation, and possibly over US $17 million per year in tourism losses.	Economic returns are potentially high—in excess of US$2 return per dollar invested in urban areas and at least US$4 return per dollar invested in rural areas. Economic efficiency of improved sanitation can be optimized by improving program performance, which leads to sustained behavior change. Future projects should carefully plan and implement activities cost-effectively, and closely monitor project costs and impacts, to ensure that the project resources are being appropriately utilized. Sanitation solutions in urban areas that involve wastewater management are potentially cost-beneficial, despite not all benefits having been included. While difficult to quantify in economic terms, the associated environmental benefits of wastewater management are highly valued by households, tourists and businesses. Improved hygiene and sanitation conditions in institutions, public places and tourist sites are important to attract more businesses and tourists to Lao PDR.
Viet Nam **Population: 84 M. (2005)**	Economic losses: overall population welfare losses are equal to 1.3% of GDP (US$780 M) which translates into a per capita loss of US$9.40 per year. Poor sanitation, including hygiene, causes at least 10 million disease episodes (70% are diarrheal diseases) and more than 7,000 premature deaths annually. The total health-related economic cost is more than US$262 million per year. Financial losses – reflecting expenditure or income losses resulting from poor sanitation – are equal to roughly 0.5% of annual Gross Domestic Product (GDP). The majority of economic losses are shared between health (34%), water resources (37%), and the environment (15%).	The installation of pit latrines in rural areas has an economic return of at least six times the cost, and off-site treatment options in urban areas have an economic return of at least three times the cost. Net benefits from low-cost sanitation options are especially high, offering an affordable option to poor households. Economic efficiency of the improved sanitation can be optimized by making programs more demand-sensitive, which leads to sustained behavior change. Users should be involved in all the stages of sanitation projects.

Source: WSP, http://www.wsp.org/content/east-asia-economic-impacts-sanitation

The economic impact of inadequate sanitation in the three focus countries is huge and increasing (US$1.421 billion per year). To sustain economic growth, cities in the three countries will need to address significant gaps in their sanitation services. However, returns on sanitation investments are also high. According to the WHO[22], each $1 invested on urban sanitation provides a return of at least $2.

Another challenge is the capacity and technical expertise implication of widely implementing DEWATS vis-à-vis the current drive of the countries to choose decentralization and deconcentration:[23] this includes powers/authorities/decision making devolving to province, district and village level, and the challenge to build understanding and capacities at local levels.

Another increasing challenge of wastewater management in large urban areas of the region is adaptation to climate change (Box 3). In some areas, the balance of supply and demand will change due to changes in the seasonality of rainfall. More frequent and intense rainfall events are expected to occur. As most of the drains in the region are combined, there is a risk of more frequent sewage overflows to the streets affecting human health and the environment during flood events. In addition, climate change will increase the emphasis on water reuse in the long run. The reuse of nutrients and the production of bio-gas from the sludge also offer prospects for the sector to contribute to climate change mitigation. As the treatment and collection of septage increases and as more sludge is generated through increased wastewater treatment, opportunities to use sludge and septage as nutrients for agricultural purposes will increase

Box 3: Climate Change Impact on Urban Sanitation: Ho Chi Minh City, Viet Nam

A study of the impact of climate change in Ho Chi Minh City (HCMC), Viet Nam, revealed how unprepared many urban centers are for climate change. Currently, HCMC has a major system of canals and waterways running through it which help drain rainfall and flood waters. These canals, however, are severely polluted from domestic and industrial wastes and are often blocked by sediment, rubbish and aquatic weeds. Climate change predictions for HCMC conclude that by 2050, storm surge, tidal flooding and extreme monsoon rains will be the most serious concerns for HCMC. The effect of sea level rise will be comparatively small (26 cm increase) but a tipping point exists at around 50 cm, where the impacts will severely damage infrastructure and affect livelihoods. More intense rainfalls may end up transporting contaminants and sediments into water bodies, overloading wastewater treatment systems. Increases in flooding are also likely to increase incidence of water borne diseases, as floodwater could be easily contaminated by sewage overflowing from pit latrines and septic tanks. By 2050, the estimated HCMC population will be about 25 million people, half of which could be affected by extreme events. In order to deal with future challenges, the nine existing wastewater treatments plants are being upgraded to meet discharge volumes and another eight by 2025are being built to cover demand. However, the upgrade and planned new treatment capacity is unlikely to address drainage needs beyond 2035. Furthermore, consideration of location for the projects has not considered climate change impacts, such as the potential extent of extreme flooding events.

Governance arrangements, legislation and national standards are in place to address water pollution, but implementation has been slow. In order to effectively address future challenges, it is important to incorporate climate change impacts into planning processes and improve enforcement of regulations.

Adapted from: ICEM, 2009, Climate Change Impact and Adaptation in Ho Chi Minh City, Viet Nam, Report Summary, Prepared for the HCMC People's Committee and Asian Development Bank by ICEM – the International Center for Environmental Management, Hanoi, Viet Nam.

[22] WHO, "Global Costs and Benefits of Drinking-Water Supply and Sanitation Interventions to Reach the MDG Target and Universal Coverage." Report WHO/HSE/WSH/12.01 (May 2012). Geneva

[23] Such issue has different names in the region: in Lao, the local term is 'Sam Sang' or the '3-build system'

2.2 Common drivers and barriers for sustainable sanitation services

2.2.1 There are three key drivers of change that lead to improved urban sanitation services: the disclosure of information about negative environmental impacts of poor sanitation services; citizen demand for better services and individual champions among policymakers and civic leadership; and effective regulations that are strictly enforced.

Public health is the primary argument for improved urban sanitation and environmental health. Without effective urban sanitation, there is a risk of the spread of disease through epidemics such as cholera, as well as the chronic effects of poor health from diarrhea. A study carried out by WSP in South East Asia on the economic impacts of sanitation[24] concluded that health impacts had the greatest economic impact: Cambodia, Lao PDR and Viet Nam have more than 100 million people and poor sanitation causes close to 23 million disease episodes and more than 23,000 premature deaths annually. The combined health-related cost is US$564 per year (2005-2006 reference)

The impact on the environment is a second powerful driver for improved urban sanitation and environmental health. Inadequate sanitation affects the environment through pollution of water supplies, which affect not only drinking water supply but also fish and agricultural production, as well as the tourism industry, thereby having significant economic implications. The combination of inadequate water quality and environmental conditions accounts for a significant percentage of the annual economic losses of poor sanitation (Cambodia 49 per cent or US$ 274 million; Lao PDR 27 per cent or US$ 52.5 million; and Viet Nam 52 per cent or US$266 million). The combined water and tourism related costs amount to more than US$592 million per year. While, in financial terms, the start-up costs plays a central role in sanitation investment decisions; in economic terms, it is important to focus on the annualized life cycle cost to gain a true idea of the benefit–cost ratio.

Aspiration to improve quality of life is also a strong driver. As income levels increase and basic needs are met, people expect a better quality of life and environment in which they live. Public demand is potentially the strongest and most reliable factor in promoting change. By and large, the public demand for change in sanitation has not been that pronounced in the three countries, mainly because the public is not fully informed about the negative impacts of inadequate sanitation services and because civil society started to be organized more recently. Champions among policymakers and civic leadership help increase awareness which stimulates willingness to make changes.

Presence and effective implementation of regulations is a strong driver for improving sanitation services. Where local authorities are held accountable, services are likely to improve. Frequent septic tank emptying and safe disposal has improved service provision in many towns. Furthermore, it has been shown that well-regulated septic tank emptying can be financially viable and provide an income stream both for private and public operation.

2.2.2 The common barriers to sustainable urban sanitation services in the three countries can be summarized along these four groups: policy and citizen's demand, technical, institutional, and financial.

Policy and citizen's demand barriers. Sanitation policies and strategies to expand coverage exist but are not properly implemented due to institutional and financial constraints. In most cities, there are no citywide strategies in place to deal with flooding, groundwater contamination, and the separation of waste and its safe disposal. Piecemeal interventions have taken place but the sanitation problems remain as seen through low levels of treated septage and wastewater. Even in Viet Nam, where concerted efforts have been made, only 10 per cent of urban wastewater is safely treated.
Public awareness of and demand for sanitation services are low in all three countries. As a consequence, low willingness to charge is a significant constraint.

[24] Figures indicated come from WSP, 2008-2009, Economic Impacts of Sanitation in Cambodia, Lao PDRand Vietnam, http://www.wsp.org/pubs/index.asp

Women's involvement in sanitation service delivery options is weak in all three countries. One main reason for is that sanitation, like water supply, is considered a technical issue and not a social and economic issue. As evidence shows worldwide, women's participation to WASH decision-making and management is a key ingredient for success because they are responsible for household sanitation duties.

Technical barriers. Poor design and maintenance of septic tanks make septage a vector for disease. Septage management is poorly regulated, creating motivation for illegal disposal of septage, generating health problems. So far, urban sanitation improvements are handled as infrastructure projects rather than as an element in wider service delivery oriented planning. Without quality feasibility studies and designs, there is a risk of over-design and under-utilization of sanitation improvement facilities. Thus the treatment technology selected is often inappropriate and not the least-cost option. Also, house connections to the sewers are not of high quality, resulting in the discharge of wastewater to the groundwater or soil, contributing to health and environmental risks.

Lack of systematic data collection, processing and dissemination of sanitation and wastewater management techniques hinders the systematization and scaling up of technical options including DEWATS.

Institutional barriers. The urban sanitation sector is fragmented throughout different national and municipal institutions and service providers which lack coordination in planning and implementation of service delivery. Autonomous and commercialized utilities that take responsibility for septage and wastewater collection and treatment are rare across the focus countries. Often these functions are fragmented across city departments and prone to interference. Operational budgets are not well defined, and it is difficult to predict revenues and to plan future investments to improve services.

Enforcement of regulations and standards and compliance monitoring are weak or lacking, encouraging limited enforcement of fee collection and poor maintenance of sanitation facilities.

The sector suffers from a limited number of technical staff and low capacity among these available staff to carry out sanitation services at policy and operational levels**.** Capacity building is not institutionalized as part of a career development path. For the target countries, the sanitation profession has not benefitted from strong independent associations that ensure professional integrity and provide rewarding career prospects for new entrants.

Financing barriers Policies are not backed by viable financing and clear expenditure frameworks for developing, funding, implementing, and maintaining urban sanitation service delivery. The potential sources of finance—such as tariffs, taxes, and transfers from central government and the blend of loans and grants—are not well delineated. The rules that govern public transfers, tariffs, and the engagement of private sector finance are often unclear. Urban sanitation improvement projects are largely implemented through donor funds with government providing counterpart funding (normally valued at 10 per cent of project costs), resulting in a serious dependence on external finance, especially in Cambodia and Lao PDR.

Financing operating costs is an immediate challenge. Tariffs are too low to meet operating costs in the focal countries. Due to low public awareness and demand, government and municipal authorities are often reluctant to increase tariffs because of concern about reaction from citizens.

2.3 Regional networking on knowledge management and trade practices on sanitation among the three countries (product innovation, commercialization, trade practices)

Cambodia, Lao PDR and Viet Nam are part of the East Asian Conference on Sanitation and Hygiene (EASAN), a government led biennial convention held on a rotational basis in each country that

provides a platform for interaction on sanitation. EASANs are intended to develop a Regional agenda on sanitation and hygiene, enabling learning from the past experiences and setting actions for the future. The objectives of such conferences are to accelerate the progress in sanitation and hygiene promotion in East Asia and to enhance quality of people's life. The EASAN process is instrumental to generate political wills towards better sanitation in the region. So far, three conferences were held since 2007. One of the commitments made at EASAN-2 was to increase cooperation among the countries of East Asia, including through development of an action plan for regional cooperation to address shared financial, technical, institutional and information issues[25].

Mekong Water and Sanitation Programme (MEK-WATSAN) is implementing implementation the "fast track" demonstration projects in about 27 towns across China, Lao PDR, Cambodia, Viet Nam, etc. MEKWATSAN initiative seeks to expedite pro-poor water and sanitation investments in secondary towns, enhance institutional and human resource capacity at local and regional levels to sustain water and sanitation services, enhance capacities of local private sector entities in service delivery, operationalize upstream sector reforms at the local level mainstream gender, support economic development in secondary towns and facilitate investment in the region, and justified the need for development of the decentralized wastewater treatment systems (DEWATS) in the region.

2.4 Multi-stakeholder participation and coordination mechanism for sanitation

Cambodia, Lao PDR and Viet Nam PR each have some sort of **coordination system** to deal with sanitation programs and projects (Table 3). However, no country has committees or Technical Working Groups dedicated solely to sanitation. The trend in those countries is to move water and sanitation tasks from a national to a local responsibility.

Table 3: Multi-stakeholder Mechanism for Sanitation Issues (Last updated on 09.09.13)

Country	Multi-stakeholder mechanism	Status	Policy
Cambodia	None found There are two non-governmental fora: WatSan Group (international NGOs) meets monthly and is focused on Rural WatSan issues, run by MRD. Urban WatSan issues are sometimes discussed due to there being no other forum for such discussions. Cambodia NGO Forum	N/A Monthly meetings of WatSan https://groups.google.com/forum/#!forum/watsan-sector-kh	National Policy on Water Resources Management; Natural Water Resources Policy for the Kingdom of Cambodia (2004); Water Supply and sanitation policy for town and urban areas http://www.rrcap.ait.asia/nsds/uploadedfiles/file/Publication%202-NSDS%20Cambodia.pdf
Lao PDR	Water Resources Coordinating Committee, Ministry of Health, National Water Supply and Environmental Health (Nam Saat)[26] but no central organization solely for sanitation	Functioning	Urban wastewater strategy and investment plan for 2009-2020 http://www.rrcap.ait.asia/nsds/uploadedfiles/file/Publication%203-NSDS%20LaoPDR.pdf
Viet Nam	Not one specific committee for urban and peri-urban areas,		National Strategy on Environmental Protection for period 2004-2010 and

[25]http://www.wpro.who.int/environmental_health/documents/docs/SecondEastAsiaMinisterialConferenceonSanitationandHygieneEASAN2.pdf?ua=1

[26] http://www.righttowater.info/community-participation-in-laos/

	responsibility shared between Min, of Construction, Min. of Environment, Min. of Health, and Ministry of Agriculture and Rural Development[27] Viet Nam Health Environment Management Agency also plays a role Rural sanitation: there is a Partnership Steering Committee among Min. of MARD. Min. of Health, Min. of Training and Education, donors and INGOs working in the field of rural water supply and sanitation (RWSS) since National Target Program on RWSS no.1 in 2006 until present (NTP3). There is a RWSS partnership office to coordinate the activities of this committee located at MARD. More at: http://www.rwssp.org.vn/en	Functioning	oriented to year 2020 (2004) Unified Sanitation Strategy (U3SAP) http://www.rrcap.ait.asia/nsds/uploadedfiles/file/gms/vn/reference/NSDS-VN-Sustainable%20Development%20Implementation.pdf

Chapter 3: Background Policy Study of Cambodia

This Chapter presents the legal, regulatory, policy and institutional framework of sanitation underlying the National Policy on Water Supply and Sanitation and the importance of the Rectangular Strategy. It describes the specific roles of the Ministry of Public Works and Transport and Ministry of Environment. It shows that the private sector is able to deliver any sanitation services despite being fragmented. Recent pilots demonstrate the value of PPP for DEWATS facilities that could be adapted for peri-urban and low income area. It examines specific barriers and drivers for sustainable sanitation services in Cambodia.

3.1 Existing policies, regulations, standards and networks on wastewater management and sanitation services (what works and what needs more attention)

The law on Water Resources Management of the Kingdom of Cambodia (entered into force on June 29, 2007) to be implemented by the Ministry of Water Resources and Meteorology relates to Integrated Water Resources Management as well as permits and licences for any kind of water use and discharge of polluting substances[28]. A "National Policy on Water Supply and Sanitation" was adopted by the Council of Ministers in 2003 and a draft version of the "Water and Sanitation Law of the Kingdom of Cambodia" was released in 2004. The policy lays out the vision for the sector, and

[27] http://www.un.org.vn/en/unicef-agencypresscenter2-89/424-poor-sanitation-putting-children-at-risk-in-rural-viet-nam.html

[28] http://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/documents/Cambodia.pdf

specifies roles of different agencies[29]. Two priorities indicated in the Policy have important implications for sanitation interventions:

1. Communities are to choose the type and level of service based on information about the technical and financial aspects of service options;
2. Services to the poor are prioritized.

The policy has created a broad framework for urban and rural water supply and sanitation. However, it lacks a clear strategy of how to carryout policy recommendations and it does not specifically identify who is responsible for what. Although it does state that municipal and provincial authorities are responsible for urban sanitation. While this policy is a commendable document without political support and no supporting water and sanitation law its implementation remains extremely limited. [30]
The proposed law (supported by the Ministry of Industry, Mine and Energy, or MIME) will establish an independent regulatory and licensing body for piped water supplies and sewerage operated by private suppliers. According to MIME,[31] the proposed regulator would:

- License all public and private operators to ensure that they have the necessary technical and financial qualifications to provide service that meets standards and regulations;
- Monitor and enforce contractual service standards; and
- Regulate a combined water supply and sanitation tariff that would be reviewed every five years on the basis of plans, submitted by the licensed operators, detailing projected operating expenditures (OPEX) and CAPEX, and adjusted with the consumer price index in the intervening years.

So far, neither the Water and Sanitation Law nor the National Policy set out minimum technical or operating standard for household sanitation.

Another main achievement of the sector to date is the superior performance of the Phnom Penh Water Supply Authority (PPWSA). The PPWSA, which is serving the capital city, has a 90 per cent pipe network coverage (2010) and fully recovers its financial costs for both water supply and sewerage.

