ADB

Cambodia

Water Supply and Sanitation Sector Assessment, Strategy, and Road Map

Asian Development Bank

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Currency Equivalents

(as of 26 April 2011)

Currency Unit	–	riel (KR)
KR1.00	=	$0.00024
$1.00	=	KR4,004.00

Abbreviations

ADB	–	Asian Development Bank
AFD	–	Agence Française de Développement
CARM	–	Cambodia Resident Mission
CMDG	–	Cambodian Millennium Development Goal
CSP	–	country strategy and program
GDP	–	gross domestic product
GMS	–	Greater Mekong Subregion
GRET	–	Groupe de Recherches et d'Echanges Technologiques (Research and Technology Exchange Group)
IDA	–	International Development Association
JMP	–	World Health Organization and UNICEF Joint Monitoring Programme for Water Supply and Sanitation
m^2	–	square meter
MDG	–	Millennium Development Goal
MIME	–	Ministry of Industry, Mines and Energy
MLMUPC	–	Ministry of Land Management, Urban Planning and Construction
mm	–	millimeter
MOE	–	Ministry of Environment
MOH	–	Ministry of Health
MOWRAM	–	Ministry of Water Resources and Meteorology
MPWT	–	Ministry of Public Works and Transport
MRD	–	Ministry of Rural Development

NGO	–	nongovernment organization
ODA	–	official development assistance
PPTA	–	project preparatory technical assistance
PPWSA	–	Phnom Penh Water Supply Authority
RWSS	–	rural water supply and sanitation
SEDIF	–	Syndicat des Eaux d'Ile de France
TA	–	technical assistance
UNICEF	–	United Nations Children's Fund
VDC	–	village development council
WHO	–	World Health Organization
WSA	–	water supply authority
WSP	–	Water and Sanitation Program
WSUG	–	water and sanitation user group

Acknowledgments

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I Sector Assessment: Context and Strategic Issues

A. Introduction

1. Access to improved water supply, sanitation, and hygiene (i) brings economic development and poverty reduction; (ii) ensures food safety and better livelihoods; (iii) preserves the environment; (iv) reduces health burdens; (v) improves school enrollment and retention rates, especially for girls; and (vi) empowers communities and provides opportunities for women.

2. The Asian Development Bank (ADB) has prepared a sector assessment, strategy, and road map for the water supply and sanitation sector in Cambodia.[1] It provides a current sector assessment and outlines the strategic investment priorities of ADB based on the involvement of the Government of Cambodia and ADB in Cambodia's water supply and sanitation sector. It highlights sector performance, development constraints, government plans and strategy, past ADB support and experience, other development partner support, and the strategy for future ADB support.[2] The sector assessment, strategy, and road map is a working document which has been prepared as an input to ADB's Cambodia country partnership strategy 2011–2013.[3] It will be updated as the strategic program and developments of ADB and the Government of Cambodia's strategic program and developments are refined and/or changed in the sector. It is intended to provide sector background information for investment and technical assistance operations.

B. Overall Sector Context

1. Economic and Poverty Indicators

3. Between 2004 and 2008, Cambodia's economic growth averaged 10.2%. It fell sharply in 2009 (to 0.1%) before beginning a recovery in 2010 (6.3%). The decline is attributable to the impact of the global economic crisis on garment exports, tourism, and construction, which together account for nearly 40% of gross domestic product (GDP). The government responded in an effective and targeted manner to the

[1] This assessment strategy and road map is based on discussions with sector officials of the Government of Cambodia; the rural water supply and sanitation sector analysis completed in preparation for the Second Rural Water Supply and Sanitation Sector Project (approved in 2009, $21 million from the Asian Development Fund, Grant 0156-CAM); the project completion report (2008) for the Provincial Towns Improvement Project (Loan 1725-CAM approved in 1999 and Loan 2013-CAM approved in 2003); the Country Assistance Program Evaluation for Cambodia (2009); and the Sector Assistance Program Evaluation for the Agriculture and Rural Development Sector in Cambodia (2009).

[2] The World Bank commenced a review of the water supply and sanitation sector in Cambodia in 2010. ADB's assessment, strategy, and road map may need to be updated once the review is completed to take into consideration the World Bank's strategic directions and future support to the sector.

[3] ADB. 2011. *Country Partnership Strategy: Cambodia, 2011–2013.* Manila.

impacts of the financial crisis through a fiscal expansion of 3.3% of GDP, but the experience highlighted the vulnerability of the economy to external shocks and the need to pursue economic diversification. Agriculture continues to play an important role in the economy, as evidenced by its relatively strong performance during the crisis. The private sector remains heavily dominated by informal and very small enterprises and farms, with only a few large, modern operations.

4. Per capita GDP rose from around $297 in 1995 to $731 in 2009, and the incidence of poverty declined from over 35.7% in 2004 to 30.1% in 2007. Rural poverty also declined but remains relatively high at 35%. The poverty incidence in urban areas (excluding Phnom Penh) was 22%. The Gini coefficient of inequality increased from 0.39 in 2004 to 0.43 in 2007.[4] The average per capita daily consumption of the richest 20% of the population is more than 8 times that of the poorest 20%. Food price inflation in 2008 disproportionately affected the nonfarming rural and urban poor and near-poor, and their welfare was further threatened by the adverse effects of the global economic crisis. (See country partnership strategy thematic assessment on poverty for more information.)

2. Socioeconomic and Population Indicators

5. Cambodia has a growing and diverse population.[5] In March 2008, there were 13.4 million Cambodians, of whom 51.4% were women and girls. Approximately 80.5% of the total population lives in rural areas. There are approximately 2.8 million households with an average household size of five people, of which one-quarter were headed by women. Of these, around 2.3 million are rural households, which clearly illustrates that Cambodia remains an overwhelmingly rural country. In 1983, about 80% of the workforce was engaged in agriculture, forestry, and fishing.[6] According to the 2008 census, this figure had fallen only slightly to 72% of the workforce.