Urban sanitation studies have been carried out for a few selected cities, and small wastewater treatment plants (centralized management) are operating in two medium-size cities**.** However, the sector reform program lacks legislative support to hold responsible government authorities and service providers accountable to performance targets, and implementation has been uneven. As a result, there is no urban sanitation strategy, the willingness to pay for sanitation services is low, and two-thirds of local private service providers are unregulated. Lessons learned from pilot programs have not led to a calibration of policies and operating strategies, or to scaling up of good practices. Annex 1 provides a summary of the status of implementation of these policies.

3.2 Current capacity of the governance and institutional framework on wastewater management and sanitation services in urban and peri-urban areas

a) The planning and decentralization process for sanitation services

The Royal Government of Cambodia (RGC) has evolved a 'Rectangular Strategy' (RS), which has been the hallmark of development since 2004. The National Strategic Development Plan 2014-2018

[29] Sustainable Water Supply and Sanitation Review, financed by AusAid and jointly undertaken by the Ministry of Economy and Finance, Ministry of Industry, Mines and Energy, Ministry of Public Works and Transport, Ministry of Rural Development, and Ministry of Environment, and by the World Bank, Draft of August 31, 2012
[30] Governance in Urban Sanitation-Case Study Siem Reap-A.V. Campbell,2012,pg 5
[31] Ibid

carries forward the agenda laid out in RS Phase III that provides a development framework, which will be implemented throughout the next five-year period. However urban sanitation and wastewater management are not explicitly mentioned in the key policies and actions between 2014 and 2018 regarding environmental sustainability. Mention is made that the Ministry of Environment will issue a pamphlet on the management of wastewater to municipal and provincial authorities. The development partners have prepared a draft input to RS Phase III[32] with Outcome/Intermediate outcome indicators by 2018 covering urban issues in general with recommendations on sanitation & flood protection: 90% of urban population has access to improved sanitation, of which 50% households are served by sewer connections (centralized/decentralized systems) and 40% have improved on-site sanitation with adequate fecal waste management; 25% of collected fecal waste (sludge/wastewater) is treated and disposed safely; the extent of flood incidents in urban areas reduced; and the capacity of wastewater treatment plants is increased.

The Ministry of Public Works and Transport (MPWT) is responsible for implementing urban sanitation projects and other urban services such as solid waste management, drainage, roads, and public parks**.** The MPWT's mandate covers preparation of plans, policies and investment programs, resource mobilization, setting of standards for construction and services, and coordination in the implementation of projects. Until July 2011, the office of the Director General for Public Works was responsible for all these activities with 12 employees. The MPWT has recently been reorganized to strengthen its capacity to set policies and regulations, promote the financing and implementation of urban sanitation schemes, and monitor and evaluate the performance of the two operators. The Department of Sub-National Infrastructure and Engineering is now in charge of urban wastewater planning and overall supervision. Even so, it is fair to say that the task of building an urban sanitation sector remains. The MPWT is represented in the provinces by its provincial departments, which are responsible for planning, project implementation, and O&M of urban infrastructure. These provincial departments are called Departments of Public Works and Transport (DPWTs) and work in close coordination with provincial authorities. MPWT's wastewater management plan involves focusing on the growth poles of the country i.e. the Phnom Penh, Kandal, Sihanoukville, and Siem Reap growth poles (first priority), the Kampong Cham and Battambang growth pole (second priority), and the Stung Treng, Banteay Meanchay, and Koh Kong growth pole (third priority).

The Ministry of Environment (MoE) is responsible for setting water quality standards for effluents discharging into water bodies as well as monitoring and regulation.[33] However, in practice, MoE only monitors industrial on-site wastewater treatment facilities and does not monitor or regulate domestic or public wastewater. Operations of wastewater treatment plants are currently under the drainage and wastewater units of the provincial DPWTs. These units monitor effluent discharges based on Sub-Decree 27 standards and protocols developed with donor support, but do not coordinate with MoE.

The Ministry of Health is responsible for controlling the quality of surface and ground water used for public water supply as well as for health education and other matters relted to public health

In 2001, Cambodia embarked on new systems of governance at commune/sangkat level, and provincial, municipal, and district levels, in order to strengthen local democracy, promote local development, and reduce poverty. The Organic Law (2008) on the Management and Administration of Province/Municipality and District/Srok was meant to improve effectiveness and efficiency of service delivery at the sub-national level. The policy on decentralization has not been fully implemented in practice and urban water supply and sanitation remain, essentially, under central government control with minimal involvement from local levels.

b) Need for reform and multi-sectoral cooperation and coordination (institutional arrangements)

[32] Donor Input Note for NSDP: Urbanization, June 2013
[33] Sub-Decree 27 on Water Pollution Control, 6 April 1999

The 2012 Sustainable Water Supply and Sanitation Review recommended the transfer of ministerial oversight for urban sanitation from the MPWT to the MIME in order to focus on the close relationship between urban water supplies and urban wastewater management. It was also recommended that each urban operator be made responsible for the provision of water supply and municipal wastewater services within its service area. Unified control over the two services will focus attention on the appropriate collection, treatment, and final disposal of treated wastewater and produce synergies in the administration of the customer base. It is furthermore suggested that the MPWT retain its ministerial oversight for urban drainage that would be implemented and operated by local authorities. It is recognized that since separate sewerage systems are in the early phase, there will be a prolonged period of transition during which MIME and MPWT will need to coordinate closely their respective plans for sanitary and combined sewerage systems.

The water and sanitation sector coordination is done through various platforms, the urban WASH sector through the **Technical Working Group (TWG)** for Infrastructure chaired by MPWT. To enhance effectiveness, the coordination for urban water supply sector is done through the sub-Technical Working Group (sub-TWG) chaired by MIME, which is established under the Infrastructure TWG. The urban sanitation subsector does not have the same sub-TWG TWG meetings are normally held quarterly with participation from government ministries, development partners, and NGOs. A TWG is normally tasked to provide the policy guidance and strategic directions for the development of the sector in a coordinated manner. However, achieving this is still an ideal rather than the reality.

c) Partnerships with the private sector (PPP), social entrepreneurs, NGOs and CBOs: How to ensure the pro-poor PPP (5P) and socially inclusive integrated approach in sanitation services

In the absence of a more formal legal framework, MIME, with the support of the World Bank–financed Provincial and Peri-Urban Water and Sanitation Project, has developed guidelines and procedures by which the government can contract with private firms to improve sanitation services at the local level. The WSP 2008 study "Identifying Constraints to Increasing Sanitation Coverage Sanitation Demand and Supply in Cambodia", indicates that the private sector is responding to an unsubsidized demand for latrines and providing by far the majority of latrine installations. Clearly the private sector in Cambodia is able to deliver any services for which there is a market, that is a clientele willing and able to pay the costs. The challenge is to convert the needs of the poorer members of society for safe sanitation services into *effective demand* (informed willingness and ability to pay). However, this private sector is characterized by a fragmented set of independent businesses, each supplying one or other of the 'ingredients' of a latrine construction, or the on-site construction service itself. For latrine construction, there are masons, who provide construction services, and prefabricated concrete producers, who make concrete components for the construction trade. At the local level, private individuals are in the manual removal of sludge while small companies are engaged in de-sludging services. Private sector engagement is hampered by two factors: (a) cost recovery is highly uncertain since fees are low and irregularly collected; and (b) the land needed to build a treatment plant is difficult to obtain from the government.

In the urban sanitation sector, there is little evidence to suggest that local NGOs are actually engaging the Government to direct more assistance/ importance to the sector. BORDA has always been active in promoting DEWATS to Cambodian government agencies, using completed DEWATS to help influence policy development, to date the interest has been minimal, with the exception of MoEYS on school sanitation issues, here BORDA was able to push to have wastewater management issues & technical input into school WASH policy guidelines. The WatSan group of MRD(attended mostly by local NGOs, International and government staff), does not formally position itself to favor or support any side of the development issues inherent in the sanitation sector, e.g. whether subsidized or non-subsidized, or a combination of both, should be the main policy of the Government.

However, there are now enough demonstration and pilot small-scale sludge treatment projects in villages, public and private facilities (e.g., schools, orphanages, hospitals, slaughterhouses) and small

towns in Cambodia to show the value of PPP for DEWATS facilities that could be adapted for peri-urban and low income areas. GRET and BORDA have been in the forefront of such DEWATS demonstration in Cambodia for years.

BORDA & DEWATS in Cambodia
Start: since 2008
Partner: Environmental Sanitation Cambodia (ESC)
Focus: Staff/Partner capacity building and promotion of DEWATS for SME, public institutions & communities
Implementations: 23 (17 SBS, 3 Hospitals, 1 town, 1 SME, 1 Orphanage)

GRET funded the Project "Small-Scale Sludge Treatment System for Daeum Mien Commune," aiming to demonstrate the rapid cost-recovery of an investment in a small-scale treatment plant for replication and scaling up through the low cost of the project, the involvement of private desludgers, and potential revenues from desludging and sales of compost.

The BORDA Project "Decentralized Wastewater Treatment Systems for a Commune" aimed to improve the sanitation situation of the Commune by installing a DEWATS for 250 households and small businesses, capable of treating up to 100 m^3/day of wastewater flow, thus reducing groundwater pollution from the unsafe traditional sanitation practices. This was the Trapeang Sab project developed by GRET with BORDA acting as technical consultant on DEWATS design & construction. GRET installed the sewer pipelines around the town and also a town water supply system. They also developed the institutional framework for the project in cooperation with local government and local business man – PPP+NGO.

Other projects have included, Sovann Komar Orphanage, where BORDA improved sanitation at the orphanage by installing a DEWATS, able to treat 15m3/day, for the 120 residents; School Based sanitation (SBS) projects in 17 primary schools in Phnom Penh and Siem Reap. The purpose of SBS is to improve the sanitation situation by installing a DEWATS, able to treat 3 to 5m3/day, and improving school WASH facilities, with supporting social trainings which focus on sustainable O&M; Hospital WASH infrastructure improvement in 3 Kampong Speu referral hospitals. The project constructed and renovated WASH facilities and installed a DEWATS in each hospital.

Building on BORDA's and GRET's experience,[34] the following key features are highlighted, Table 4.

Table 4: Key features of BORDA and GRET DEWATS demonstration projects

Project & population	Components	Partnerships	US$ Costs/funding agencies	Impacts
Small-Scale Sludge Treatment System for Daeum Mien Commune GRET 600 households with potential of 1,000 HH	- Involving the commune and users - Construction & operation of a treatment plant - Promotion of hygiene & desludging services - Latrine construction	- Daeum Mien Commune owns the plant - Contract of desludgers w/ the commune - $15 HH charge per desludging	Sludge treatment plant & equipment: $9,200 (GRET) Truck & materials: $5,500 (private company)	-Safe disposal of excreta -Reduced groundwater pollution, foul odors, and health risks -Higher awareness of hygiene and desludging benefits -$6,000 revenue per year covering $5,500 private investment in Y.1

[34] *Demonstration of Ecological Sanitation and Other Decentralized Sanitation Systems in Southeast Asia* http://www.susana.org/lang-en/library?view=ccbktypeitem&type=2&id=1327

				-Safe compost sale: $5-10 per 50 kg
Decentralized Wastewater Treatment Systems for a Commune BORDA 250 HH	- Involving the Commune Council in design and O&M, - Construction of DEWATS: 100m3/day of wastewater - Connecting DEWATS to 250 HH and SMEs - Training the community on O&M.	-Trapeang Sab Commune Council owns the plant and contractis out O&M to a private operator	-Commune DEWATS: $50,200 (GRET + commune, district provincial gov'ts) -O&M costs for desludging covered by commune	-Safe disposal of excreta -Reduced groundwater pollution, foul odors, and health risks -Higher awareness of hygiene and desludging benefits - HH do not pay for desludging the system (subsidized by the commune)
School Based Sanitation **ESC-BORDA Unicef MoEYS/MRD 17 primary schools (2009-2013) Phnom Penh & Siem Reap 10,000 students/teachers**	- Building School WASH Institutions - Promoting Health & Hygiene Education -Improving WASH Infrastructure including on-site wastewater treatment (DEWATS) and good O&M	• **School Level Actors** (School WASH Committees, School Management, Teachers, Local Communities) • **National and Local Authorities** (e. g. MoEYS, MRD, Phnom Penh Dep. of Education, Provincial & District officials • **NGOs/IOs** ESC-BORDA, Unicef • **Private Sector** Construction Contractor,	-Installing DEWATS with integrated WASH facilities - $420,000 invested software & hardware (Ministry of Rural Development), UNICEF, OAV, BORDA/BMZ - Average $25,000 per school; $15,000 for hardware; DEWATS $5-6000, 3 to 5m3/day - Cost per direct beneficiary: $42 per person -Annual average O&M costs per student for DEWATS & WASH Facilities <$1.00	- School WASH Committees are responsible to take charge of O&M - Improved sanitary knowledge , skills and behavior (hand washing with soap, end of open defecation) - Reduced occurrence of diarrheal diseases - Each school has suitable toilets, sinks, urinals and a DEWATS able to treat 5 to 3m^3 of wastewater daily - Improved O&M - Social profit : 10,000 persons x $34.00 = $340,000 10 years x $340,000 = $3,400,000 (Based on WSP Economics of Poor Sanitation,2008

However, there is a need to make baseline assessments, such as a strategic environment assessment and sustainability/impact of outcomes to sustain the built DEWAT systems mentioned in Table 3 beyond project scope and look for pathways for expansion.

d) Review of management of current wastewater infrastructures and development of new facilities (review and lessons learnt of pilot experiences)

In 24 major cities, only four have treatment plants with one of them out of function. Institutional responsibility for operation of urban sanitation facilities is lodged with the wastewater management units of the Provincial Department of Public Works and Transport (PDPWT). Only in Siem Reap

does the PDPWT monitor effluent quality. The recent assessment of the performance of ministries and service providers in the urban sanitation sector shows that that the task of building an urban sanitation sector remains significant.[35] The MPWT has recently been reorganized to strengthen its capacity to set policies and regulations, promote the financing and implementation of urban sanitation schemes, and monitor and evaluate the performance of the two operators. The joint Sustainable Water Supply and Sanitation Review recommends that a national urban sanitation master plan be prepared and updated for the seven largest cities (Phnom Penh, Banteay Meanchey, Battambang, Kampong Cham, Kandal, Siem Reap, and Sihanoukville) and for all provincial capitals. The minimum scope of the master plan would be a set of analyses and recommendations as to: (a) appropriate sanitation technologies and guidelines on the use of these technologies; (b) an investment program prioritizing cities; (c) a financing strategy; (d) a tariff policy; and (e) institutional arrangements at the sector/national level and utility/operational level. In this respect it is recommended that the MIME canvas potential ODA agencies for grant financing of an urban sanitation master plan.

Households and establishments often delay connecting to the primary system because they consider the fees expensive. This reluctance shows a lack of appreciation for the benefits of sanitation and, therefore, requires an effort in raising awareness on the part of local governments and service providers. There is a need for a legal ordinance that requires consumers to connect their households and to pay monthly tariffs where there are available wastewater collection and treatment facilities, including imposing penalties for non-compliance. At present, there are neither penalties nor incentives to connect. There is a limited amount of experience with the condominium approach in Cambodia, principally using NGOs in cooperation with municipally authorities. In these systems, communities build low-cost drainage/sewerage systems as a secondary network and connect to the municipal primary network. The community provides the labor, either as an in-kind contribution or as a payment to hire community laborers. Materials and supervision are provided by the municipality. These systems are appropriate for small streets and alleys off of main roads in informal neighborhoods. Construction standards are relatively low, and may be a problem in the future if facilities begin to deteriorate. Maintenance is provided by the community. Hygiene and water use education is often associated with these projects. The condominial approach has also been applied by NGOs to other community-based projects such as solid waste recollection. One issue for the future is the one of ownership of the systems. Apparently, these systems are considered as "municipal property," although they were built and are operated by communities. In the advent that a new law turns the municipal sewerage system over to a private operator, it is not clear what would happen to these condominial systems.

There is a need to create a simple monitoring and evaluation (M&E) system with key performance indicators of equity, efficiency and sustainability of service for all public and private urban service providers. In the urban sector, it is suggested to use a maximum of ten key performance indicators linked to the sector development goals in order to fit within the budget, capacities and duties of the oversight body.

3.3 Financing of sanitation facilities

a) **Economic decision making process on wastewater facilities, investment plan and operations: from design to monitoring**

The MPWT is responsible for: (a) setting design and construction standards and tariffs for public sanitation systems; (b) mobilizing funding support from development partners for feasibility studies and capital investments; and (c) liaising with interested private investors. Provincial DPWTs operate and maintain the facilities in provincial cities. The provision of neighborhood sanitation facilities (pilot demonstration projects supported by World Bank) was facilitated and supervised by a local NGO. Maintenance of the facilities is the responsibility of the beneficiaries. Foreign investors have indicated interest in the Phnom Penh and Siem Reap systems, but there are no financial commitments to date.

[35] Sustainable Water Supply and Sanitation Review, ibid

b) Financing facilities and recovering costs of operations: What is currently financed and how: the value chain for centralized and decentralized sanitation services

Given the substantial capital expenditure required to upgrade existing wastewater treatment plants and build the first stages of wastewater treatment for Phnom Penh, any investments in this area should be conditioned on concessionary overseas development assistance. Rough cost estimates for upgrading only the first stage of wastewater treatment for Phnom Penh might be as high as US$140 million, or about US$100 per capita[36]. The capital expenditure for Battambang, Siem Reap, and Sihanoukville for wastewater treatment might be US$10 million, US$6 million, and US$4 million, respectively, implying per capita costs of approximately US$60, US$30, and US$40 respectively.[37] Costs would be lower in these three towns because they have already built the first stage of wastewater treatment. In addition to this substantial capital expenditure, the cities would have to invest in further work to collect and convey their wastewater to the treatment works to ensure early full utilization of the treatment capacity. The lessons from their operating experience are that Cambodia is well advised to develop an urban sanitation strategy that would focus on modular sanitation development using appropriate wastewater treatment with low investment and O&M costs, and simple operational requirements.

In 2006, an inter-ministerial prakas from the MPWT and Ministry of Economy and Finance issued a decision on Service Connection Fees and User Fees for sewer collection and treatment. Block rates were introduced for different types of establishments. A household connection fee ranges from US$10 to US$40, and the monthly fee ranges from US$1 to US$4. This tariff structure and fees are being applied in Siem Reap and Sihanoukville. At best, tariffs recover only O&M costs. In Phnom Penh, the PPWSA assesses 10 per cent of the consumer's water bill for sanitation and remits monthly about a million dollars to the municipality.

For Siem Reap and Sihanoukville, tariffs are collected directly by the PDPWTs and are used partially by these departments for maintenance of drainage systems (See Box 4). No allocation is made for capital investments in urban sanitation. In Siem Reap, to fund operations of the SRWWTP $10,000 a month is required, with about 50% of this going to electricity costs, mostly for pumping stations.
At the end of 2011, after one year of operation, the SRWWTP had less than 500 connections. The funds collected are not enough to cover electricity costs for operations. Some income is derived from giving access to sludge truck operators to the sludge treatment plant at the SRWWTP. But the income is low, with trucks being charged about $1/day for access (SSWTPU, 2010) [38].

Box 4: The challenge of running a centralized wastewater system in Sihanoukville.

The Sihanoukville wastewater treatment plant with improved sewerage network, completed through an ADB loan, currently obtains its O&M budget from tariffs charged to households and large service and industrial establishments. Individual households are charged $1/ month while larger establishments including industries are charged based on their service capacities. Industry and large service establishments comprise 60% of total O&M while households tariff comprise the remaining 40%. The investment cost ($11M) is being paid by the Government. [39] It has been an expensive undertaking, costing almost US$5,500 per connected household to construct based on its expected operating capacity (or US$544 per year, based on a 20-year lifespan and discount rate of 8 per cent). Given that, in the years after its construction, only around 20 per cent of the households have connected (which requires a one-off connection fee and a monthly wastewater fee), the actual construction cost per household of US$27,500 is five times the planned cost per household. This translates to a benefit-cost ratio of 0.14 under full capacity use, and 0.03 under actual capacity use. However, the value of the improved environment and sea water quality to residents and tourists, and the associated revenues from tourism—which are potentially substantial— have not been included in

[36] Sustainable Water Supply and Sanitation Review: ibid
[37] Sustainable Water Supply and Sanitation Review: ibid, &
WSP, 2011, Water and Sanitation Sector Financing Strategy for Cambodia, Cowi Consult
[38] Governance in Urban Sanitation-Case Study Siem Reap-A.V. Campbell,2012,pg6
[39] From ADB loan, please see Table 5 below.

the calculation. **Source:** WSP, The Economic Returns of Sanitation Interventions in Cambodia, August 2011

There are many different arrangements for the collection of fees. The Phnom Penh Water Supply Authority (PPWSA) collects sanitation fees through the water bill in Phnom Penh. In Siem Reap and Sihanoukville, it is the PDPWTs that collect the fees, while in Battambang, the municipality collects the fees. Desludging services are provided by private companies and the wastewater management units.

International best practice is to combine the delivery of water and sanitation services under one-water utility because wastewater generation is based on water consumption and this arrangement reduces administrative costs. In contrast, Cambodia has decided to separate water supply and wastewater management. The rationale given is that water supply coverage is still limited and recovering costs only from a relatively small base of consumers connected to water supply systems would put a heavy burden on these consumers. It is accepted that only those who are connected to the urban sewerage system would be expected to pay sewerage charges, although in effect both the connected and unconnected households benefit from a sewerage system. The 2012 Sustainable Water Supply and Sanitation Review recommended that urban sanitation services, where applicable, be billed as a surcharge on the water bill and be collected by water supply service providers. All consumers, whether connected or not to public sewerage, should pay the surcharge since all could be expected to gain from the external benefits of better urban sanitation. Initially, it is recommended that the level of sanitation surcharges are limited to pay for operation and maintenance (O&M) costs of the collection, treatment, and environmentally sustainable disposal of the effluent. Financing of the capital expenditure of the associated works would be on a grant basis, possibly financed by concessionary overseas development assistance (ODA), in view of the substantial external benefits of a well-functioning wastewater system

Most investments in wastewater management systems have been funded by donors (Table 5) and most sanitation investment at local level by household self-provision[40].

Table 5: Centralised Wastewater Treatment Facilities in major Cambodian Cities, 2011

City	WWTP	Wastewater Collection System			Capacity of WWTP (m^3/day)	Current Utilization Rate	Financing
		Com-bined drainage-sewerage (km)	Separate Sewerage System (km)	No. of sangkats covered			
Phnom Penh	No formal wastewater treatment facility. Wastewater is drained to lagoons and treated through passive processes before discharge to the rivers.	463	-				A master plan has been prepared to construct two wastewater treatment plants in the northern and southern parts of the city with a capacity of 500,000

[40] WSP, Economic Impacts of Sanitation in Cambodia, February 2008

							m^3/day, each.Financed by JICA
Battambang	Wastewater stabilization system including anaerobic ponds, facultative ponds, and maturation ponds. Currently not functioning due to lack of budget.	25.5	-	Four out of 10 urban sangkats	2,800	16%	Facility was funded by EU-SAWAC (1994) for €0.5million. DPWT of Battambang has reported that 80% of total population has septic tanks and discharge directly to the river or rice fields.
Siem Reap	Wastewater stabilization system including anaerobic ponds, facultative ponds, and maturation ponds.	11.0	12.8	Covers only the eastern part of the city.	5,500	100%	Funded in 2009 by an ADB loan of US$14.4 million. Coverage of the western part of the city is being planned which has an area twice that of the current area covered.
Sihanouk- ville	Wastewater stabilization system including anaerobic ponds, facultative ponds, and maturation ponds.	35.7	76.4	Three out of four sangkats	6,900	40%	Funded from an ADB loan in 2006 in the amount of US$11.19 million.

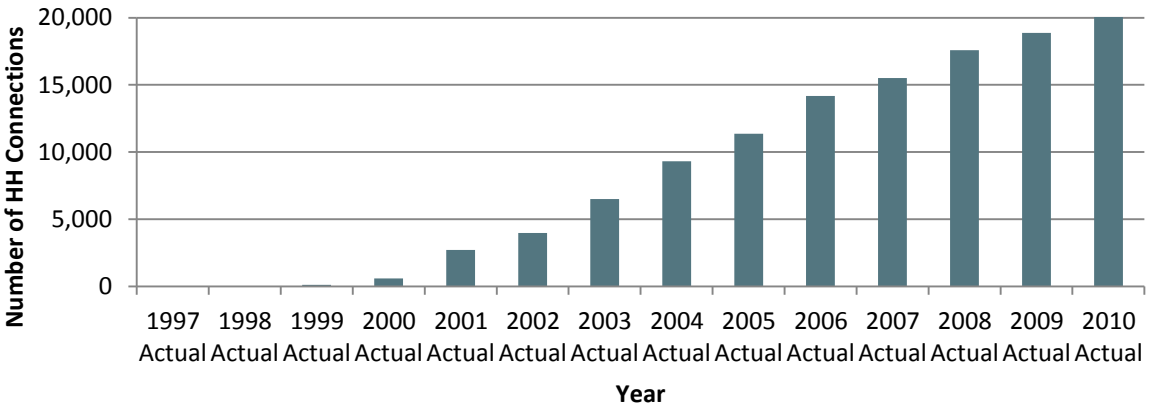
Source: 2012 Sustainable Water Supply and Sanitation Review

In the capital city, The PPWSA has more than 200,000 water connections and a program for connecting the poor through affordable financing and subsidies for the connection fees (see Box 5 and Figure 1). Such a scheme for water could be adapted to affordable and reliable wastewater management systems for the poor. The success of PPWSA today has been attributed to its autonomy under strong leadership with transparency and accountability, and a fully rehabilitated system and capable staff made possible by significant external assistance.

Box 5: The PPWSA Program of Connecting the Poor, launched in 1999.
The program provided deferred payment schemes for connection fees (cost of connection is about

US$100) in installment payments of 10, 15, and 20 months. In 2005, the program for the poor was expanded to provide subsidies of 30, 50, 70, and 100 per cent on the cost of connection. This program was supported by the World Bank under the Provincial and Peri-urban Water Supply and Sanitation Project. The identification of the poor follows a process that is community based. First, the PPWSA comes out with an initial list of poor households by business district. Then, neighbors and village chiefs validate the classification of poor households, after which the PPWSA makes the final evaluation. To date, the PPWSA has connected more than 20,000 poor households, equivalent to about 100,000 persons. Source: 2012 Sustainable Water Supply and Sanitation Review

Figure 1: Growth of Drinking Water Connections for Poor Households, 1997-2010 (PPWSA)



3.4 Specific barriers and drivers for sustainable sanitation services in Cambodia

Based on the above findings, a synthesis of significant gaps and Cambodia-specific recommendations are listed below.

Funding gaps

- Most urban investment studies have focused on capital-intensive, centralized wastewater systems and have not consider decentralized development.
- Urban sanitation is not integrated into the multi-annual investment planning cycle for the municipality urban development plans.
- DEWATS demonstration projects in peri-urban areas have set up financing partnerships between national, provincial and commune level, NGOs and other funders; there is a need to finf more long-term funding.
- There is potential to raise household demand for DEWATS which could accelerate currently low microfinance involvement in the sector.[41]

Capacity Gaps

- There is a need to strengthen the 2003 National Policy with a sustainable urban sanitation service delivery strategy for the country that encourages the development of master plans for sanitation for the major cities, starting with capital city of Phnom Penh, with emphasis on low-cost, affordable, decentralized solutions for improving sanitation using simple but effective technologies, particularly in areas having high poverty.
- Lack of/limited sector coordination: there is a need for a TWG and a common approach on urban sanitation similar to the drinking water approach.

[41] Out of a net loan portfolio of more than $700M as of 2008. WSS share of the microfinance portfolio is only about 2% indicating very low or no access for sanitation projects by NGOs, by the private sector, or by individual households.

- Development/enforcement of legal and regulatory framework by local authorities on mandatory installation of latrines/ toilets in new buildings/ houses is needed. This would require involvement of the Ministry of Land Management, Urban planning and Construction.
- NGOs have insufficient capacity to play a major role in large-scale implementation, but they may help to train people and raise awareness.

Successful approaches to sustainable sanitation service delivery that would benefit from increased funding

- Development of modular DEWATS using local materials in urban and peri-urban areas: Using the demonstration projects of BORDA, GRET and other development partners as 'DEWATS learning projects' for all relevant stakeholders order to jointly assess the full range of sewage conveyance and treatment options, and their related costs and benefits.
- The PPWSA management performance and programme for connecting the poor.
- CLTS and sanitation marketing as vehicles to trigger sanitation demand.
- School-based Sanitation as an integrated approach combining DEWATS with health-hygiene education.
- Increased role of the Ministry of Health and integration of sanitation and hygiene approaches to health policies and programs.
- Large-scale marketing programs designed to develop a value chain of appropriate products and services.
- Private sector involvement in microfinance for sanitation.

Chapter 4: Background Policy Study of Lao PDR

This Chapter presents the legal, regulatory, policy, institutional and financial framework of sanitation underlining the importance of the urban wastewater strategy and investment plan for 2009-2020 in which urban wastewater investments would require about US$103 million, the lack of a regulator and policy on sanitation tariffs, and the need to establish a government-led technical working group. It describes the specific roles of the Ministry of Public Works and Transportation, the Ministry of Health and Ministry of Environment. It shows that the private sector is able to deliver any sanitation services despite being fragmented. Recent pilots demonstrate the value of PPP for DEWATS facilities that could be adapted for peri-urban and low income area. It examines specific barriers and drivers for sustainable sanitation services in Lao PDR.

4.1 Existing policies, regulations, standards and networks on wastewater management and sanitation services (what works and what needs more attention)

An urban wastewater strategy and investment plan for 2009-2020 was prepared in June 2009 and is currently under consideration by the Government.[42] for 2015-2030. It comprises (a) institutional and legal reforms; (b) a strategy for improved access to sustainable wastewater through appropriate technology in wastewater management and appropriate toilets in schools, public markets and buildings; (c) capacity building and awareness raising at the central and local levels; and (d) financial sustainability. As for the choice of sanitation systems, it calls for decentralized systems in Vientiane Capital City and secondary towns from 2016 to 2020, and centralized systems in Vientiane Capital City and Luang Prabang after 2020.[43]

[42] Prepared as part of the National Urban Sector Development Strategy and Investment Plan (NUSDSIP), a requirement under the National 6th Five-Year Socio-Economic Plan (2006-2010). Preparation was funded by Norwegian Agency for Development Cooperation (NORAD), in support of the ADB funded the Northern and Central Water Supply and Sanitation Project

[43] Presentation of Mr Khamthavy Thaiphachanh, Director General, Department of Housing and Urban Planning Conference on Sewerage and Wastewater Treatment in Southeast Asia-12-13 October 2011, Vietnam

The sanitation sector does not have a specific law parallel to the Water Supply Law, enacted in 2009 which provides the policy framework for the water supply sector. The legal framework for sanitation and wastewater management is covered by various laws and regulations that often lack implementation decrees and enforcement. (See Box 5)

Box 6: Legal framework for the sanitation sector in Lao PDR

1994 Regulation for Industrial Waste Discharge (No. 180/MIH):

- defines effluent standards like e.g. BOD and TSS for different types of industries

1996 Law on Water and Water Resources (No. 126/PO):

- Article 42: "…Polluted water, wastewater [and] waste that exceed the discharge standard must first be treated before they may be dumped or discharged into water sources …."

1999 Environmental Protection Law (No. 09/PO):

- Article 23: "…It is forbidden to discharge wastewater, or water that exceeds the prescribed standards into canals, natural water bodies or other places without proper treatment. …"

1999 Management &Development of the Water Supply Sector (No.37/PM) Prime Minister's Decision:

- Article 2: "..Provincial Governments will be responsible for: …; collaboration with the Department of Communication Transport Post and Construction (DCTPC) of the province concerned in finding out suitable solution to assist low income households which cannot afford the cost of sanitary facility;… direction of water supply and sanitation sector project implementation in the province concerned; … ; institutional arrangements for the implementation and management of centralized wastewater management systems as for water supply when these systems become economically and financially viable, but until such time onsite treatment will be pursued and the implementation and management of the facilities shall be the responsibility of the: individual owner; … "

2001 Law on Hygiene, Disease Prevention and Health Promotion (01/NA):

- Article 17 – Hospitals, Dispensaries and Clinics shall be equipped with a system for waste-water treatment, and a system for waste separation, storage and disposal in accordance with the principles of hygiene
- Article 19 – Hygiene in Production: "… It is forbidden to release waste, chemicals or wastewater from factories, including other production sites, into water bodies or elsewhere without undergoing a treatment process."

Source: Wastewater Production, Treatment, and Use in Lao PDR, Dr. Tayphasavanh Fengthong and MR. Khamphet Roger

Lao PDR has water quality standards[44] based on WHO guidelines. A number of different agencies and institutions have mandates related to wastewater quality: the Water Resources and Environment Administration deals with urban wastewater quality; Water Supply Authority for urban water supply quality; and Ministry of Public Health for drinking water quality. Overall, there appears to be little coordination and very little overall compliance monitoring and systematic reporting on water and wastewater effluent quality in Lao PDR.

Unlike the water supply sector, which has the Water Supply Regulatory Committee, the sanitation sector has no regulatory body. The urban wastewater strategy and investment plan for 2009-2020 aims to introduce regulation of the sanitation sector (tariffs and financing) on the national, provincial and district levels.

This explains the lack of policy on sanitation tariffs. In the urban wastewater strategy and investment plan for 2009-2020, the government committed to start developing a policy towards mobilizing financing from consumers for sanitation development. This could be in the form of a surcharge equivalent to a certain percentage of the water bill. The rationale is that water consumption generates

[44]MoPH (2005): Decision on the Management of Quality Standards for Drinking Water and Household Water Supply

wastewater that has to be collected and treated prior to disposal to avoid polluting the environment. The collections could be put into a sanitation fund for use in sanitation-related programs. Contrary to water supply, the benefits of sanitation are less visible to households and therefore willingness to pay is often low or nonexistent. Thus, this requires raising awareness of consumers on the health impacts of sanitation and the potential of private benefits such as higher property values and increased incomes from livelihood from treatment systems. Implementation could be piloted in Vientiane and the secondary cities where incomes are higher and there is higher capacity to pay.

Annex 2 provides a summary of key policy issues, recommended policy actions and intended outcomes.

4.2.Current capacity of the governance and institutional framework on wastewater management & sanitation services in urban & peri-urban areas

a) The planning and decentralization process for sanitation services

There is no master plan on wastewater treatment system including sewage system, storm water drainage and treatment plants at this time.

The Prime Minister (PM) Decree no. 37 on the Management and Development of Water Supply and Wastewater Sector, issued in 1999, assigns responsibility for development of urban sanitation to the Ministry of Public Works and Transportation (MPWT). This involves developing the sector strategy, investment plans and technical regulations relating to urban wastewater and wastewater management in collaboration with the Water Resources and Environment Administration (WREA, which is not existing any more). Within MPWT, the Urban Development Division (UDD) under the Department of Housing and Urban Planning (DHUP) is responsible for this task as well as for other urban services such as drainage systems and solid waste management. UDD has less than 10 staff. The Local Administration Law created the provincial Urban Development Administration Authorities (UDAAs, with different responsibilities in each province) to provide urban infrastructure services, including drainage, solid waste and wastewater management.

The Ministry of Health (MoH), through its National Center for Environmental Health and Hygiene (Nam Saat), is responsible for promoting environmental health and hygiene in urban and rural areas. Its mandate includes planning and programming, mobilizing financing, capacity building and technical assistance for community mobilization.