6. Cambodia can be divided into five broad regions based on similar terrain, accessibility, climate, and economic activity (Table 1).

3. Rate of Urbanization

7. The current rate of urbanization in Cambodia is low. About 19.5% of the population lives in urban areas (2008), with only a 1.3 percentage point increase over the previous decade (18.2% in 1998).[7] While the annual growth rate of the rural population was 1.4% in 1998–2008, the urban population grew at 2.2% per annum. If this trend continues, the urban population could increase by 25% in absolute terms from 2.6 million in 2008 to an estimated 3.3 million by 2018. Tourism development in Cambodia is expected to contribute to the increasing pressures on existing urban infrastructure.

8. The majority of the urban population resides in Phnom Penh; the remaining live in urban areas outside of Phnom Penh. The top five most populous provinces were Kampong Cham (1.68 million), Kandal (1.27 million), Battambang (1.03 million), Prey Veng (0.95 million), and Siem Reap (0.90 million). Based on population trends since 1998, projected population increases in the provinces range

[4] United Nations Capital Development Fund. 2010. *Local Development Outlook Cambodia: Trends, Policies, Governance*. New York.

[5] This section is based on the Country Partnership Strategy Thematic Assessment for Poverty.

[6] Ross, Russel, ed. 1987. *Cambodia: A Country Study.* Washington, DC: Government Printing Office for the Library of Congress. http://countrystudies.us/cambodia/63.htm

[7] United Nations Capital Development Fund. 2010. *Local Development Outlook Cambodia: Trends, Policies, Governance*. New York. According to the report, 48% of Cambodia's total population could be considered "urban" (i.e., living in predominantly urban regions) if the Organisation of Economic Co-operation and Development definition of "rural" were applied. This is closer to the average for Organisation for Economic Co-operation and Development countries.

Table 1 Regional Poverty Profile of Cambodia, 2004

Region	Provinces	2008 Population (% of total population)	2004 Poverty Incidence (%)	2004 Poverty Magnitude (% of total poor)
Plains	Kandal, Kampong Cham, Takeo, Prey Veng, Svay Rieng	5.2 million (39%)	32	1.7 million (36%)
Tonle Sap	Kampong Chhnang, Pursat, Battambang, Banteay Meanchey, Siem Reap, Kampong Thom	4.1 million (31%)	43	1.8 million (38%)
Plateau and Mountains	Kampong Speu, Pailin, Oddar Meancheay, Preah Vihear, Stung Treng, Ratanakiri, Mondulkiri, Kratie	1.8 million (13%)	52	0.9 million (19%)
Phnom Penh	Phnom Penh	1.3 million (10%)	5	0.1 million (2%)
Coastal	Kampot, Kep, Koh Kong, Preah Sihanouk	1.0 million (7%)	27	0.3 million (6%)
Cambodia	All provinces	13.4 million (100%)	35	4.7 million (100%)

Notes: The 2004 poverty incidence is applied to the 2008 population figures for illustrative purposes. Numbers may not sum precisely because of rounding.

Sources: ADB. 2011. *Country Partnership Strategy: Cambodia, 2011–2013.* Manila; Royal Government of Cambodia, Ministry of Planning. 2008. *General Population Census of Cambodia.* Phnom Penh; and National Institute of Statistics of Cambodia. 2004 and 2007. *Cambodia Socio-Economic Survey.* Phnom Penh.

between 1.0% and 1.5% per annum, with more significant increases expected in Oddar Meancheay (4% per annum) and Preah Vihear (6% per annum).

9. According to a recent United Nations Capital Development Fund report, although urban districts in provinces seem to be growing fastest, the level and pace of urbanization remain low compared to other countries within the region (footnote 7). Further, the characteristics of the urban population are changing—people are younger and better educated, and there are more women. Household size is not expected to increase over the next few years.

10. The government is also in the process of reclassifying urban areas based on the new definition used in the 2008 population census of Cambodia. According to the new classification, urban areas are those in which (i) the population density exceeds 200 per square kilometer, (ii) the percentage of males employed in agriculture is less than 50%, and (iii) the total population of a commune is more than 2,000. After the recalculation according to the census, the 2004 rural population figure was reduced by about 250,000 and the urban population figure was increased by the same amount.[8] This reclassification will have an effect on the overall country statistics and progress toward water supply and sanitation sector goals and targets.

4. Water Resource Situation

11. Cambodia has a moist tropical climate, consistent with its location 10–13 degrees north of the equator. The climate features warm to hot temperatures throughout the year and an annual monsoon cycle of alternating wet and dry seasons. The main wet season, the southwest monsoon, occurs between

[8] Before 2008, "urban area" meant all provincial towns (whole districts), four districts of Phnom Penh municipality, and the entire provinces of Preah Sihanouk, Kep, and Pailin.

June and October, when approximately 80% of all rainfall occurs. During the cooler months between November and May, airflows are drier, resulting in cooler and less rainy weather. Average monthly rainfall is around 1,500 millimeters. However, total rainfall can vary considerably from year to year, resulting in occasional years of severe flooding and, conversely, years of significantly low rainfall. Both can result in severe difficulties. Years of low rainfall raise the risks of water use conflicts in some areas. The average daily temperature in Cambodia is 28°C, temperatures can fall to 17°C in January and rise to as high as 40°C in May and June.

12. Cambodia's water resources are relatively underexploited and its aquatic ecosystems are healthy in many locations, although they are vulnerable to damage through the impedance of drainage flows by roads and the effects of irrigation. The development of a market economy, agriculture, industry, and fisheries is likely to bring increased pressure on water resources and ecosystems.

13. The quality and quantity of available surface water vary. Surface water quality is vulnerable to sedimentation from river bank erosion and to the effects of damage to forested areas, which has occurred prolifically in recent decades as the logging of natural forests has intensified. Pollution is also a growing problem that is mainly associated with poor solid and liquid waste disposal practices in large and small towns. In rural areas, water quality is often impaired when livestock is kept or allowed to graze near rivers. Levels of coliform bacteria and biological oxygen demand of surface water are often high, particularly during the dry season.