The upcoming urban sanitation development strategy for the 2014-2030 period is strongly focused on DEWATS for wastewater treatment as a key method for wastewater treatment system in both urban and peri-urban areas. Some urban development projects under DHUP will include the installation of wastewater treatment plants in Savannakhet, Pakse, Oudomxay, Thakhek, Paksan.

b) Need for reform and multi-sectoral cooperation and coordination (institutional arrangements)

In terms of environmental coordination and decision-making processes, intersectoral coordination to manage urban environmental affairs has been lacking and has become a problem in Vientiane city, although the coordinating mechanism given has been established for urban development in Vientiane city.

- At the central government level, there is a planning body that is in charge of synchronizing interdepartmental coordination for urban activities;
- At the city level, there is a community to coordinate sectoral program and projects from loans (i.e., ADB, Work Bank loans);
- For implementation of infrastructure activities, there is a program to coordinate investment and institutional strengthening (i.e., Vientiane UDAA, DCTPC).

There is a need to establish a government-led national technical working group (TWG) on water supply and sanitation with government and development partner representation. Not only could this improve sector coordination; but it would also help to ensure that donor support is aligned with government and priorities. BORDA is working to facilitate establishment of such technical working group for urban WASH as platform for central stakeholders to coordinate and harmonize programs.

However there are cooperation arrangements between the government and external support agencies to facilitate implementation of DEWATS in the country:

- UN-HABITAT (as donor)+ DHUP (as Government organization)+ Nam Papa State Enterprise Attapheu (NPSE) (as facilitating organization) + BORDA (as DEWATS technique specialist) in Mixay and Phouxay village, Sanxai district, Attapeu province as beneficiaries;
- National Academy of Politics and Public Administration (NAPPA) (as owner + Government budget)+DHUP (as Government organization)+BORDA(as DEWATS technique model) in Thangone, Xaythany, Vientiane as beneficiaries;
- DWR+GIZ (Donor)+DHUP (as Government organization)+ BORDA(as DEWATS technique specialist) in HinTit village, HinHeub district, Vientiane Province as beneficiaries.

c) Partnerships with the private sector (PPP), social entrepreneurs, NGOs and CBOs: How to ensure the pro-poor PPP (5P) and socially inclusive integrated approach in sanitation services

The urban wastewater strategy and investment plan for 2009-2020 promotes private sector participation in wastewater services. The investment plan also estimates that about US$8.4 million would be needed to establish a revolving fund to help the poor connect their households. So far, most DEWATS programmes using pro-poor approaches and partnerships with public and private sector, NGOs and CBOs have been promoted and implemented by external funding institutions (NGOs, multi and bi laterals). BORDA and GRET are among the few NGOs that have forged links with Lao institutions to push forward DEWATS.

BORDA & DEWATS in Lao PDR
Start: since 2010
Partners: Ministry of Public Works and Transport, Department of Housing & Urban Planning (2013)
Focus: Staff/Partner capacity building, and promotion of DEWATS, implementation of pilot projects
Implementations: 8 (1 SBS, 4 CBS, 3 SME) (2 under construction with UN-Habitat)

DEWATS projects have been implemented in villages, public facilities (e.g. schools, colleges, and temples) as well as in private facilities (e.g. worker camps of hydropower plants). GRET MIREP constructed a Decentralised Wastewater Treatment System and set up a desludging service for a small town in Lao to show the value of PPP for DEWATS facilities that could be adapted for peri-urban and low income areas (Table 6).

Table 6: Key features of some DEWATS demonstration projects in Lao PDR[45]

Project & population	Components	Partnerships	US$ Costs/funding agencies	Impacts
Community-Based Sanitation	Installing DEWATS for the Staff	Lao Institute for Renewable Energy	Funder: Finnish Turku School of	- Safe disposal of excreta

[45] *Demonstration of Ecological Sanitation and Other Decentralized Sanitation Systems in Southeast Asia* http://www.susana.org/lang-en/library?view=ccbktypeitem&type=2&id=1327 and Agreement of Cooperation between UN-Habitat and NAM PAPA STATE-OWNED ENTERPRISE ATTAPEU, 2013

(CBS) service for the Staff Dormitory Residence in Sokpaluang Campus of the Faculty of Engineering, National University of Lao (NUoL) in Vientiane	Dormitory Residence (125 users) with a capacity to treat 10m³ of wastewater per day	(LIRE), BORDA as executing agencies; Finnish Turku School of Economics as a funding partner Faculty of Engineering – NUoL as beneficiaries with support from Finland Futures Research Centre	Economics	- Reduced groundwater pollution, foul odors, and health risks - Higher awareness of hygiene and desludging benefits
CBS for Thongkankham Village (1), Khualuang Primary School & Temple (2) and **CBS/SBS for monks dormitory and school of Khoualuang Temple** **Agriculture & Forestry College Luang Prabang (3)** **925 direct beneficiaries** **BORDA & LIRE**	1.Installing a DEWATS (11.2 m3/d) for 22 households (146 user) and renovating the toilet facilities for 9 HH 2.Installing a DEWATS (7m3/d) for 14 school toilets, 3 nearby temple toilets (116 users) & storm water drainage 3. Installing a DEWATS (26m3/d) for 15 households, 80 monks living in the temple, and 300 students of the school (455 user) 21 toilets 4. Installing DEWATS (15m3/d) for dormitory and canteen (208 user)	JICA & Helvetas as funding partners BORDA & LIRE as executing agencies	Project 1: $33,154 Project 2: $36,168 Project 3: - Project 4:$25,000 to cover construction costs, community engagement costs, and initial water quality testing costs O&M fee decided by community to cover the O&M costs, an allowance for the operator, and the costs of desludging the system every 2 to 3 years: $410 to 574/month	- Safe disposal of excreta - Reduced groundwater pollution, foul odors, and health risks - Higher awareness of hygiene and desludging benefits - Party Successful O&M of DEWATS by local operators
DEWATS & Desludging Service for Hin Heup Town A GRET MIREP Pilot Project **1,800 direct beneficiaries**	Installing a simplified sewer system, leading to a small-scale WTP, for 60 households of the town, while 300 more households receive local	District authorities of Hin Heup & the Local Private Water Supply and Wastewater operator Executing Agencies: GRET & Dept. of Housing and Urban	Total cost: $61,000USD, GRET: $54,000, Water operator: $5,000, User connection fees: $2,000 ($30/HH) Fixed monthly user fee:	- Safe disposal of excreta - Reduced groundwater pollution, foul odors, and health risks -Higher awareness of

	desludging service.	Planning (MPWT) Water Supply Regulatory Office	~$1.30USD Desludging service fee: $20 O&M cost around $40/month for labor and $40/month for maintenance	hygiene and desludging benefits - Successful O&M of DEWATS by local operators - No more desludging costs for HH connected to DEWATS - Reduced desludging fee: $20 compared to $50
CBS for Hintit village, Hin Heup district, Vientiane Province	DEWATS ($3m^3/d$) for 10 HH (66 user)	- Ministry of Natural Resources and Environment (MoNRE), Department of Water Resources (DWR) as responsible body - GIZ Thailand as funding agency within the Lao-Thai German Trilateral Cooperation Program - BORDA technical assistant and facilitator of social interventions	Hardware cost : $2,700 covered by GIZ Thailand Construction done by beneficiaries under supervision of BORDA Operation cost per month: $4 O&M fee: $0.4 per HH/month	- Safe disposal of excreta - Improved health, hygiene and environmental conditions in the communities - Greater community awareness on sanitation issues leading to a cleaner urban environment - Successful O&M of DEWATS by local operators
CBS for 2 target villages, namely Phousay and Mixay of Sanxay district in Attapeu Province **UN-Habitat MEK-WATSAN NPSE-ATTAPEU**	- Establish CBS Committees Action Plans; - Conduct Health Impact Assessment, Health Hygiene Education - Train the target groups on DEWATS manag't	-NPSE-Attapheu with full responsibility for project implementation - District Authority to mobilize and motivate community to participate & allocate in-kind	Total cost: about $97,000 UN-Habitat:$87,000 NPSE-Attapheu:$7,200 Community: $2,600	- Improved sanitation infrastructures -Improved health, hygiene and environmental conditions in the communities - Greater

Approx. 10,000 people by 2015 including the poor	& O&M - Constructing DEWATS & at leastfor 6070 HH latrineshouseholds inclusive the improvement of sanitation facilities (pour flush toilet) - Monitoring and Evaluation	and/or cash contribution committed for the project -UN-HABITAT as funder & oversight - BORDA as technical assistant and facilitator of social interventions	community awareness on sanitation issues leading to a cleaner urban environment - Enhanced management capacity of WATSAN users - Effectiveness of governance institutions

However, there is a need to make baseline assessments, such as strategic environment assessment and sustainability/impact of outcomes to sustain the built DEWATS, mentioned in Table 6 beyond project scope and take stock for scaling up.

As an exemplary partnership on DEWATS in the South East Asia region, the Lao Institute for Renewable Energy (LIRE) has partnered with German non-governmental organization BORDA to promote and implement DEWATS. The program, which focuses on poor and densely populated areas, takes a technological as well as social approach that enables the treatment of wastewater in an affordable and sustainable way. Seven community and school-based DEWATS have been realized under the LIRE-BORDA partnership between 2010 and 2013.

d) Review of management of current wastewater infrastructures and development of new facilities (review and lessons learnt of pilot experiences)

The country has no operational urban sewerage system or wastewater collection, treatment and disposal systems at present, although one MIREP sanitation project and two UN-Habitat MEK-WATSAN projects are under construction.

Sanitation facilities in urban areas are mainly on-site built by households and composed of pour-flush toilets with infiltration pits (single or double), although septic tanks are also used. While the regulation and standards for the design and construction of septic tanks are in place, it is still unclear the commissioning process might still be not cear, and septic tanks are not regularly desludged. This practice could pollute the groundwater from which the community draws their drinking water.[46] Sludge disposal is not regulated and often emptied untreated directly into public drains or the urban environment (roadside, paddy fields, wetlands—See box 6). Storm water drainage in most urban areas consists of roadside drains leading ultimately to natural streams and rivers[47]. The situation is worse during the rainy season, when flooding raises the groundwater level and poorly constructed septic tanks become water storage tanks. With the rising of the water level, faeces are flushed out from the septic tanks to the lower lying areas of the street.

Box 7: Wastewater Treatment and Reuse through Constructed Wetlands in Vientiane

The increase of pollution and steady decline in drainage water quality is becoming a serious challenge in the management of Vientiane's water resources as it becomes more and more urbanized. The

[46] A rapid assessment of household sanitation facilities in Vientiane was carried out with assistance from WSP
in 2010
[47] Presentation of Mr Khamthavy Thaiphachanh, Ibid.

situation could be worse due to the continuous loss of the city wetlands. As flooding is still a very big problem during the raining season, traditional combined sewage overflow is not suitable for Vientiane Capital City. Heavy rainfall will cause system overload, which will lead to raw wastewater overflow by dysfunctional septic tanks. Although the construction of a centralized treatment system should be part of the long-term planning of the city, a decentralized approach should be immediately promoted outside the city centre. Combination of properly functioning septic tanks (primary treatment) and small individual or communal treatment wetlands (secondary treatment) would be highly suitable. The EU-funded Thatuang Marsh wastewater management project was designed to improve wastewater treatment and drainage out of the central Vientiane area. The project built a system of stabilization ponds at Thatuang Marsh designed to serve an estimated population of 44,590 for 2005 with a per capita BOD1 discharge of 45g/capita/day, assuming 50% of the pollutant load would reach the treatment plant. The EU-ponds restoration could be seen as an example of an approach to build a larger neighborhood treatment system that would not require household septic tanks. In all designs, raw wastewater would be treated and reused locally. Any sustainable development of Vientiane Capital City should also include the long-term implementation of Sustainable Urban Drainage System and of Resource-Based Sanitation (Ecological Sanitation). Such approaches would not only help protecting the remaining urban wetlands, but would also contribute to both renewable energy production (e.g., biogas from septic tanks sludge and aquatic plants cropping) and food security (e.g., urine as fertilizer and biogas residues as soil conditioners).

Source: Hui Su, Ph.D Thesis, Lund University,Division of Water Resources Engineering, ISSN 1101-9824

Of the 47 poorest districts in the country, development partners are supporting sanitation and hygiene promotion in just over half, and most projects operate on a fairly small scale, covering only selected villages rather than entire districts. Typically these projects support the installation of a single technology option: the pour-flush toilet with a soak pit lined with three concrete rings. This design is very popular, but also fairly expensive: over US$100 if a durable super-structure is used.[48]

This approach to sanitation promotion has three critical weaknesses:

- it is too expensive to scale up;
- it creates community expectations of external support, reducing the motivation of householders to build latrines at their own expense; and
- it makes it very difficult for private masons and suppliers to generate business since their products are not subsidized.

Seasonal limitations in water supply can also affect the viability of pour flush toilets. Based on lessons learnt from DEWATS pilot projects and CLTS, there is now a more cost-effective approach to sanitation promotion that can be scaled up district and city-wide.

To support the policy on wastewater management, DHUP and BORDA signed a cooperative MoU from 2013 to 2015 to support central and municipal governments in technical know-how and capacity building on DEWATS throughout the country: seven activities will be completed on the end of December 2015.

4.3 Financing of sanitation facilities

a) Economic decision making process on wastewater facilities, investment plan and operations: from design to monitoring

Practically no investments have been made by the government in sewerage and wastewater treatment plants, except for a few kilometers of sewerage pipe and a stabilization pond in Vientiane. According to the Sanitation Financing Study of 2009 funded by WSP, expenditures on basic sanitation and hygiene promotion were about US$6.0 million in 2008/09, with approximately 13% funded by government (largely in terms of staff time/salaries and administrative expenses), 35% from development partners, and 52% from household financing of latrine construction. The report suggests that annual expenditures for sanitation and hygiene should increase by about 2.5 times if a scenario of 60% coverage were to be met by 2015, and should be increased by about four times to reach 70%

[48] World Bank, 2010, Water Supply and Sanitation Sector Review in Lao PDR

coverage by 2015. The composition of support among the government, development partners, households and the private sector would be a key variable.

Based on the urban wastewater strategy and investment plan for 2009 to 2020, total *urban wastewater investments would require about US$103 million* which would include institutional support and capacity building (0.7%), facilities for Vientiane city (27%), secondary towns (20%), provincial capitals (17%), district centers (35%), and emerging small towns (0.3%). Possible funding sources identified are from government budgetary allocations at all levels, domestic and foreign private sector investment, and development partners such as donor governments, funding agencies, international and national NGOs.

b) Financing facilities and recovering costs of operations: What is currently financed and how: the value chain for centralized and decentralized sanitation services

In general, urban wastewater management falls under the responsibility of the Urban Development and Administration Authority (UDAA) and 12 other districts/small urban towns. In the case of Vientiane capital, the government has provided subsidies for wastewater management. The arrangement is that Nam Papa Na Khone Luang deducts the amount of about US$920,000 per month (56,076 water meters at a flat rate of $16.40 per meter per month) from its payable turnover tax and remits the same amount to the Vientiane Urban Development Administration Authority.[49] However, in some provinces the wastewater management cost is charged directly to consumers by applying a flat rate of 1,000 Kip per month per water connection. Desludging costs about $2,460 per trip by private companies. The tipping fee to dispose of sludge in a landfill costs about $246 per truck.

In contrast to the government investment constraint mentioned in the previous section, a very encouraging finding of the 2010 WSP Sanitation Financing Study was that households with the necessary resources are willing to pay for good quality toilets and desludging services. Household financing is in fact the main reason that coverage is, slowly, increasing. Only 18 per cent of household latrine construction in 2008/09 was subsidized, with the vast majority funded from households' own resources. Three quarters of these household built latrines costing around US$318, and one quarter spent around US$614. These are substantial sums and such toilets would only be affordable to middle- and high-income earners; for large numbers of poor households to build their own facilities, more affordable technology options would need to be available. It is also estimated that about US$8.4 million would be needed to establish a revolving fund to help the poor connect to sanitation systems. Using official definitions, it is estimated that about 10% of the urban population (or about 190,000 people) is considered poor.[50] The investments for improving access of the poor to improved sanitation assumes that 10% will be included in communal systems, 50% will install pour-flush facilities, and 40% will install dry latrines.

4.4 Specific barriers and drivers for sustainable sanitation services in Lao PDR

Funding gaps and opportunities

- The sanitation sector is heavily dependent on donor support, but there is no mechanism in place for coordinating government and donor resources. The level of private sector contribution is difficult to determine but is evidently very low, probably less than 2 per cent.[51]
- Most urban investment studies have focused on capital intensive, centralized wastewater systems and did not consider modular development.
- The cost of building an improved latrine is currently high, making it unaffordable to most low income households.

[49] Base on the Prime Minister's Decision number 052/PMO, dated 25/5/2009
[50] WSP, 2010, Financing Sanitation Study in Lao PDR, Lao Office
[51] World Bank, 2010, Water Supply and Sanitation Sector Review in Lao PDR

- Urban sanitation not integrated into the multi-annual investment planning cycle for the municipality as part of urban development plans.
- Potential to scale up DEWATS demonstration projects in peri-urban areas due to financing partnerships between national, provincial and commune level, NGOs and other funders.
- Potential to raise household demand for DEWATS with promotion, technical support and attractive financing option including the currently low microfinance involvement.

Capacity Gaps

- Need to implement the urban wastewater strategy and investment plan for 2009-2020 for the country that encourages the development of master plans for sanitation for the major cities, starting with capital city of Vientiane, with emphasis on low-cost, affordable, modular solutions for improving sanitation using simple but effective technologies, particularly in areas having high poverty.
- Lack of/limited sector coordination: need for a TWG and a common approach on urban sanitation and alignment of donor support with government priorities.
- Development/enforcement of legal and regulatory framework by local authorities on mandatory installation of latrines/toilets in new buildings/houses.
- NGOs have insufficient capacity to play a major role in large-scale implementation.

Successful and problematic approaches to sustainable sanitation service delivery that would benefit from increased funding.

- Development of modular DEWATS using local materials in urban and peri-urban areas. Using the demonstration projects of BORDA, GRET, MEK-WATSAN and other development partners as 'DEWATS learning projects' for all relevant stakeholders order to jointly assess the full range of sewage conveyance and treatment options, and their related costs and benefits.
- Find a more cost-effective approach to sanitation promotion that can be scaled up district and city-wide: CLTS and sanitation marketing as vehicles to trigger sanitation demand.
- School Based Sanitation as an integrated approach combining DEWATS with health-hygiene education.
- Increased role of the Ministry of Health and integration of sanitation and hygiene approaches to health policies and programs.
- Large-scale marketing programs designed to develop a value chain of appropriate products and services
- Private sector involvement in micro-finance for sanitation.

Chapter 5: Background Policy Study of Viet Nam PR

This Chapter presents the considerable efforts to develop urban sanitation policies, legislations and regulations and to invest in urban wastewater treatment systems over the last 20 years in Viet Nam. Issues remain with providing sanitation services in a sustainable way, integrating sanitation into urban development master planning, deciding on tariffs and reaching cost recovery and establishing a regulator and government-led technical working group. It describes the specific roles of the Ministry of Construction, Ministry of Health and Ministry of Environment. It shows that private sector involvement in building and managing DEWATS and WTPs should be the next step. Recent pilots demonstrate the value of PPP for DEWATS facilities that could be adapted for peri-urban and low income area. It examines specific barriers and drivers for sustainable sanitation services in Viet Nam.

5.1 Existing policies, regulations, standards and networks on wastewater management and sanitation services (what works and what needs more attention)

Over the past 20 years, the Government of Viet Nam has made considerable effort to develop urban sanitation policies, legislations and regulations and to invest in urban sanitation including wastewater treatment systems. Such efforts happen in a context of rapid urbanization (Table 7).

Table 7: Process of urbanization in Viet Nam over last 25 years and forecast to 2020

Year	1986	1990	1995	2000	2005	2009	2010	2011	2020
Number of urban areas	480	500	550	649	689	750	-	760	1000
Urban population (million)	11.87	13.77	14.94	19.47	22.6	25.4	30.4	29.56	46.0
Rate of urban population to the total population	19.3	20.0	20.75	24.18	26.7	29.6	33.0	34	45.0

Source: Dr. Duong Thanh An, 2014, Wastewater Management and Sanitation Practices in Viet Nam

A comprehensive legal framework for environmental sanitation, including urban wastewater management, currently exists in Viet Nam. The framework consists of different laws, national strategies, decrees, circulars, decisions, programs and plans. However, a lack of proper synchronization as well as overlaps and gaps are found within this framework. Overly ambitious and sometimes conflicting targets for environmental protection and wastewater collection and treatment are contained in legal regulation documents prepared by various Ministries. The first Environment Protection Law was issued in 1995 and revised in 2005. An Environmental Protection Fee imposed on urban and industrial wastewater discharges was introduced in 2003. Important Decrees on Urban and Industrial Water Supply, Wastewater Management, and Solid Waste Management were issued in 2007. Regulations controlling effluent standards issued by the Ministry of Natural Resources and Environment (MONRE) have undergone significant change since the first standard was issued in 1995 (TCVN [Viet Nam National Standards] 5945:1995) with six revisions between years 2000 and 2011 (becomes QCVN- Viet Nam National Technical Standards). This has created continuing uncertainty among local authorities responsible for implementing wastewater projects. It is important that the treatment technology used to meet the effluent standards should be carefully reviewed so that low cost options that do not put additional burden to increase operating expenditure (OPEX) and wastewater tariffs are considered.

There is a lack of clarity and overlapping of responsibilities between MONRE and the water supply companies in terms of establishing and collecting wastewater fees. Decree 25/2013/ND-CP alongside the Circular 63/2013-TTLT guiding implementation of Decree 25 both adopted in 2013 is an attempt to clarify this and distinguishes the environmental protection (EP) fee from the wastewater fee. The EP is to be implemented by the Ministry of Natural Resources and Environment (MONRE) and collected from industrial users and from households discharging wastewater to the environment. For domestic wastewater, the wastewater system operator and the households who are not connected to a piped water system have to pay EP fee which should not exceed 10 per cent of local water tariff. Since 10 per cent of the water tariff is far below the wastewater tariff which should follow the principle of recovery of wastewater system O&M costs, this rule may not encourage the connection of households to the wastewater network. Separately, Decree 88 (On Drainage and Sewerage for Urban Areas and Industrial Zones" and its replacement might be "On Drainage and Wastewater Treatment") is being revised and provisions will be re-named as “tariff for wastewater collection and treatment services”, instead of wastewater fee. This tariff is to be collected from all users of wastewater services by the water supply companies. The revised Decree 88 addresses the development of standards for the quality of wastewater discharged to the urban sewerage and drainage system; legislation by the local authority mandating regulations on urban wastewater management; establishment of policies for mobilizing resources for urban sanitation investment clarification of the ownership of urban wastewater systems; and development of a methodology for wastewater tariff setting for urban and industrial wastewaters aiming at gradual O&M cost recovery. The replacement of Decree No.88 is intended to not only focus on urban areas and industrial zones but also the rural residential areas there are now mostly no connection to the centralized drainage systems so that the decentralized should be the option.

The policy to increase urban sanitation is in place, but issues remain with providing sanitation services in a sustainable way. Through the Prime Minister's decision, the overall policy to improve urban sanitation is being implemented. Investments have also taken place over the years (US$1.2 billion between 1991 and 2005), but this is not supported by a national strategy for urban sanitation. To address the situation, a unified sanitation strategy (U3SAP) had been developed with high-level impetus. The strategy involved the development and progressive application of an integrated programme for accelerated delivery of sanitation services in both urban and rural areas, embracing activities related to the policy and legal framework, capacity-building and sector finance. The expected outputs of U3SAP were a practical action plan; sanitation advocacy and communication systems; and piloting the unified sanitation plan at city and small town levels. The adoption of U3SAP was scheduled for December 2011. The strategy was ambitious and broad based, including industrial, agricultural, domestic and service sectors, and the phased approach would focus initially on wastewater management, solid waste management and drainage.

5.2 Current capacity of the governance and institutional framework on wastewater management and sanitation services in urban and peri-urban areas

a) The planning and decentralization process for sanitation services

Decree 88 and its revised draft version require cities to prepare wastewater plans. However, sanitation planning is often not integrated into an urban development master plan. Regulations and specific technical guidelines for the planning, consultation and appraisal of urban sanitation development projects are still lacking – leading to the construction of WWTPs without a holistic city-wide approach to address environmental and urban development concerns. Wastewater management companies are generally not involved in the design and construction phases and have no ownership of the assets. The investor (central government or local authorities) manages the design and construction before handing over to the wastewater management company for O&M. The company can then face difficulties in the operation and maintenance of sewers and wastewater treatment facilities, especially if the construction has been sub-standard.

In Viet Namese urban areas, domestic wastewater drainage and treatment responsibilities belong to the Municipalities authorities through their public-private companies such as Hanoi Sewerage and Drainage Company (HSDC) in Hanoi. However, the company does not have at present the resources to handle the whole amount of wastewater and covers only 60% of the urban area. Actually, their scope of work is mainly focused on operation and maintenance of the urban center's drainage and sewers facilities. For the tertiary network in the inner city, and the whole sewerage network in other areas, responsibility for service provision is taken on by local authorities or under self-provision by local residents. The approach taken in Viet Nam is to collect and treat the wastewater through centralized systems. In Viet Nam, as of 2012, 17 wastewater plants were constructed and 30 more plants in urban areas are planned. However, adequate emphasis has not been placed on the collection networks, which need: rehabilitation to prevent infiltration of groundwater; better design, with a proper slope to carry water during dry and wet weather conditions; and proper house connections so that wastewater is not discharged into the groundwater. In addition, attention needs to be paid to proper collection and treatment of septage.

No city in Viet Nam has yet developed a clear strategy for Fecal Sludge Management (FSM) or implemented an acceptable treatment technology or regulated the design and construction of septic tanks for household sanitation. The most common FSM practice by both public and private emptiers is dumping at landfills. Many private emptiers are still illegally dumping septage to drains, sewers, ponds or open land. In some cities where centralized WWTPs have been built, such as Buon Ma Thuot and Da Lat, septage is brought to the plant headworks and co-treated with wastewater. Despite the common prevailing use of septic tanks for household sanitation in most urban areas, no city in Viet Nam regulates their design and construction. Moreover, no regulations on septic tank operation and

maintenance and on fecal sludge management have been issued. Many provinces operating wastewater systems do not have regulations mandating household connections. Although not regulated, some cities implementing sanitation ODA projects have taken these issues into account in the design and management of the project

Management of wastewater systems is performed at the commune level in peri-urban areas. It is divided into two levels. For the construction of lines along the main roads of the commune, the PCd approves the PCc's proposal and design and allocates budget for the construction. Maintenance of those lines is usually the responsibility of commune itself. For smaller lines, the hamlet submits its proposal and gets approval from the PCc which allocates a part of the budget. The budget balance is mobilized by local residents. Construction for both cases is implemented by private constructors and maintenance is assured by community's labor. Therefore, the local community leaders play a vital role to get the population involved in sewer cleaning, site clearance, etc.

Peri-urban areas of large cities such as Hanoi and Ho Chi Minh Ville are highly influenced by urban activities and consequently undergo a faster development than other rural areas. However, though they are relevant to the provincial and national strategies, they are not yet considered as a priority by the actual urban policies. Thereby, they should follow the National Rural Water Supply and Sanitation Strategy which might not be appropriate to peri-urban districts, especially concerning wastewater management issues. For these areas, DEWATS have been promoted.

The application of decentralized and on-site sanitation systems in Viet Nam has been a mixed experience. Through a "Unified Sanitation Sector Strategy and Action Plan - U3SAP," adopted in 2011, the Ministry of Construction has introduced decentralized low-cost sanitation options into the national context as a promising solution for low density communities in urban and rural areas. In urban areas, on-site (package) treatment systems have been incorporated as part of newly built large hotels, hospitals and office buildings to provide suitable treatment (Class B) prior to discharge to the combined public drainage/sewerage network. However, these on-site treatment systems at hospitals, for example, have witnessed a high rate of early failure. The septic tank, discharging to the drainage system, is still the most common type of on-site sanitation facility utilized at old public buildings, residential apartments, as well as small commercial operations.

The number of small-scale decentralized wastewater collection and treatment systems serving small communities has increased significantly over recent years. Examples of decentralized wastewater treatment systems using low-cost technologies include two community-based treatment systems in Lai Xa village, Minh Khai commune, Hoai Duc district, Hanoi, which utilize a baffled septic tank and an anaerobic filter followed by horizontal flow constructed wetland. A cluster system in Kieu Ky village, Gia Lam district, Hanoi and treatment systems in the mountainous Cho Moi and Cho Ra towns, Bac Kan province, utilize a similar treatment process. The project costs of these 10 DEWATS pilot projects ranged from $71,000 (about 300 beneficiaries ~60 HH) to $ 370,000 (about 1,000 beneficiaries ~320 HH)[52]. In these DEWATS pilot projects, the costs of O&M and of desludging every 2 to 3 years are currently being covered by the People's Committee and are averaging about $10 to $23 per month. This is financially sustainable thanks to the user fee implemented on each participating household of about $0.25 per month, which is well within the budget of these residents. The stakeholders for decentralized systems are different from those associated with larger scale centralized systems and are typically NGOs, local community residents and local government. Sustainable operation and maintenance can be a major concern for the decentralized wastewater management systems resulting from the need for local maintenance and management skills.

[52] *Demonstration of Ecological Sanitation and Other Decentralized Sanitation Systems in Southeast Asia* http://www.susana.org/lang-en/library?view=ccbktypeitem&type=2&id=1327

b) Need for reform and multi-sectoral cooperation and coordination (institutional arrangements)

Greater coordination of sector agencies is also required for programs to be efficient. Some progress is being made such as through policy dialogues among key stakeholders and formation of a Donor's Sanitation Coordination Group (since 2012, led by ADB Viet Nam). However, in the absence of a national government-led sanitation program, the dialogue between government and donors is mostly held on a bilateral, case-by-case basis. Currently there is no coordinated government-donor dialogue on sector programming and financing at a high level and there is inadequate coordination among government agencies at central and local levels. This situation does not facilitate effective mobilization of ODA funds and is not suitable for mobilizing sufficient funding to cover the financing needs for sanitation. There is an obvious case for developing a national strategy and a national target program (NTP) for urban sanitation, mirroring the existing NTP 2 for rural sanitation.

Lessons from the NTP 2 for rural water and sanitation are worth to consider for the urban sanitation sector coordination[53]:

- The program encouraged policy dialogue and thus helped launching a range of institutional improvements, including integrating water and sanitation services
- Lessons learnt from project experiences were useful to develop an effective program-based approach
- Strong government leadership has led to greater coordination, including reporting, budgeting, financial management and procurement
- NTP2 allowed donors to better align their support to the water and sanitation sector, which reduced fragmentation in the sector
- The positioning and nature of the support concentrated its efforts on strengthening capacities and building confidence in government planning and budgeting systems
- The focus on institutional and management arrangements avoided over promising and under delivering on program outcomes.

a) Partnerships with the private sector (PPP), social entrepreneurs, NGOs and CBOs: How to ensure the pro-poor PPP and socially inclusive integrated approach in sanitation services

There appear to be few incentives provided to encourage private sector investment in the wastewater business, although a policy of encouraging private sector participation in urban infrastructure is supported by the Viet Namese Government. Ministry of Finance (MOF) Circular 230/2009/TT-BTC creates favorable tax conditions for enterprises dealing with environmental protection activities, offers concrete instructions for the creation of favorable business development conditions and supports provision for private sector participation in sanitation, as stated in Decrees 04/2009/ND-CP and Decree 59/2007/ND-CP. Lack of cost recovery, cumbersome bureaucratic administrative procedures, and lack of effective regulation on service levels and tariffs are the main causes of limited private sector participation in urban sanitation. To date, there are few examples of wastewater projects with private sector participation initiated in Viet Nam[54].

A poor-specific strategy is vital to sustainable sanitation delivery services. A World Bank study[55] indicated a need to develop and test a special sanitation marketing strategy for the poor, which would be carried out by promoters, providers, and supply chain networks. For example, this strategy could include more detailed information on potential cost reductions; more evaluation and sharing of different ways to finance households and providers; and a more detailed roadmap for staged construction, including bulk buying and storage of materials (Box 7)

Box 8: Five-Point Strategy for Promoting Pro-Poor Household Connections in Viet Nam

[53] AusAid, http://www.eldis.org/go/home&id=58024&type=Document#.Uxn0JGePLui

[54] Currently only the build and transfer projects in Da Nang and Hanoi have included an element of private sector participation.

[55] World Bank, Urban Sanitation Review in Indonesia, Philippines and Vietnam, 2013

In Da Lat and Boun Ma Thout in Viet Nam, a series of information, regulatory, institutional, and pro-poor measures were needed to effectively promote household connections. These included the following:
• Public awareness and behavior change was increased by launching an Information Education Communication (IEC) campaign to end up open defecation with CLTS and promote the connection of households to the public sewer system, citing the benefits of the program to the homeowner and environmental improvement to the community as a whole.
• Local authorities issued a decree mandating that all households located within an area served by public sewerage system or drains be connected to the system.
• A government subsidy was provided for household connections to encourage connection and to reduce the financial burden on the vulnerable households, especially the poor (using ID)
• Local authorities established a specific house connection group or department responsible for operating the sewer system. The purpose of such a group is to promote, issue permits and monitor the permitted household connections throughout the sewerage service area.
• Household connections are required to be an integral part of project formulation, funding, and implementation for new sanitation projects or existing sanitation projects that will be expanded.

A few international NGOs have worked with Viet Namese institutions to push forward DEWATS in urban and rural areas: BORDA, EASTMeetsWest, GRET, SANDEC, EAWAG, SNV .

BORDA & DEWATS in Viet Nam
Start: since 2005
Partner: Viet Nam Academy for Water Resources
Focus: Staff/Partner capacity building and promotion of DEWATS for SME, public institutions & communities
Implementation: 10 (1 SBS, 3 Hospitals, 2 CBS, 3 SME, 1 Prison)

c) Review of management of current wastewater infrastructures and development of new facilities (review and lessons learnt of pilot experiences)

Since 1998, the Government of Viet Nam has initiated policies and provided investment to improve urban sanitation resulting in significant progress in development of the wastewater sector[56]:

- Provision of wastewater services to the urban poor has been impressive with open defecation now eliminated;
- Access to toilets is now 94 per cent, with 90 per cent of households using septic tanks as a means of on-site treatment;
- 60 per cent of households dispose of wastewater to a public sewerage system, primarily comprising combined systems;
- By 2012 some 17 urban wastewater systems had been constructed in Hanoi, Ho Chi Minh City and Da Nang and another five systems in provincial towns and cities with a total capacity of 530,000 m^3/day;
- Currently some 30 new wastewater systems, primarily comprising combined systems, are in the design/construction phase.