14. The total estimated groundwater resource in Cambodia is around 17.6 billion cubic meters, and is readily recharged by rainwater.[9] The alluvial deposits of the Tonle Sap River and Mekong River floodplain are believed to be good shallow aquifers with high recharge rates (5–20 cubic meters per hour) and a groundwater table generally within 4–6 meters of the surface.[10] While the resource as a whole is plentiful, its distribution is uneven and actual abstraction rates in certain localities may be low, particularly toward the end of the dry season. In some localities, groundwater is used for irrigation, and where this occurs there is potential for resource conflicts.[11]

5. Water Supply and Sanitation Coverage

15. The United Nations General Assembly adopted the Millennium Development Goals (MDGs) in 2000. Sustainable access to safe drinking water and basic sanitation is one of four targets under Goal 7: Ensure environmental sustainability.[12] Specifically, the target calls on countries to halve, by 2015, the proportion of people without sustainable access to improved drinking water and basic sanitation. MDG 7.C has two indicators: Indicator 7.8 addresses use of an improved water source, and is a proxy to measure access to safe drinking water; and Indicator 7.9 considers the proportion of the population using an improved sanitation facility.[13]

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[9] Royal Government of Cambodia, Ministry of Water Resources and Meteorology. 2001. *National Water Sector Profile, Kingdom of Cambodia.* Phnom Penh.

[10] G. Wright, D. Moffatt, and J. Wager. 2004. *Establishment of the Tonle Sap Basin Management Organization: Tonle Sap Basin Profile* (TA 4212-CAM). Cambodia: ADB and Cambodia National Mekong Committee (March).

[11] ADB. 2009. Summary Initial Environmental Examination of the Second Rural Water Supply and Sanitation Sector Project. Manila (ADB Grant 0156-CAM).

[12] Other targets include: Integrate the principles of sustainable development into a country policies and programs and reverse the loss of environmental resources (MDG 7.A); reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss (MDG 7.B); and by 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers (MDG 7.D).

[13] World Health Organization. 2010. *Achieving the Health-Related Millennium Development Goals in the Western Pacific Region: 2010 Progress Report.* Geneva. Section IV: Progress Report against MDGs 1, 7, and 8 (pp. 53–63).

16. In Cambodia, the MDGs were adapted to the Cambodian National Development Plan, and are known as the Cambodian Millennium Development Goals (CMDGs).[14] The global MDG targets for water and sanitation were adapted to the country situation and in some cases act as intermediary targets to long-term sector goals. Hence, any post-2015 MDG indicators will need to consider country-level sector targets and should build on working definitions in use. The CMDGs include[15]

i. improved water supply to reach 50% of the rural population by 2015 (CMDG 7.10),
ii. improved water supply to reach 80% of the urban population by 2015 (CMDG 7.11),
iii. improved sanitation to reach 30% of the rural population by 2015 (CMDG 7.12), and
iv. improved sanitation to reach 74% of the urban population by 2015 (CMDG 7.13).

17. Water supply and sanitation coverage figures for rural and urban areas are listed in Table 2. It is generally agreed that coverage figures based on the 2008 census reflect the current figures. Cambodia's progress against global targets, in comparison with other countries in Southeast Asia, can be found in the World Health Organization report: *Achieving the Health-Related MDGs in the Western Pacific Region: 2010 Progress Report*.[16]

Table 2 National Progress toward Attaining Cambodian Millennium Development Goal Targets (% coverage)

Indicator	1998[a] Baseline	2004[b] Actual	2008[c] Actual	2015[a] Target	2020[d] Target	2025[e] Target
Rural Access to Improved Water Supply	24.0	35.5	40.5	50	75	100
Urban Access to Improved Water Supply	60.0	52.7	75.8	80		
Rural Access to Improved Sanitation	8.6	15.0	23.0	30	50	100
Urban Access to Improved Sanitation	49.0	47.5	81.0	74		

[a] Millennium Development Goal documents.

[b] Cambodia Socio-Economic Survey 2004.

[c] Ministry of Planning, Census 2008.

[d] Ministry of Rural Development estimate agreed during project preparatory technical assistance grant for the Second Rural Water Supply and Sanitation Sector Project.

[e] Royal Government of Cambodia, National Policy on Water Supply and Sanitation 2003.

Note: 52.7% urban access to improved water does not include Phnom Penh.

Sources: Royal Government of Cambodia, Ministry of Planning. 2003. *Cambodian Millennium Development Goals.* Phnom Penh; Royal Government of Cambodia, Ministry of Planning. 2008. *General Population Census of Cambodia.* Phnom Penh; National Institute of Statistics of Cambodia. 2004. *Cambodia Socio-Economic Survey.* Phnom Penh; Royal Government of Cambodia, Coordinating Committee for Development of Water Supply and Sanitation Sector. 2003. National Policy on Water Supply and Sanitation. Phnom Penh; and Ministry of Rural Development. 2009. Update of the 2005 Rural Water Supply and Sanitation Sector Investment Plan. Phnom Penh.

18. Regional disparities also exist. More than 76% of residents in Phnom Penh have access to piped water supply compared with the national average of 42% (Table 3). Furthermore, there are still disparities in provincial coverage. In 2007, access to improved water supply in rural areas was the lowest in Banteay Meanchey Province at just 17.2%, and highest in Siem Reap Province at 33.2%.[17]

[14] Royal Government of Cambodia. 2006. *National Strategic Development Plan 2006–2010.* Phnom Penh.

[15] Royal Government of Cambodia, Ministry of Planning. 2003. *Cambodian Millennium Development Goals.* Phnom Penh.

[16] World Health Organization. 2010. *Achieving the Health-Related MDGs in the Western Pacific Region: 2010 Progress Report.* Geneva. Section IV: Progress Report against MDGs 1, 7, and 8 (pp. 53–63).