Despite these impressive initiatives, urban sanitation continues to face critical issues that need to be urgently addressed:

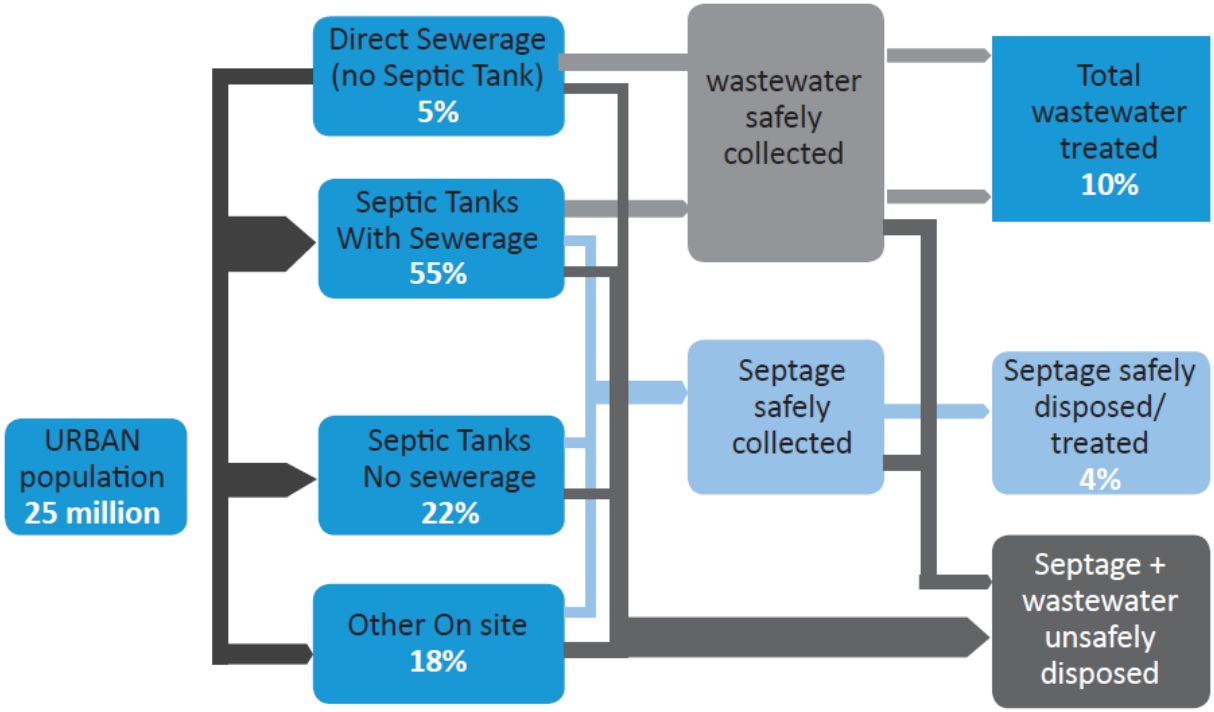
- Although 60 per cent of households dispose of wastewater to a public system, much of this is directed informally to the drainage system and only 10 per cent is treated;
- While 90 per cent of households dispose of wastewater to septic tanks, only 4 per cent of septage is treated;
- The focus of wastewater expenditure to date has been in constructing centralized treatment facilities, but this has not always been accompanied by appropriate collection systems.

[56] World Bank, 2013, Performance of the Wastewater Sector in Urban Areas in Socialist Republic of Vietnam

The current sector performance is illustrated in Figure 2.

Most urban wastewater enterprises do not own the wastewater system assets, but operate the system under the mechanism of a "work order from the city authority" and are paid directly from the city budget. The current practice of providing the enterprises with a fixed annual budget for operations does not allow the enterprises to invest in research and development or in the optimization of the wastewater system. Unplanned expenses must be approved by different administrative bodies of the city which takes considerable time and can result in loss of sewerage services.

Figure 2: Status of urban wastewater management and the 17 WTPs in Viet Nam[57]



[57] World Bank, 2013, ibid.

No	Plants	City	Start up Year	Capacity, m3/d		Sewer type	Treatment process/technology
				Design	Operation		
1	Kim Lien	Hanoi	2005	3,700	3,700	CSS	A2O (AS)
2	Truc Bach		2005	2,500	2,500	CSS	A2O (AS)
3	North Thang Long		2009	42,000	7,000	CSS	AO with nitrification
4	Yen So		2012	200,000	120,000	CSS	SBR
5	Binh Hung	HCM City	2009	141,000	141,000	CSS	CAS
6	Binh Hung Hoa		2008	30,000	30,000	CSS	Aer. Ponds + Mat. Ponds
7	Canh Doi (Phu My Hung)		2007	10,000	10,000	SSS	OD
8	Nam Vien (Phu My Hung)		2009	15,000	15,000	SSS	A2O (AS)
9	Son Tra	Da Nang	2006	15,900	15,900	CSS	Ana. Pond w/float cover
10	Hoa Cuong		2006	36,418	36,418	CSS	Ana. Pond w/float cover
11	Phu Loc		2006	36,430	36, 430	CSS	Ana. Pond w/float cover
12	Ngu Hanh Son		2006	11,629	11,629	CSS	Ana. Pond w/float cover
13	Bai Chay	Quang Ninh	2007	3,500	3,500	CSS	SBR
14	Ha Khanh		2009	7,000	7,500	CSS	SBR
15	Da lat	Da Lat	2006	7,400	6,000	SSS	Imhoff tank + Trick. Filt.
16	Buon Ma Thuot	BMT	2006	8,125	5,700	SSS	Stab. Ponds (AP,FP,MP)
17	Bac Giang	Bac Giang	2010	10,000	8,000	CSS	OD
18	Phan rang	Ninh Thuận	2011	5,000	5,000	CSS	Facultative. Ponds + Mat. Ponds

DEWATS have been experimented with in many peri-urban areas and secondary towns with an increasingly high population density, around 15,000 inhabitants per square kilometer. Based on the fact that the septic tank is the usual pretreatment facility in Viet Nam, decentralized systems based on Anaerobic Baffle Reactor (ABR) + Anaerobic Filter (AF) + Constructed Wetlands (CW) technologies,

such as DEWATS, could replace centralized piped systems in peri-urban areas and secondary towns where network accessibility was complex (hilly or isolated places). Due to their good flexibility, ABR + AF + CW systems match many contexts, thus saving a significant amount of money in investments and O&M (See Box 8).

Box 9: Major lessons learnt from some DEWATS projects in peri-urban areas in Viet Nam

_ There is a general lack of policies and national targets concerning peri-urban areas. Besides, there is no regulation for grey wastewater treatment, which represent up to 50% of total wastewater. Septic tanks do not handle grey wastewater. Besides, its technology is not sufficient to achieve good treatment quality, especially in urban and peri-urban areas.
_ Although piping systems provide numerous advantages, detailed field surveys should be strongly considered, especially about the connectivity of existing households' wastewater outlet. Separate system may reveal that it is technically difficult, and even impossible, to connect an existing house to wastewater outlets. Before recommending separate piped system, the designer has to ensure that the real connectivity is worth the investment costs.
_ ABR + AF technologies require a long starting time for a proper functioning. Wastewater is liable to undergo high hydraulic loads is not recommended for such devices since it can flush out the bacteria. Consequently, ABR + AF cannot tolerate big rainwater input.
_ Among both technical solutions proposed by BORDA within the prefeasibility study, the one using the existing combined system was associated with only one treatment component: CW. Besides, this solution would have required a large parcel of land for construction. That is why the partners of the project opted for separate system associated with 'ABR + AF + CW'. However, this solution was not technically able to connect every household. The rate of connection (80%) would have been higher for larger coverage areas. With small and simple systems preventing rainwater and solid wastes from entering the treatment installations, existing combined sewer could be a cheaper and easier alternative to collect wastewater for ABR + AF + CW. It can save a significant amount of money (separate system = 55% of investments costs). To be experienced.
_ The technologies favored for implementation within decentralized concept systems generally incur minimal O&M liabilities and investments, thus enabling the commune/community to self-provide its own sanitation service.
_ People prefer to pay for collective service and their O&M over individual systems. More effort needs to be made in order to promote this kind of technology where people do not have any sufficient alternative to facing wastewater hazard.
_ In non crafts village, combined open sewer with anaerobic/aerobic ponds or CW would be a cheap alternative but require a great piece of land. To be experienced.
_ Residents might be enticed to discharge black and grey wastewater into the collective sewer and to invest in their in-house disposal system when it is lacking.
_ High pressure on peri-urban land is a critical parameter for decision maker

Source: ADB, 2009, Developing Appropriate Sanitation Solution for Peri-Urban Areas in Viet Nam, PDA final Report, An EAST Viet Nam-BORDA Partnership

5.3 Financing of sanitation facilities

a) Economic decision-making process on wastewater facilities, investment plan and operations: from design to monitoring

Economic decisions on investments and operations are not often considered. Wastewater management is a new business in Viet Nam and the feasibility studies prepared by consultants are often not questioned in a rigorous manner that could lead to an optimization of the investment. For the feasibility study analysis, adequate data—water quality and quantity—are not always collected or used to make an informed decision on the wastewater treatment technology choice. There is also a lack of information on technology alternatives such as DEWATS that allow decision-makers to make the optimal economic and site-appropriate conditions. When wastewater treatment plants do not function

as planned, usually it is not the failure of the technology, as the processes used for wastewater treatment are well established. The main reasons for non-functioning treatment plants are:

- the cost of operations cannot be sustained by the tariffs;
- household connections are not maximized or the network is not fully developed; and
- the operations are complex and the institutional capacity to operate a wastewater plant is not adequate.

The central government has financed the investments in sanitation, often backed by loans from international donors. However, investment decisions have been made on a case-by-case basis and a strategic approach to address priority actions in the country has been missing. Local authorities largely view this lending arrangement as a free investment, at least until such time that the investment has been completed.

So far, centralized sewerage and treatment plant systems have been the prioritized option for urban sanitation. However, decentralized systems as demonstrated by past pilot projects and recommended by the Unified Sanitation Sector Strategy and Action Plan U3SAP should be considered as an option for areas that cannot be economically serviced by a centralized network such as peri-urban areas and secondary towns. The decentralized approach offers important benefits, such as the possibility of dealing with wastewater locally and applying pollution control measures close to the source. By tackling pollution problems close to their source, the large capital investment in trunk sewers associated with centralized systems can be reduced, thus increasing affordability. The decentralized systems are mostly developed and operated through a community-based approach, where users are involved from the early stages of infrastructure system planning. Local resource contributions in decentralized wastewater management systems make the system's financial requirements more affordable and feasible and the user participation and the decision-making process more committed. Sustained resources for O&M and technical capacity to operate the treatment facility are essential conditions of sustainability (Table 8).

Table 8: Scope of DEWATS upscaling based on ADB funded DEWATS Project[58]

	Category	Technical parameters for replication	Management and O&M	Investments requirements	Contexts for replication
ABR + AF + CW (DEWATS)	Decentralized intensive system	- Topography: hilly areas ; - High population density; - Low land availability; - From moderated to very high pollution concentrations (can be applied to treat some industrial wastewater); - Use of existing combined sewer: possible, *to be experimented.*	- Local or institutional if any; - Small technical and financial requirements; - Stable and reliable functioning.	Medium	- Urban areas to supplement centralized sytems in isolated places; - Dense periurban areas or Small towns with or without existing households' septic tanks; - Organic industrial wastewater (breeding centers, food processing…).
Anaerobic + aerobic ponds (collective)	Decentralized extensive system	- Low population density; - Moderated pollution concentration; - Existing combined sewer.	- Local or institutional if any; - Strongly rely on physico-chemical parameters. Can become unstable.	Low	- Rural communes with existing combined sewer and lots of land available.
Septic tank alone	Individual system	- Very low population density; - Good soil permeability.	- Individual; - Small technical and financial requirements; - Households need to be aware of the necessity of O&M	Medium	- Individual isolated households; - Very extended village.

However, there is a need to make baseline assessments, such as strategic environment assessment and sustainability/impact of outcomes to sustain the built DEWAT systems mentioned in Table 8 beyond project scope and take stock for scaling up.

[58] ADB, 2009, Developing Appropriate Sanitation Solution for Peri-Urban Areas in Vietnam, PDA final Report

b) Financing facilities and recovering costs of operations: What is currently financed and how: the value chain for centralized and decentralized sanitation services

Level of investment. The past 10 years have seen a growing investment in urban sanitation and especially wastewater treatment in both large and medium cities primarily supported by Official Development Assistance (ODA) funding. In urban sanitation projects, the total contribution from the Government and donors is much higher than contributions from households (77 versus 23 per cent)[59]. Major funding still comes from overseas development assistance (ODA grants or loans) compared with local and central government contributions (56 versus 21 per cent). During the period 1995-2009, ODA commitments (including loans and grants) to finance drainage and sewerage projects totaled USD 2.1 billion, or an average of about USD 150 million per year, accounting for 8 per cent of total ODA loans and grants received in the same period. However, the efficiency of this investment that has focused largely on provision of treatment facilities with limited development of collection systems is yet to be established. An appropriate strategic or programmatic approach that would lead to a better targeting of investment to address the particular environmental and public health deficiencies, followed by proper investment planning is needed.

Financial commitment and cost recovery. Despite being fundamental for financial sustainability, little has actually been done to achieve cost recovery. The majority of local authorities seem willing to continue to subsidize operations. The cost recovery principle is clearly stated in Decree 88, but this should be committed to and put into action by the local decision makers. Cost recovery is also impacted by operation and maintenance expenses which are a function of the level of technology selected.

Cost recovery levels are low in general but DEWATS pilots demonstrate a high willingness to pay. For urban sanitation projects in Viet Nam where sufficient cost and revenue data is available, only 20-30 per cent of actual O&M costs are being recovered in the form of collected tariffs and fees (ranging from \$0.01 /m^3 to \$0.03 /m^3). The remaining costs are borne by local government based on annual budgets submitted by the operating companies. Local authorities appear to view these subsidies as a necessary government contribution to a public enterprise and therefore are reluctant to levy higher wastewater fees, even when the public awareness and satisfaction for the wastewater services provided is high. The operating subsidies vary from year to year, depending on other competing needs, creating uncertainties regarding the quality of the sanitation services. Any shortfall in O&M costs is generally subsidized from local budgets. On the other end, DEWATS projects funded by ADB, BORDA and others show a higher willingness to pay: the ADB funded post project survey found out that people would even be willing to participate for investments costs through their individual connection and in-house equipments renovation, amounting respectively at US$ 35 (household class having about US$ 76 total monthly income) and at US$ 177 (household class having about US$ 222 total monthly income). People would then massively agree to pay to renovate/buy individual disposal system if any collective post treatment system would be installed.

Willingness to charge customers to recover costs is lacking on the part of most local city or provincial authorities. This was most apparent in the case of Buon Ma Thuot, where the operating enterprise enjoys very positive public opinion regarding the sewerage services offered by the company with households eager to connect once the SSS is expanded in the next phase. However, even with apparent high customer satisfaction, the local provincial government has not taken positive action to increase the rate of cost recovery, choosing instead to subsidize the operating costs from local budgets. In other cities, despite commitment in the Investment Loan agreement to gradually increase wastewater tariffs, most local authorities do not comply. Pressure on local budgets, together with an

[59] Nguyen Viet Anh, Nguyen Khac Hai, July 2012, Vietnam water supply and sanitation sector assessment report. For MOH-WHO-UNICEF.

increasing need for improvement in wastewater collection, treatment coverage and service quality may change this view but this will take time and political will to achieve.

Pro-poor incentives need to be generalized in order to support investment in septic tanks and other sustainable fecal sludge management systems. So far, subsidies provided by communes and municipalities have been used. New mechanisms such as microfinance and revolving funds could be more widely used with development organizations partnering with local governments (Box 9)

Box 10: The Sanitation Revolving Fund in Viet Nam

A Sanitation Revolving Fund (SRF) component was incorporated in the broader Three Cities Sanitation Project in Viet Nam to provide loans to low-income households for building on-site sanitation facilities. Working capital for the revolving funds was provided by the World Bank, DANIDA (Denmark) and FINNIDA (Finland) for three sub-projects in Danang City, Haiphong City and Quang Ninh Province (Halong City and Campha Town). The programme benefited almost 200,000 people over the course of seven years. The average hardware costs of the sanitation facilities built through the program was USD 197. The SRF provided small loans (USD 145) over two years at partially subsidized rates to low-income and poor households to build a septic tank or, in fewer cases, a urine diverting/composting latrine or a sewer connection. The subsidized interest rate was equivalent to providing a USD 6 subsidy on each loan. The loans covered approximately 65% of the average costs of a septic tank and enabled the households to spread these costs over two years. The loans acted as a catalyst for household investment but households needed to find other sources of finance to cover total investment costs, such as borrowing from friends and family. Additional funding was provided by the project for software activities. Trémolet et al. (forthcoming) found that these subsidies were highly effective at mobilizing households' own investment; each dollar of public investment generated 20 dollars of investment from households. Targeting also appeared to be extremely good; all of the beneficiaries were found to be in the bottom income quintile. The programme was also highly sustainable – the funds have already been revolved several times and the scheme, which is now administered through Women's Unions, could continue operating until demand is exhausted.