[17] Royal Government of Cambodia, Ministry of Planning. 2008. *Statistical Year Book of Cambodia.* Phnom Penh.

Table 3 Public Piped Water Supply Coverage

Province or Municipality[a]	Population			Piped Water Supply Coverage (%)	
	Total	Urban	%	2008	2009
Phnom Penh	1,326,432	1,242,992	93.71	72.02	76.12
Siem Reap	897,731	174,265	19.41	12.12	12.37
Sihanouk Ville	199,503	89,447	44.83	17.42	17.65
Pursat	397,174	25,650	6.46	50.57	64.04
Battambang	1,025,198	180,853	17.64	21.60	23.20
Kampong Cham	1,680,782	118,242	7.03	14.51	16.22
Kampong Thom	630,687	31,871	5.05	51.63	59.39
Svay Rieng	482,760	17,029	3.53	29.63	39.40
Kampot	585,074	48,274	8.25	27.84	29.78
Kampong Chhnang	471,937	43,130	9.14	12.17	12.87
Prey Veng	947,367	33,079	3.49	18.93	22.08
Ratanakiri	149,902	19,317	12.89	13.70	13.95
Kratie	318,052	35,964	11.31	18.47	22.37
Stung Treng	112,572	17,022	15.12	39.98	42.62
Total	13,388,497	2,614,027	19.52	40.05	42.68

[a] The list includes provinces with a public water supply authority and excludes coverage figures for Kandal, Kampong Speu, Banteay Meanchey, Takeo, Koh Kong, Oddor Meanchey, Preah Vihear, Pailin, Kep, and Mondulkiri, which are serviced by private water supply providers.

Source: Royal Government of Cambodia, Ministry of Industry, Mines and Energy, Department of Potable Water Supply. 2009. *Cambodia Water Data.* Phnom Penh.

19. Private companies (or small-scale providers) provide access to water supply for about 21% of the urban population with a piped connection. Wastewater treatment facilities (e.g., lagoon systems or waste stabilization ponds) exist in Phnom Penh, Preah Sihanouk, Svay Rieng, and Siem Reap provinces. Additional small-scale treatment systems exist at health facilities around Cambodia. In areas without coverage, wastewater is discharged either directly to the subsoil or via open drainage channels to surface water bodies using various forms of on-site sanitation facilities (e.g., septic tanks, lined pits, unlined pits, and overhanging latrines).[18]

20. Progress toward these targets depends on the definitions of "access," "safe," and "improved." The original MDG targets were presented in terms of access to safe water, but this changed in interpretation in 2003 to access to an improved water supply. Following interpretation, variations in coverage figures still continue as some may question what improved water supply and sanitation corresponds to in terms of technology. Over the years, the MDG definition has come to focus solely on access with little attention to sustainability and quality of service.

21. Rural water supply national surveys and databases do not identify safe sources in terms of water quality; instead, they distinguish between improved and unimproved supplies based on technology and/or facilities. The Ministry of Rural Development (MRD) and the Ministry of Planning have adopted the recommendations of the World Health Organization (WHO) and the WHO and United Nations

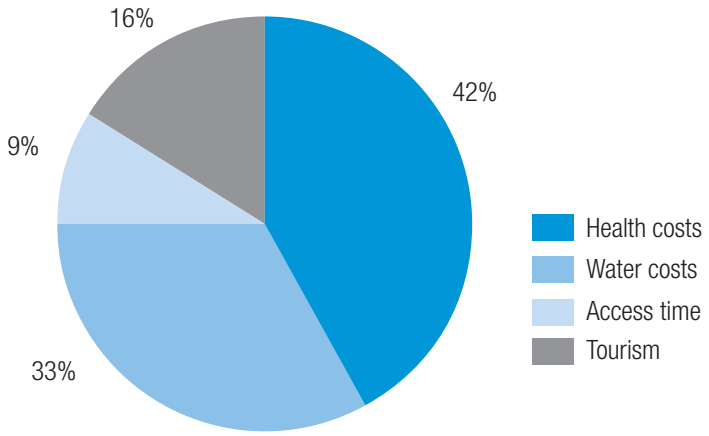
[18] An estimated two-thirds of the population practices open defecation (77% of all rural households and 19% of all urban households). The public health implications of open defecation are significant.

Children's Fund (UNICEF) Joint Monitoring Programme on Water Supply and Sanitation (JMP).[19] An improved drinking water source is defined as a drinking water source or delivery point that, by nature of its construction and design, is likely to protect the water source from outside contamination, particularly from fecal matter. An improved sanitation facility is defined as one that hygienically separates human feces from human contact. However, cultural differences and local context have further refined the JMP definitions adopted. In the current version of the government's Rural Water Supply, Sanitation, and Hygiene Strategy,[20] the MRD has included protected and filtered ponds as an improved water source, but shared latrines are not considered an improved sanitation facility even though it is culturally appropriate for an extended family with one or more households to share a latrine facility (Appendix 1).[21]

6. Costs and Benefits of Adequate Water Supply, Sanitation, and Hygiene

22. Cambodia, Indonesia, the Philippines, and Viet Nam lose an estimated $9 billion per annum due to poor sanitation. Cambodia has the lowest sanitation coverage and the highest per capita losses in Southeast Asia. In 2005, the total annual financial loss due to poor sanitation and hygiene was about $160 million—equivalent to $12 per capita. The annual economic impact of poor sanitation in Cambodia is about $448 million, which amounts to about $33 per capita per annum in economic loss, or about 7.2% of Cambodia's GDP in 2005.[22] The loss comprises health costs, water costs, access time, and tourism costs, with health impact being the largest contributor to the estimated costs at 42% ($187 million per annum) (Figures 1 and 2).

Figure 1 Economic Loss of Poor Sanitation and Hygiene



Source: Water and Sanitation Program. 2008. *Economic Impacts of Sanitation in Southeast Asia: A Four-Country Study Conducted in Cambodia, Indonesia, the Philippines, and Viet Nam under the Economics of Sanitation Initiative.* Jakarta: World Bank.

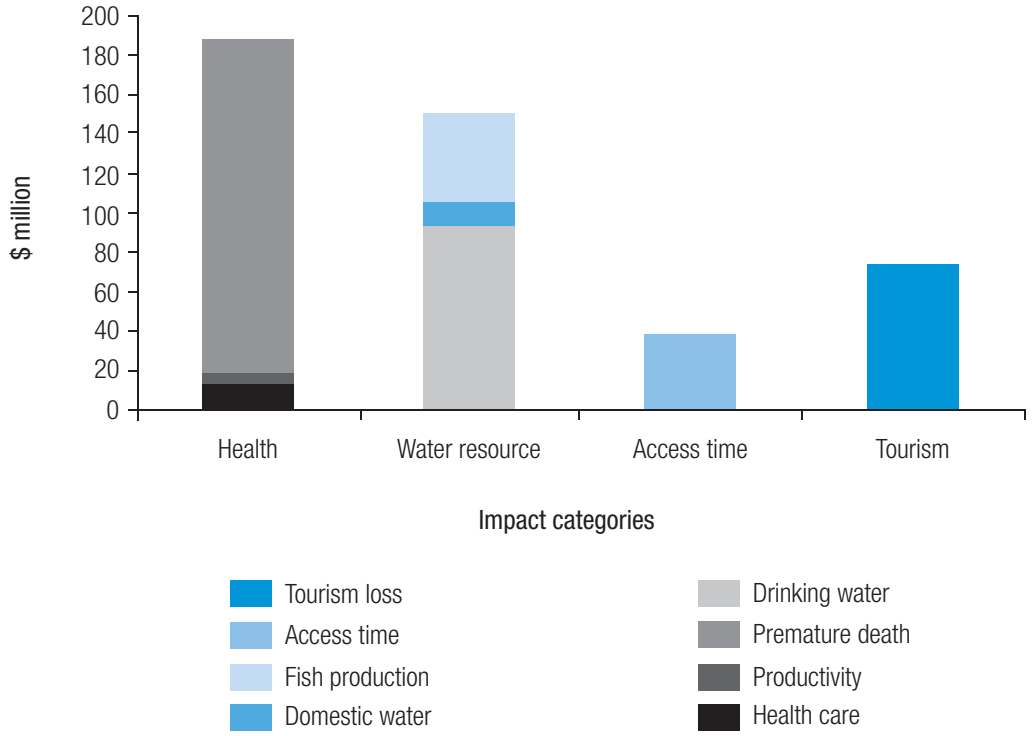
[19] Joint Monitoring Program. 2008. *Progress on Drinking Water and Sanitation: Special Focus on Sanitation.* Geneva: UNICEF and WHO.

[20] Ministry of Rural Development. 2010. *Rural Water Supply, Sanitation and Hygiene Strategy 2010–2025.* Phnom Penh.

[21] Shared latrines were found to be common in a number of countries due to cultural practices and local living and settlement patterns; however, it is not considered by the JMP to fall under the definition "improved sanitation."

[22] World Sanitation Program. 2008. *Economic Impacts of Sanitation in Southeast Asia: A Four-Country Study Conducted in Cambodia, Indonesia, the Philippines, and Viet Nam under the Economics of Sanitation Initiative.* Jakarta: The World Bank.

Figure 2 Economic Losses by Impacts



Source: Water and Sanitation Program. 2008. *Economic Impacts of Sanitation in Southeast Asia: A Four-Country Study Conducted in Cambodia, Indonesia, the Philippines, and Viet Nam under the Economics of Sanitation Initiative.* Jakarta: World Bank.

23. Many rural areas show high rates of waterborne and water-related diseases. Based on feasibility studies completed for Kbal Trach commune in Pursat Province and Bos Sbov commune in Banteay Meanchey Province, common waterborne illnesses include cholera, diarrhea, dysentery, and typhoid.[23] In 2008, annual expenditure incurred by households for related medical care was KR242,206 ($60.55) in Kbal Trach commune (approximately 5.95% of the total annual expenditure or 5.87% of the average annual household income) and KR320,000 ($80.00) in Bos Sbov commune (about 8% of the total annual expenditure or 7% of the average annual household income).[24]

7. Institutional Setting

24. Agency responsibilities in the water supply and sanitation sector are distributed across several ministries (Table 4).

[23] In Kbal Trach commune, diarrhea makes up 12.7% of cases, cholera 1.6%, dysentery 7.9%, typhoid 25.4%, malaria 11.1%, and dengue 11.1%. In Bos Sbov commune, diarrhea makes up 36% of cases, cholera 5%, dysentery 27%, and typhoid 76%.

[24] Based on an exchange rate of KR4,000.00 per $1.00.