Source: WSSCC, primer, Public Funding for Sanitation: The many faces of sanitation subsidies, Geneva, 2009

5.4 Specific barriers and drivers for sustainable sanitation services in Viet Nam

a) Barriers

● Local authorities have to prioritize expenditure from their limited budget for a range of activities, including environmental sanitation. The majority of provinces, on the other hand, are subsidized for infrastructure development from the National budget. The lack of a committed counterpart investment from local authorities for ODA loans or grants often leads to delays in implementation;

● Slow decision-making processes and ineffective management from the local executing agency is a barrier to the scaling up of urban sanitation including DEWATS projects;

● Some provinces are implementing wastewater projects in the absence of city plans and drainage and sewerage master plans. As a result, these projects have faced difficulty in wastewater system selection, zoning and phasing of project stages, access to land, prioritizing of household connections, the sewerage network and the treatment plant components;

●The failure to achieve a higher rate of house connections is a significant barrier to the development of the sector. The connection ratio is still low, particularly in low density towns and peri-urban areas and in central cities which are situated on sandy soils with high percolation properties;

● Limited capacity of the project implementation staff, local contractors and other players involved in wastewater project activities is very common. Limited capacity in project management is demonstrated by delays in carrying out site clearance for construction, inefficiencies in managing and monitoring contractors, weak project financial management, poor knowledge of the procedures of basic construction and limited knowledge of the bidding processes in Viet Nam and of the donors. Weaknesses of contractors, including design and build contractors, leads to limited quality of construction works or worse, failures. The lack of adequately trained technical sanitation personnel is an important challenge for effective O&M.

b) Drivers

- Presence of a strong institutional and legal framework is critical to effectively scale up of urban sanitation. Roles and responsibilities for urban and rural environmental sanitation have been established among line ministries. A set of laws and relevant documents have been developed aiming at the establishment of a strong legal framework and enabling resource allocation for sanitation improvement activities;

- Access to sources of funding is undeniably a strong catalyst in the development of sanitation programs. Cities and towns currently served by urban wastewater systems (sewerage + treatment) and DEWATS all share the common characteristic of having had access to funding, either as grants or low-cost loans, typically provided by international donors, allowing the recipients to carry out sanitation projects that would have otherwise not been financially possible;

- Peoples' aspiration to improve their quality of life is a strong driver. ADB-funded pilot projects surveys revealed a great septic tank owners' willingness to pay for collective solution's investments costs and O&M. By extrapolation, the areas where septic tanks are available make the model technically more sustainable and should involve a good population acceptance and demand for decentralized solutions;

- Local authorities play a pivotal role in the development and long-term management of urban sanitation services. Local authorities in DEWATS pilot projects who displayed a strong sense of ownership, based on the capacity of management and operations staff and the commitment to providing quality services, have been shown to have significant impact on the improvement of the quality of urban sanitation services and living conditions of the poor;

- A commitment to supporting O&M costs by the local authorities can be a strong driver for improvement to the urban sanitation services offered. Recovery of O&M costs has not yet reached financial sustainability in Viet Nam;

- The need for household sewage disposal is a fundamental driver for the implementation of sustainable sanitation services. The DEWATS solution implemented in pilot projects in small towns and peri-urban areas has been elaborated, focusing on four main constraints: (i) land restriction; (ii) low O&M financial and technical requirements for local management; (iii) low investments costs; and (iv) ability to treat black & grey wastewater to a high quality treatment standard

Chapter 6: The Way Forward

This Chapter highlights critical issues to bring DEWATS to scale: Learning from past DEWATS experiences; Ensuring sustainability of service delivery through Pro-Poor Public-Private Partnerships for Sustainable Sanitation Services, resource recovery and enabling a sanitation value chain with capacity building of supply chain interveners; Creating demand including from the poor for sustainable sanitation services facilitating integration of DEWATS to centralized systems; Strengthening the capacities of all interveners and creating a regional platform for dialogue, knowledge management and innovation among the three countries; Enhancing innovative financing and financial viability of sanitation facilities with Output-Based Aid.

a) Learning from past DEWATS experiences and assessing ways to bring DEWATS at scale

It is important for main DEWATS interveners to draw and share lessons from past implementation of DEWATS and that the Government of each country integrates them in sanitation and wastewater strategic plans and programs.

Box 11: Summary of DEWATS Approach in Mekong Countries by BORDA

- Inform & educate stakeholders on DEWATS
- Demand responsive approach: Willingness of stakeholders to promote, finance and manage DEWATS infrastructure
- Participatory approach: joint planning, transparent selection processes, and active involvement
- Multi-stakeholder funding and contributions in kind from beneficiaries
- Staff & Partner capacity building (Quality Management Standards/Standardized Operational Procedures)
- Capacity building and training programs (O&M, health and hygiene)
- Monitoring and follow-up of completed DEWATS
- Promotion of Co-management of operation & maintenance (O&M)

Source: BORDA, 2014, DEWATS Implementation Experience in Mekong Countries (Regional Workshop at UN-ESCAP)

b) National visioning of DEWATS

National visioning of and the implementation strategies through established participatory planning activities at national level, integrating the DEWATS with national strategic planning documents (ex on waste management, on IWRM, on green growth, etc) Participants to the ESCAP Regional Workshop on DEWATS recognized the importance of DEWATS in meeting the increasing challenge of sanitation in the 21st century and the need to establish a sustainable process of integrating DEWATS into the national development processes of their respective countries. In this connection, they strongly recommend the development of a national vision on DEWATS through a participatory and interactive series of discussions concurrent with the formulation of implementation strategies, preferably at the national workshops taking place in 2014 in Cambodia, Lao PDR, Viet Nam

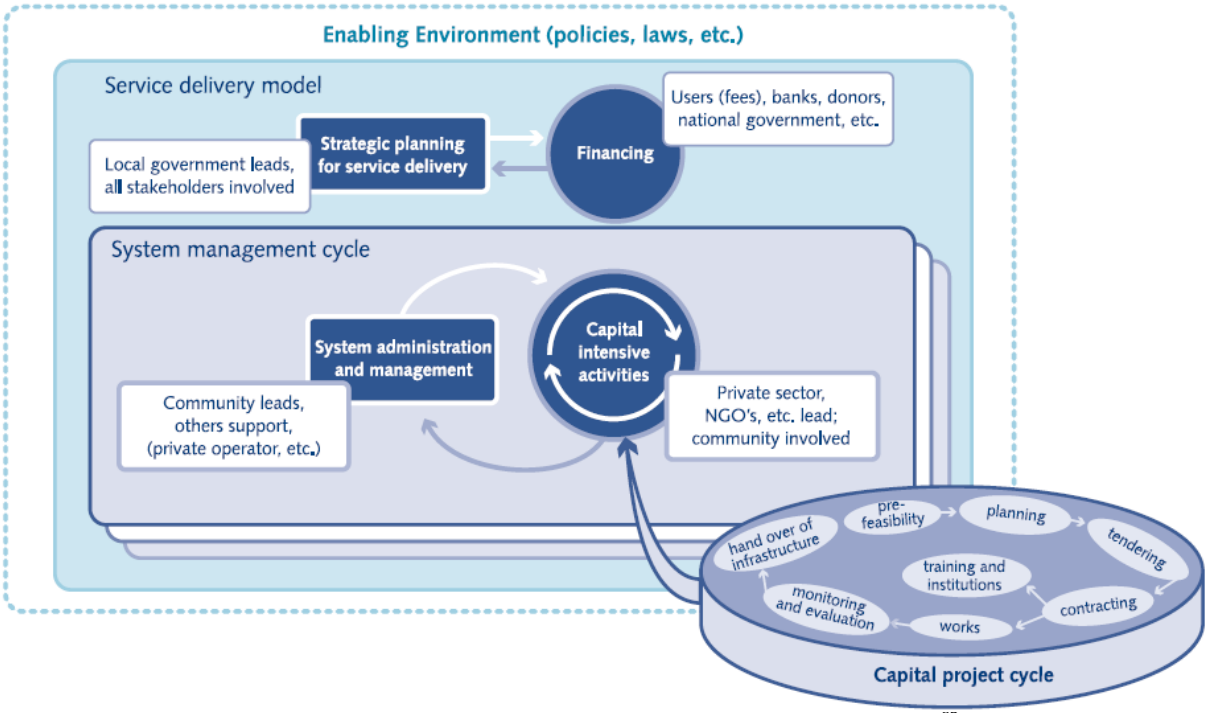
c) Ensuring institutional set up

Ensuring institutional set up at national and regional level, such as the Pro-Poor Public-Private Partnerships for Sustainable Sanitation Services (5 P for 3 S), to address the resource recovery and enabling a sanitation value chain, coupled with capacity building of supply chain interveners

Sanitation for the urban poor is not about toilets or sewers; it is about a sanitation chain – from the seat/pan to collection, transport, treatment, disposal or reuse of urine and faeces. It is about processes of planning, of partnership and accountability, of developing solutions which are sustainable,

affordable and meet users' demands. Providing sanitation services to the urban poor involves linking governance, finance and technology into scalable and sustainable partnerships. While traditional PPPs are popular for large-scale sanitation infrastructure projects, the smaller, community-based infrastructure requirements continue to remain reliant on government budget and other development assistance. A pro-poor public-private partnership model, usually abbreviated as "5P," has evolved to explicitly target the provision of services to poor communities (Figure 3). The 5P model views the poor not only as consumers that receive benefits, but also as partners in business ventures.[60]

Figure 3: Service Delivery Model for Sanitation Services[61]



Based on key recommendations of ESCAP Regional Workshop on DEWATS[62] and on barriers and drivers identified in previous sections, six key drivers of success should be seen as strategic guides to future development of urban sanitation advocacy:

- High-level political support and institutional leadership guided by policies and strategies to overcome administrative barriers;
- A sustainable financing strategy;
- Partnership across sectors including with the poor;
- Tailored technology to local conditions;
- Transfer of technologies and knowledge within each country and among the SEA countries
- Establishment of three national networks on DEWATS and the connection of these national networks into a regional network for SEA
- Establishment of national sanitation consortia (at least three DEWATS Consortia in target countries) for possible involvement of the private sector and interested professional and NGO organizations
- Hygiene promotion and sanitation marketing;
- Empowering community centered approaches.

[60] ESCAP, 2013,"Pro-Poor Public-Private Partnerships Regional Training Handbook". Available from http://www.unescap.org/esd/Energy-Security-and-Water-Resources/meetings_energy/meeting-5Ps-RTWS/5P_Training_Handbook_8Sep2013.pdf

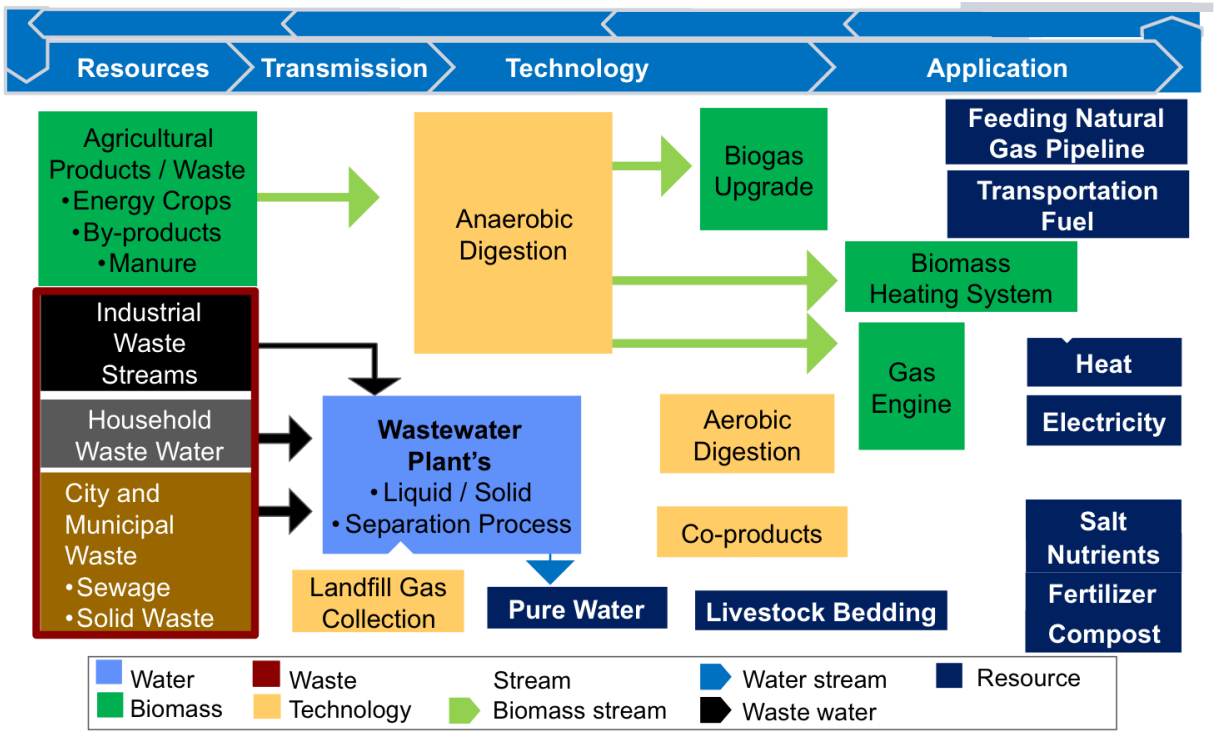
[61] P. Moriarty, IRC, 2008

[62] http://www.unescap.org/resources/workshop-proceedings-regional-policy-workshop-stakeholders-decentralized-waste-water

There are limited experiences on water reuse. Nutrient reuse, water reuse, and energy production from wastewater is not common in Cambodia, Lao and Viet Nam. However, there are successful experiences in the region that can provide lessons in this field. In Korea, as part of the green growth initiatives, there are plans to increase water reuse and to reduce energy use at treatment plants. Increasingly, water in Korea is called the "Blue Gold" of the future. Similarly, in Singapore, recent advances in converting wastewater to drinking water have shown that concrete measures can be taken to address the issue of water shortages that many cities will increasingly face in the future. In Singapore, the recycled water is called NEWater and it already supplies about 30 per cent of demand. It is expected that by 2060, 50 per cent of the water used will be recycled water. Singapore also has a plan to increase its supply of desalinated water; by 2060 about 80 per cent of the water will be either NEWater or desalinated water[63].

The potential for DEWATS to improve social and economic conditions was acknowledged by the ESCAP Regional Policy Workshop, either as a permanent solution for communities or as a bridge measure while larger wastewater treatments plants are constructed. In this regard, the number of co-benefits of DEWATS was also highlighted by the group, particularly in terms of the Food-Water-Energy Nexus. The potential for Pro-Poor Public-Private Partnerships (5P) for Sustainable Sanitation Services (3S) was recognized by the Workshop as a key opportunity to ensure sustainability of DEWATS. UN-ESCAP is promoting a model of re-using, recycling and recovering wastewater within a concept of **Pro-Poor Public-Private Partnerships for Sustainable Sanitation Services** (5Pfor3 S).

Figure 4: Wastewater as a Resource (Resource Recovery)



When the right technology is applied in the wastewater, resources as heat, electricity, salt, nutrient, fertilizer, compost and pure water can be generated. The generation of new resources can increase the willingness to use the system and the willingness and capacity to pay for it which generates a demand increase. It can lower the price or encourage entrepreneurship, by adding more value to the system[64].

[63] More policy recommendations and tools can be found in UNESCAP, 2012 : Low Carbon Green Growth Roadmap for Asia and the Pacific, Turning resource constraints and the climate crisis into economic growth opportunities,

[64] UN-ESCAP, 2014, 5 P for 3 S: Pro-Poor Public Private Partnership for Sustainable Sanitation Services

d) Creating demand for sustainable sanitation services facilitating integration of DEWATS to centralized systems

● Decentralized sanitation systems can be more appropriate for peri-urban parts of the city where communities are more isolated and population density is lower. The decentralized approach offers important benefits, such as the possibility of dealing with wastewater locally and applying pollution control measures close to the source. By tackling pollution problems close to their source, the large capital investment in trunk sewers associated with centralized systems can be reduced, thus increasing affordability.

● The decentralized systems are mostly developed and operated through a community-based approach, where users are involved from the early stages of infrastructure system planning. Local resource contributions in decentralized wastewater management systems make the system's financial requirements more affordable and feasible and the user participation and the decision-making process more committed.

● Stimulating demand by the poor has shown effectiveness with education and awareness programs that directly target households that already have some kind of sanitation to complement programs targeting open defecation, and address limited household understanding of the characteristics of improved sanitation systems. Such campaigns have to address the gender dimensions of sanitation awareness and decision-making[65] where appropriate. In all three countries, women place a higher priority on sanitation than do men, partly out of concern for their children. Both men and women agree the women make the decision about building or not a building a latrine or toilet. The move toward improved sanitation is viewed as a joint decision, however, with the woman acting as the initiator and the man as the implementer. In contrast, women play a minor role in the sanitation supply business.

● It is not a case of either centralized or decentralized. There will be a place for both approaches in every city. It is at the citywide sanitation planning stage that areas where centralized and decentralized systems should be designated using basic criteria. Subsequently feasibility studies will be conducted to complete the economic and financial analyses required to establish the technology that will be implemented. The decentralized wastewater management approach is an appropriate choice for areas of a city than cannot be economically covered by a traditional centralized system.

● There are common challenges for both centralized and decentralized wastewater projects. These include technological option selection, quality of design and construction, administrative appraisal procedures, low rate of household connections, financial sustainability, local capacity for O&M, monitoring, evaluation and system control in the implementation stages. Key success factors for decentralized wastewater management systems relate to planning and decision-making, design of physical infrastructure and management arrangements for operations and maintenance. Participation of the community, awareness raising and local capacity building play significant roles in ensuring project success.

● In the three countries, the sanitation supply chain still must be developed. In the three countries, the following measures based in DEWATS pilot projects will support the supply side:

Capacity building of supply chain members. Training in business and technical skills for masons, concrete producers, and retailers to improve quality, reduce costs, expand the product offerings, and increase sales volumes. Involving women in the sanitation supply chain is a key incentive to increase demand. In IDE's pilot projects in Cambodia and Viet Nam[66], the providers trained were, with nine exceptions, all men. Previous studies indicate that poor women who work as unskilled labor (e.g., as

[65] UN-Habitat-Gender and Water Alliance, 2013, E-Resource Book on Gender, Water and Sanitation in Cambodia, Laos and Vietnam

[66] WSP, Supply Chain Assessments for Sanitary Latrines in Rural and Peri-Urban Areas of Cambodia and Vietnam, 2007 and 2010

road workers and mason helpers) benefit greatly from opportunities to work as trained toilet masons, and prove to be highly committed promoters and skilled craftswomen with a strong eye for neat work.[67]

Supply chain coordination. Improved coordination and information flow within the supply chain can improve efficiencies and allow for more concerted efforts at market development (See Box 11). Coordination could be improved by enabling "lead enterprises" to play a central role in coordinating the inputs of other actors. Lead enterprises include importers and wholesalers because of their apex position in the supply chain; provincial or district retailers because of their proximity to local markets; or concrete producers because of the high proportion of their business that depends on latrine sales.