Table 4 Roles and Responsibilities in Water Supply and Sanitation

Subsector and Agency	Responsibilities
Overall	
Ministry of Economy and Finance http://www.mef.gov.kh	The Ministry of Economy and Finance is responsible for allocating annual budget to the sector.
Ministry of Interior http://www.interior.gov.kh	The Ministry of Interior is responsible for the administration of subnational organizations through its network of appointed heads of provinces, districts, communes, and villages. It is also responsible for implementing the government's decentralization and deconcentration framework and the Organic Law. The National Committee for Subnational Democratic Development (http://www.ncdd.gov.kh) is located in the Ministry of Interior.
Ministry of Water Resources and Meteorology (MOWRAM)	MOWRAM has overall responsibility for water resources planning and management. It has a separate department for rural water supply.[a] MOWRAM is organized into three directorates: inspection, administration, and technical affairs. Six departments report to the Directorate of Technical Affairs, including the Department of Water Supply and Sanitation. MOWRAM is responsible for (i) defining the policies and strategic development of water resources in order to serve the exploitation, development, and sustainable conservation of water resources at national and international levels consistent with the government's policy program; (ii) studying and researching the potential of available water resources, including surface, underground, and atmospheric water resources; (iii) preparing short-, medium-, and long-term plans for the exploitation, development, and conservation of water resources; (iv) managing all direct and indirect exploitation of natural resources in a rational manner and to minimize water- and flood-related disasters; (v) drafting regulations relating to the management of water resources, and monitoring the enforcement of laws; (vi) collecting, compiling, and using meteorological, hydrological, and hydrogeological data to serve the private sector, organizations, communities, and all people involved in the improvement and exploitation of water resources; (vii) developing and promoting new technology and providing training; (viii) strengthening and expanding national and international collaboration on water resources management and meteorology; and (ix) participating in the implementation of the work of the Mekong River Commission, consistent with MOWRAM obligations.
Ministry of Planning http://www.mop.gov.kh	The Ministry of Planning is responsible for guiding and managing national socioeconomic development planning; managing the government's statistical functions; and monitoring and implementing plans and national programs in all sectors, including progress toward the Cambodia Millennium Development Goal targets. It works in cooperation with other ministries and institutions in Cambodia.
Ministry of Health (MOH) http://www.moh.gov.kh	The Department of Preventive Health in the MOH is responsible for setting water supply and wastewater quality standards, and monitoring and controlling drinking water supply quality and wastewater discharges. The department is developing a national environmental health action plan in cooperation with other line ministries, and the director of the Department of Rural Health Care in the Ministry of Rural Development cochairs the MOH subtechnical working group.
Urban Water Supply	
Ministry of Industry, Mines and Energy (MIME) http://www.mime.gov.kh	The MIME is responsible for urban water supply; provincial towns' water supply, including water quality control; and the regulation of commercial piped water supply throughout the country, including private and public operators.
Department of Potable Water Supply in the MIME	The Department of Potable Water Supply within the General Directorate of Industry in the MIME is responsible for regulating all commercial piped water supplies in the country.

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Table 4 *Continued*

Subsector and Agency	Responsibilities
Phnom Penh Water Supply Authority (PPWSA)	The PPWSA is a well-managed water supply authority (WSA) that delivers to its consumers potable water that satisfies 200 quality parameters. It is responsible for urban water supply in the municipality of Phnom Penh, including water quality monitoring.[b] With a staff of 600, the PPWSA is headed by a general manager who reports to a board of directors, the chairman of which is a representative of the governor of Phnom Penh Municipality. While the water supply infrastructure is government owned, the authority is completely autonomous. It has full cost recovery and finances its own capital works. It provides assistance to the Siem Reap WSA on a fee-paid consultant basis, and has capacity to extend this service to other WSAs.
Water supply authorities	Government-owned WSAs have been established in 13 provincial towns and operate with varied efficiency, autonomy, and cost recovery. Smaller WSAs are often privately owned and these usually deliver untreated water to consumers.
Ministry of Land Management, Urban Planning and Construction (MLMUPC)	The MLMUPC is responsible for checking the architectural design of new development for water supply arrangements. For all new development, the developer applies to the MLMUPC for approval for the provision of water supply to the development. The MLMUPC has a checklist of approval parameters and must itself seek the approval of the WSA for water supply infrastructure. Once approvals have been obtained, a permit is issued and the work proceeds under the supervision of the WSA. Where new developments have a floor area of less than 3,000 square meters (m^2) all responsibilities can be delegated to the provincial departments of the relevant line ministries. Approvals for development with a floor area of more than 3,000 m^2 are referred to the national level.
32 licensed private operators and about 300 informal private operators	Private operators are responsible for the delivery of water supply services and are unregulated. They accounted for 21% of new connections in 2008.
Urban Sanitation and Wastewater Management	
Ministry of Public Works and Transport (MPWT) http://www.mpwt.gov.kh	The MPWT is responsible for urban drainage and urban sanitation due to its role in drainage.
Ministry of Environment (MOE) http://www.moe.gov.kh	The Department of Pollution Control (including provincial departments), the executive institution of the MOE, monitors the quality of effluent passing to a natural waterway or stormwater drain, and licenses all operators who transport and/or discharge septic waste.[c]
Ministry of Education, Youth and Sport http://www.moeys.gov.kh	The Ministry of Education, Youth and Sport is responsible for promoting sanitation and hygiene activities in schools.
Ministry of Land Management, Urban Planning and Construction (MLMUPC)	The MLMUPC is responsible for checking the architectural design of new development for sanitation and wastewater treatment arrangements. For all new development, the developer applies to the MLMUPC for approval for the architectural design of wastewater collection and treatment infrastructure. The MLMUPC has a checklist of approval parameters and must itself seek the approval of the MPWT for the technical design of the water supply arrangements. Once approvals have been obtained, a permit is issued and the work proceeds under the supervision of the MPWT. As with piped water supply, new developments with a floor area of less than 3,000 m^2 may be delegated to the provincial departments of the relevant line ministries. Approvals for development with a floor area of more than 3,000 m^2 are referred to the national level. Once the work is completed, the MOE, or its provincial department, monitors the quality of effluent being discharged from the system.