Technology development and innovation. The introduction and/or development of low-cost latrine and DEWATS designs, components, or materials is needed to increase the range of
attractive and affordable options on the market. Pilot projects in the region showed the value to develop modular technologies that facilitate incremental improvements to sanitation facilities as household interest grows and households are able to mobilize funds.

Financial services. Lack of capital is a significant constraint for all supply chain actors. Improved linkages with MFIs or other financing schemes would improve supply chain functioning.

Box 12: Capacity building at scale: one-stop shops, Indonesia

In Indonesia, the one-stop shop has been used a model of provision where customers can select the latrine option and organize for their latrine to be constructed in one visit. One-stop shops are run by sanitation entrepreneurs, and local governments are providing resources to support the training and coordination for sanitation entrepreneurs. The role of the public sector is to generate demand and develop capacity and accredit one-stop providers and promote and monitor quality of trained providers as well as coordination of increased community demand for improved latrines with entrepreneurs ready to serve them. The private sector ensure product and service availability to meet local demand at affordable price and acceptable quality as well as respond to demand. Sanitation entrepreneurs have also formed the Asosiasi Pengelola and Pemberdayaan Sanitasi Indonesia (APPSANI, or Indonesia Sanitation Developer and Empowerment Association) APPSANI entrepreneurs will be able to collectively advocate for standardization of pricing, standards, recruitment of new entrepreneurs and a training curriculum.

Source:http://www.communityledtotalsanitation.org/sites/communityledtotalsanitation.org/files/EAP_Regional_Sanitation_Learning_Event_Bangkok.pdf

e) Strengthening the capacities of all interveners and creating a regional platform for dialogue, knowledge management and innovation among the three countries

● Improving governance is at the heart of the challenge of improving sanitation for the urban poor. The lead responsibility to move from a project-based approach to a service delivery approach lies first with local government, which has an obligation to form strong partnerships with NGOs and CBOs, the local private sector and donors and to draw on the strengths of all parties. In the context of the three countries: "Donor-funded and NGO-implemented" projects can only show possible solutions, but cannot, on their own, scale up to address the country-wide problem. This is the role of national, provincial and local governments that have to provide WASH services to the urban poor". However, as shown by the Study, the capacity of most local governments to lead this process is woefully weak,

[67]IRC International Water and Sanitation Centre, et al. 2007, Women, Well-being, Work, Waste, and Sanitation (4Ws). Action research on alternative strategies of environmental sanitation and waste management for improved health and socioeconomic development in peri-urban coastal communities in South Asia: 2003–2006 Synthesis. http://www.irc.nl/page/227

and donors and projects could pay more attention to the need to actively support government organizations tasked with carrying out the changes by building capacity, and facilitating information exchange. Lessons learnt from the NTP 2 for rural water and sanitation (See Viet Nam 5.2. b) are worth considering for the urban sanitation sector coordination in the region.

At the regional level, UN-ESCAP[68] identified two main priorities for regional cooperation on urban sanitation and DEWATS: (i) capacity building of governments on options for institutional improvement and (ii) knowledge sharing on community initiatives. Participants to the ESCAP Regional Workshop on DEWATS highlighted the importance for UN-ESCAP to identify a Regional Centre on DEWATS to serve as a "Centre of Excellence" to support WWR with capacity building and promotion of DEWATS in the target countries and throughout the SEA. Such a Regional Centre can gather institutional experiences from various countries, identifying lessons learned from DEWATS projects and providing advice on governance. Assisting governments in identifying investment options and providing possible fund-raising mechanisms, in sanitation campaigns and technology transfers were the other three priorities. Knowledge sharing and technology transfer were the key recommendations for the ESCAP Regional Workshop, but several responses added the need to translate existing commitments and vision into action.

f) Enhancing innovative financing and financial viability of sanitation facilities

Individual client approach is not an efficient way to disseminate DEWATS and secure infrastructure funding:

- Demand responsive approach: target specific sectors where there is private/donor/government interest
- Promote policy development to help create demand and investment[69]

Reaching the 'bottom 40%' with sustainable sanitation services. The three countries are considering partnering with existing targeting systems (such as country poverty alleviation or social safety net programs) in order to increase access to improved sanitation for the poorest. In Cambodia, poor households are identified through the nationally standardized ID-Poor procedures. Households that have been classified as ID-Poor 1 or ID-Poor 2 (the two poorest groups) are issued special identity cards with a picture of all family members. The ID-Poor household identification methodology involves a high degree of participation by and consultation with local community members, which increases the transparency of the process and the accuracy of its results. All service providers must use the ID-Poor data as the primary targeting method to identify the poor. Similar procedures are used in Viet Nam to identify poor households for program targeting. A household's poverty status is verified through its government-issued Certificate of Poverty, which also includes a unique identification number.

Targeting financing to sustainable sanitation service delivery with Output-Based Aid on Improving affordability by smoothing and subsidizing sanitation expenditures helps very poor households mobilize cash to pay for improved latrines/toilets, using instruments that do not distort markets.
Here, two mechanisms can be devised:

- Develop and support sanitation facilities that enable payment on installment terms[70], either intermediated through agency arrangements with manufacturers and suppliers of components or through financial institutions that provide consumer loans to households.
- Develop and finance targeted subsidies and OBA for extremely poor households in locations where suitable technology cannot be delivered at affordable costs (See Box 12).

[68] UN-ESCAP, 2009, Institutional changes for Sanitation, Discussion Paper
[69] BORDA, 2014, DEWATS Implementation Experience in Mekong Countries (Regional Workshop at UN-ESCAP)
[70] Purchasing improved sanitation requires a large outlay of cash at one time. Many poor households have uncertain and seasonally varying incomes; in many cases, a significant part of their consumption is also self-produced, so that cash income is less than total income.

Box 13: Community Hygiene Output-Based Aid (CHOBA)

The project in poor rural and peri-urban areas of Viet Nam and Cambodia is led by the East Meets West Foundation (EMW) and its local partners including the Viet Nam Women's Union (VWU) in Viet Nam and the Reproductive and Child Health Alliance (RACHA) and Cambodian Women for Peace and Development Union (CWPD) in Cambodia. The project is based on an output-based aid (OBA) approach, which EMW has been pioneering in the fields of education, clean water and sanitation extensively over the past 4 years.

CHOBA aims to raise awareness, develop local supply chains, and provide access to finance through an OBA incentive, which is either a consumer rebate (about $20) or conditional cash transfer (CCT) that encourages poor households and communities to actively participate and increase sanitation uptake. Essentially, the consumer rebate serves as a demand triggering tool while the conditional cash transfer is a reward for communes that achieve at least a 30 per cent increase in sanitation coverage and to develop the sanitation chain (e.g. trash removal, clean drinking water). Overall, the incentives serve as smart subsidies designed to address specific sanitation market failures while also increasing participation among poor households and other stakeholders by building local capacities with emphasis on women and community leaders.

A key feature of the EMW model is the verification process. EMW staff will verify a) the construction of new improved latrines with standards approved by MOH, and hand washing devices, and b) hygiene behavioral changes in usage, hand washing, garbage disposal and safe water.

- Compared with the business-as usual model, in which there is limited private sector participation in sanitation services and donor funds are delivered as grant or loans to governments, the outcome-based financing model[71] offers the following advantages:
  - It injects discipline and opportunities to the marketplace. Innovation, scale and efficiency are brought into sanitation service delivery through a combination of entrepreneurs and large-scale companies and distributors;
  - Public and philanthropic funds significantly leverage private sector and foundation funds for investment and provision of scaled-up sanitation services. Some of these funds are raised at below market rates;
  - Social impacts are built-in into the mechanism. The different market segments are assessed among the different stakeholders, and providers are paid based on the delivery of social outcomes (e.g., poverty reduction). These metrics are based on independent verification using the best available and commonly agreed measurement approaches;
  - Positive externalities from improved sanitation are internalized into the system of incentives and contractual arrangements.

Other financing instruments such as micro-financing and special sanitation financing funds such as the Global Sanitation Fund of the Water Supply and Sanitation Council (available for Cambodia) and the ADB Water Financing Partnership Facility (WFPF) (Box 13)

Box 14: ADB Water Financing Partnership Facility (WFPF)

On 25 July 2013, the Bill & Melinda Gates Foundation (the Foundation) signed a Channel Financing Agreement with ADB to contribute $15 million through a Sanitation Financing Partnership Trust Fund (the Fund) under the trust fund component of the WFPF.

The Fund resources will be used to support projects whose focus will include: (i) piloting innovative and improved sanitation technologies and septage management systems; (ii) supporting innovations in ADB sanitation projects for septage management, non-networked and decentralized sanitation and wastewater management projects; (iii) formulating policies, regulations, and business innovations to create enabling environments for improved quality and coverage of septage management; and (iv) promoting new service delivery mechanisms and innovative financing models for sanitation systems,

[71]UN-ESCAP, 2013, Development Financing for Tangible Results: A Paradigm Shift to Impact Investing and Outcome Models

including maintenance and upgrades.
First priority will be given to Bangladesh and India. Second priority countries are Indonesia, Philippines and Viet Nam. Other countries may be considered based on need, in consultation with the Foundation.

Source: ADB, WFPF, Sept.2013

g) Introducing the Guidance Manual on DEWATS

As a next step. UN-ESCAP aims to prepare a Guidance Manual on DEWATS in order to bring more inputs on good practices and lessons learnt from policymakers and experts of the three countries and deliver it in partnership with the potentially selected Regional Resource Center of Excellence on DEWATS and UN-Habitat. The goal of the Manual is to provide guidance, tools and illustrations of practices towards integrated service oriented approach to wastewater management for households in peri-urban areas and secondary towns by tackling three major issues:

- Moving to water and energy sensitive and low impact development: reviewing the pro's and con's of centralized and decentralized wastewater treatment systems in light of integrated urban sanitation
- Defining an updated conceptual framework for a pro-poor sanitation improvement program from design to monitoring of implementation
- Strengthening the enabling environment and consumer demand for affordable, eco-efficient and reliable DEWATS.

Annex 1: Cambodia National Urban and Rural WSS Policy (2003) and Status & Accomplishments to Date

Urban Sanitation Policy

No.	Sector Policy	Objective	Status/Accomplishment to Date
1	Investment decisions: Investment decisions shall promote and encourage technical designs that are appropriate, and to properly construct sanitation infrastructure that responds to what users want and are willing to pay for.	To ensure efficient and sustainable investments for operational sanitation systems especially installed facilities.	The centralised wastewater treatment schemes applied in Sihanoukville, Siem Reap, and Phnom Penh are based on low-cost technology (stabilization ponds, lagoons) and low maintenance, taking advantage of the availability of land. The treatment facilities have limited coverage. There is low willingness to connect to the systems and to pay for the services. MoE does not monitor effluent quality from these facilities. No monitoring of effluent quality prior to discharge to water bodies is done for Phnom Penh and Sihanoukville. For Siem Reap, monitoring is done by the provincial DPWT but without coordination with MoE. For Phnom Penh, land is getting scarce due to urbanization, and facilities need to be upgraded to modern systems. BORDA DEWATS experience has been collected.
2	Technology choices: Technology choices should follow a demand-responsive approach based on incentives for appropriate technology choices that are simple to install, operate, and maintain, and priced appropriately so they are consistent with Cambodia's conditions.	To utilize technologies that function satisfactorily and are durable without adverse impact on public health and environment.	The centralized wastewater treatment plants, as systems installed in Sihanoukville, Siem Reap, and Battambang are essentially supply driven, utilizing simple technology and requiring low maintenance. It is not certain whether effluent quality is according to standard as no monitoring is done by the MoE. A pilot project on neighborhood sanitation systems in rural/small towns (20 communities) was done with World Bank assistance (completed in 2011). More than 7,000 household sanitation facilities were constructed, directly benefiting almost 40,000 people, and an additional 3,500 people from neighboring households without such facilities. The project involved on-site and off-site facilities (individual toilets and septic tanks). It followed a demand-driven approach and required

			beneficiaries to contribute in kind for the investments. External supervision was provided to ensure that technical designs and quality of construction are according to standard. Factories and SMEs in Phnom Penh are required by the MoE to treat their wastewater prior to discharge to drainage channels. They are regulated and monitored by the MoE.
3	Financing and cost recovery: There should be a promotion of different approaches ranging from government financing to user-backed financing for neighborhood sanitation systems and for investors at all levels of the systems. At the same time, these should follow a demand-responsive approach at all levels of the urban sanitation systems so as to cover O&M costs, and in order for the tariff to be fair and tied to the users' willingness to pay.	To ensure financial sustainability, facilitate the expansion of the sanitation system to all and make it efficient to operate and maintain.	The centralized wastewater treatment facilities in the cities of Sihanoukville and Siem Reap, and the pilot neighborhood sanitation facilities in small towns were financed from donor funds. The sanitation tariff in Phnon Penh is 10% of the water bill. In Battambang, it is 100 riels (US$0.025) per cubic meter of water used. In Sihanoukville, this is based on land area, while for Siem Reap, it is based on floor area. In all cities, the tariffs are nominal and partially cover O&M costs. Maintenance of household sanitation facilities (financed by the World Bank) is a responsibility of the beneficiaries.
4	Management of sanitation systems: MIME, other responsible ministries and local authorities shall unbundle responsibilities in order to build the confidence of community, local and international NGOs, public utilities, and the private sector for investment at all levels of urban sanitation.	To ensure operational management and performance at all levels of sanitation systems.	The MPWT is responsible for: (a) setting design and construction standards and tariffs for public sanitation systems; (b) mobilizing funding support from development partners for feasibility studies and capital investments; and (c) liaising with interested private investors. Provincial DPWTs, operate and maintain the facilities. Provincial authorities lead public awareness raising efforts. The provision of neighborhood sanitation facilities (pilot demonstration project supported by World Bank) was facilitated and supervised by a local NGO. Maintenance of

			the facilities is the responsibility of the beneficiaries.
5	Service delivery and private sector participation: Encourage participation and open the delivery of services (all levels of urban sanitation systems) to the private sector.	To expand service coverage to all and ensure financial efficiency for the system by using investment funds instead of subsidies from the government. To develop sewage treatment in order to reduce environmental pollution and public health hazards, and provide better a quality of service. To ensure higher operating and maintenance efficiencies.	There are no public sanitation facilities operated by the private sector. Foreign investors have indicated interest in the Phnom Penh and Siem Reap systems, but there are no financial commitments to date.
6	Expanding sanitation services to the poor: MRD and any other responsible institutions and local authorities shall focus on promoting and encouraging service providers, be they public or private utilities, NGOs, or communities in expanding sanitation services to the poor.	**To provide access to sanitation network services by the poor at appropriate prices so that they are able to pay for the service.**	The pilot neighborhood sanitation facilities supported by World Bank were an attempt to introduce pro-poor sanitation services. There are no plans for scaling up.

Annex 2: Lao PDR Urban Wastewater Strategy and Investment Plan for 2009-2020

Issue(s)	Recommended policy action(s)	Outcome(s)
Fragmentation in the planning and delivery of sanitation services including lack of complete, accurate sector data to inform planning	- Consolidate and streamline responsibilities for planning and sector oversight between MPWT, MoE, and MoH - Develop a sanitation sector data base, and a consistent monitoring and evaluation framework, and centralize data management - Implement a donor coordination mechanism dedicated to water and sanitation - Establish a TWG on sanitation	- Better coordination of sector policies and planning of investments, - Focused sector development and - More efficient use of limited resources
Lack of / unsustainable investments	- Conduct appropriate due diligence of investments in order to (a) provide sustainable sanitation service delivery levels based on what consumers want and are willing to pay subject to technical and financial viability and (b) adopt designs that are appropriate to local conditions for urban wastewater and septage management including DEWATS - Include connection fees in the investment cost for households willing to connect during project implementation - Undertake sustained social marketing on the benefits of safe and reliable sanitation services	- Sustainable investments in urban wastewater and septage management including DEWATS; - Operations not dependent on government subsidies; - Maximum utilization of distribution networks - Financially viable operations
Lack of institutional support for operators of community-based sanitation systems / DEWATS and small scale providers of sanitation services	-Develop institutional arrangements for better accessibility to sanitation materials and spare parts in the market - Develop capacities for operations and maintenance, including helping instill community ownership of facilities	- Fewer system breakdowns and non operational facilities
Lack of appropriate sanitation solutions to the urban poor	- Prepare a package of affordable and reliable options for sanitation systems incl. DEWATS - Organize health hygiene promotion to create demand -Establish a revolving fund to help the poor connect (about 10% of urban population—190,000 people)	-Increased access of the poor to sustainable sanitation services -Increased willingness to pay

Lack of an implementing framework for private sector participation	- Develop a strategy to encourage more private sector participation - Provide support to developing transactions/feasibility studies and overseeing procurement of private sanitation providers - Develop appropriate procurement templates that are in line with global best practices, e.g., procedures that promote transparent and competitive bidding for sanitation goods and service providers	- Potentially lower prices of sanitation goods and services - Wider participation in competing for the market of sanitation services
Lack of regulation of sanitation sector	- Set up a regulatory body for tariff setting and compliance of public/private sanitation providers with regulatory requirements - Institute benchmarking of performance for all service providers - Streamline the issuance of operating licenses so that sanitation service providers can be regulated under a single consistent framework	- Stronger regulation, enhanced competition, better services - Better accountability of sanitation goods and service providers and operators
Lack of policy on sanitation tariffs	- Develop a policy on sanitation tariffs and pilot implementation in Vientiane capital and the secondary cities	-Clear rules on cost recovery facilitating investments in urban sanitation
Lack of technical guidelines for urban wastewater systems	Prepare technical guidelines for design, construction and O&M of urban wastewater systems incl. DEWATS: -standard design guidelines for wastewater facilities; - materials use guidelines, -technical standards, -codes of practice, standard model designs and -drawings and project management guidelines.	-Clarity on technical design, construction norms and standards, material use and O&M guidelines