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Table 4 *Continued*

Subsector and Agency	Responsibilities
Rural Water Supply and Sanitation	
Ministry of Rural Development (MRD) http://www.mrd.gov.kh	The MRD is responsible for rural development, including rural water supply and sanitation, rural roads, and community development.
Department of Rural Water Supply	The Department of Rural Water Supply is the MRD department responsible for water supply in rural areas.
Department of Rural Health Care	The Department of Rural Health Care is the MRD department responsible for rural sanitation and hygiene.
Gender Working Group	The Gender Working Group oversees the mainstreaming of gender into rural development activities in the MRD.
Provincial Department of Rural Development	The Provincial Department of Rural Development plans, implements, and monitors rural water supply and sanitation interventions in collaboration with district officers of rural development, commune councils, and village development councils (VDCs).
Commune councils	Commune councils are responsible for the planning, implementation, and financing of rural infrastructure. They prioritize and formulate their needs and prepare annual plans. They have had their roles and responsibilities significantly strengthened by the process of election of members. Each commune council comprises three committees: procurement, women and children's affairs, and technical facilitation. The committee on women and children's affairs helps to coordinate hygiene promotion activities at the commune level.[d]
Village development councils	VDCs are responsible for managing village affairs, including infrastructure works. They are aligned with the decentralization and deconcentration framework following an interministerial *prakas* (subdecree) in 2010.[e] The village chief will be VDC chair, the vice village chief will be vice VDC chair, and the VDC secretary will be elected from the village. Each VDC includes a representative for water supply and one for sanitation. Membership is open, and at least 40% of VDC members are expected to be female.
Water and sanitation user groups (WSUGs)	WSUGs are responsible for managing, operating, and maintaining communal water supply and sanitation facilities following MRD guidelines. Each WSUG has a board of at least five persons, of which 40% are female members. WSUG responsibilities include the collection of contributions from users and management of operation and maintenance arrangements. Ownership of facilities, agreements with the private sector, and legal aspects regarding user service remains a commune responsibility. WSUGs are organized around each communal water facility, but will be linked to the VDCs to facilitate the long-term operation and maintenance of facilities.
Private sector	The private sector plays an important role as per the 2003 rural water supply and sanitation (RWSS) sector policy, but it remains weak. It includes locally based artisans, mechanics, markets and stores, manufacturers, drilling companies, and consultants (i.e., individuals, nongovernment organizations [NGOs], and firms). Private sector services can be engaged for the provision of supply of materials and equipment; construction of RWSS infrastructure; technical advice; facility management; maintenance and repair; and training for management, maintenance, or hygiene issues. The business environment essential for their successful large-scale involvement in RWSS is hampered by a lack of (i) business services, (ii) clarity of private sector regulation, (iii) financial services, (iv) technical specifications, and (v) expected service levels. Despite these constraints, the private sector is evolving. There are many private suppliers of jars, pipes, hand pumps, latrine slabs, and concrete rings for lining wells or pits. Contractors have drilling rigs and small entrepreneurs have water carts.
Nongovernment organizations	NGOs are actively involved in the provision of RWSS services, but their capacity remains limited.

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Table 4 *Continued*

Subsector and Agency	Responsibilities
Interagency Coordination Units	
Technical Working Group for Rural Water Supply, Sanitation and Hygiene	The working group was established by the MRD in November 2007 as an interministerial working group comprising senior representatives from the MIME, MOWRAM, the MRD, the MOH, and external agencies (e.g., development partners and a water and sanitation sector working group representative). The working group meets quarterly and is chaired by the Minister of Rural Development and cochaired by a development partner representative (on a rotating basis). The chair has coordinating and advisory roles under the headings of policy guidance, strategy and budget, capacity development, aid effectiveness, and report and review. The working group supports rural water supply, sanitation, and hygiene activities.
Water and Sanitation Sector Working Group	The working group, chaired by the director of the Department of Rural Water Supply in the MRD, meets monthly to exchange information and discuss technical issues. It is attended by other MRD departments, NGOs, and development partner representatives.
Sub-Technical Working Group on Urban Water Supply	The sub-group was established in March 2010 under the Infrastructure and Regional Integration Technical Working Group, chaired by MIME. The sub-group consists of government officials and key development partners involved in urban water supply.

[a] National Water Resource Policy for the Kingdom of Cambodia, approved by the Council of Ministers in January 2004.

[b] While water quality monitoring is a MOH responsibility, the PPWSA monitors the quality of the water they produce for 200 parameters.

[c] Subdecree on Water Pollution Control: No. 27 ANRK BK of April 1999.

[d] Set out in the Organic Law (Royal Kram No. NS/RKM/0508/017).

[e] The Ministry of Rural Development and the Ministry of Industry signed Interministerial Prakas No. 2391 on the Formation and Functioning of Committee for Village Development (22 December 2010).

Note: At the provincial, level, all the above-mentioned ministries are represented by their respective "down line" department in every province. The head of each department office reports "up line" to their respective ministry, as well as to the provincial governor.

Sources: Discussions with government officials; ADB. 2009. *Proposed Grant Assistance to the Kingdom of Cambodia for the Second Rural Water Supply and Sanitation Sector Project.* Manila (0156-CAM); ADB. 2010. *Mekong Water Supply and Sanitation Project:* Consultant's Final Report. Manila (TA 6484-REG [Cambodia report]).

C. Core Sector Issues, Causes, and Effects

1. Core Sector Issues

25. **Policy and legal framework.** The policy and legal framework that has been adopted for the water supply and sanitation sector is generally sound. The National Policy on Water and Sanitation was ratified by the Council of Ministers on 7 February 2003.[25] The policy has three parts: urban water supply, urban sanitation, and rural water and sanitation. The overall policy is guided by the Rectangular Strategy for Growth, Employment, Equity, and Efficiency and the National Strategic Development Plan Update (2009–2013).[26] However despite the overall policy and legal framework, a number of issues remain. These are highlighted for each subsector in Tables 5 and 6 and fall into three board categories: coordination, regulation, and implementation. For instance, the level of coordination and awareness about sector activities across different ministries or agencies could be improved. A problem tree analysis is provided in Appendix 4. This could be done through external assistance during project implementation. External agencies and project staff that are aware about institutional arrangements and policies are more able

[25] Royal Government of Cambodia, Coordinating Committee for Development of Water Supply and Sanitation Sector. 2003. *National Policy on Water Supply and Sanitation.* Phnom Penh.

[26] Royal Government of Cambodia. 2004. *The Rectangular Strategy for Growth, Employment, Equity, and Efficiency (2004–2008).* Phnom Penh; and Royal Government of Cambodia. 2009. *National Strategic Development Plan Update (2009–2013).* Phnom Penh.

Table 5 Subsector Issues Assessment

No.	Issue	Rural Water Supply	Rural Sanitation	Urban Water Supply	Urban Wastewater
1	Lack of strategy and direction in the sector			X	X
2	Lack of operational action plan in the sector	X	X		
3	Insufficient investment for new infrastructure	X	X	X	X
4	Insufficient O&M funds (e.g., cost recovery, rehabilitation)		X	X	X
5	Lack of capacity (planning and implementation)	X	X	X	X
6	Limited interministerial coordination	X	X	X	X
7	Limited human resources and skills training	X	X	X	X
8	Inadequate mechanisms for monitoring water supply and sanitation and its impact on other sectors (e.g., health)	X	X	X	X
9	Unclear sector definitions and service levels	X	X		
10	Lack of business environment for private sector involvement	X	X	X	X
11	Low capacity for decentralization and deconcentration at subnational levels and questionable sustainability of WSUGs	X	X		
12	Limited understanding of women's roles in water supply and sanitation management at community and utility levels	X	X	X	X

O&M = operation and maintenance, WSUG = water and sanitation user group.

Source: Asian Development Bank assessment based on government consultations.

to work with appropriate agencies on sector coordination, regulation, and implementation (e.g., water resource data management).

26. **Coordination of key sector institutions.** Coordination is being done through different sector working groups (e.g., the Technical Working Group for Rural Water Supply, Sanitation, and Hygiene; the Water and Sanitation Sector Working Group; and the Sub-Technical Working Group on Urban Water Supply) and memoranda of understanding. For instance, representatives from other ministries (e.g., the Ministry of Water Resources and Meteorology; the Ministry of Industry, Mines and Energy [MIME]; and the Ministry of Health [MOH]) are invited to attend the Technical Working Group for Rural Water Supply, Sanitation, and Hygiene. In 2005, a memorandum of understanding between the Ministry of Rural Development (MRD) and the MIME helped clarify the overlap between the two ministries regarding piped water systems, and agreed that the MRD would be responsible for community systems of 250 households or less. The Council for Agricultural and Rural Development also coordinates with the MRD and other ministries involved in the government's priority sectors of agriculture and rural development. The Department of Preventive Medicine in the MOH is developing a national environmental health action plan in cooperation with other line ministries, and the director of the Department of Rural Health Care is the cochair of the subtechnical working group in the MOH.

27. **Incompatible data sets.** Many water supply and sanitation data sets are incompatible because of the low frequency of data collection, differences in definitions, lack of coordination by government agencies and development partners, and lack of consensus on service indicators. This weakness has been recognized by the government and steps are being taken to reestablish a national capacity to acquire and manage data and information related to water supply and sanitation and the environment. In the case of rural water supply and sanitation, the task is more difficult, as a number of nongovernment organizations and private individuals contribute to sector goals through individual and/or direct contributions. The Water and Sanitation Working Group provides a forum for discussions and knowledge sharing among different nonprofit groups.

Table 6 Challenges in Urban and Rural Water Supply and Sanitation

Challenge	Urban Water Supply (MIME)	Urban Wastewater (MPWT)	Rural Water Supply, Sanitation, and Hygiene (MRD)
Inadequate institutional and legal framework	• Inadequate regulatory framework • Inadequate tariff policy (including cross subsidy system) • No holistic approach to water supply, sanitation, and wastewater management	• Cost recovery mechanisms are ad hoc interministerial decrees (Siem Reap) • No regulation on collection and disposal of septic effluent and sludge	• RWSS responsibility split between two departments of the MRD • Water quality and safety management is needed • Regulation on household sanitation (latrine maintenance) to be improved • Limited skills and human resources
Lack of funds	• No internal revenues (inefficient operations) • Limited government funding (mainly ODA) • Limited private funding (no incentives)	• Limited government funding (mainly ODA) • No private funding	• Limited government funding (mainly ODA) • Limited role of private sector involvement, but increasing efforts to bring in the private sector
Weak sector planning and implementation capacity	• Central coordination, mainly vertical (MIME) • Heightened focus on urban wastewater • Limited central government capacity • Low capacity in provincial water service authorities and private operators, with the exception of the PPWSA.	• Unclear responsibilities in implementing and operating facilities • No active planning and coordination by line ministry (MPWT) • Low awareness level of wastewater's potential impact on health and sanitation	• RWSSH Strategy approved but not yet disseminated • Low capacity and resources at district and commune levels • Sustainability of WSUGs may be questioned • Limited results from health and hygiene awareness efforts • Low demand for sanitation • More effective way in targeting sanitation subsidies for poor households needed • Multiple agencies install RWSS infrastructure with limited coordination
	• Limited interministerial coordination and cross-sectoral coordination • Lack of monitoring data and monitoring capacity • Limited awareness of women's role in the sector		

MIME = Ministry of Industry, Mines and Energy; MPWT = Ministry of Public Works and Transport; MRD = Ministry of Rural Development; ODA = official development assistance; PPWSA = Phnom Penh Water Supply Authority; RWSS = rural water supply and sanitation; RWSSH = rural water supply, sanitation, and hygiene; WSUG = water and sanitation user group.

Source: Asian Development Bank assessment based on government consultations.

28. **Shortage of qualified staff.** Cambodia has relatively few qualified managers, planners, technicians, and social or health specialists working in water and sanitation. The shortage of qualified staff is more evident in the provinces and districts. Given the high natural growth rates in some areas and the large amount of work required in water supply and sanitation to meet the Cambodian Millennium Development Goals (CMDGs), there is an urgent need to encourage personnel to enter the sector and build skills.[27] The Rural Water Supply, Sanitation, and Hygiene Strategy highlights this shortage at all levels of planning and implementation.

[27] Cambodia's annual population growth rate is 1.9%; and in 2005, 12.3% of the population was under the age of 5. Source: World Sanitation Program. 2008. *Economic Impacts of Sanitation in Cambodia.* World Bank research report. Jakarta.

29. **Retention of government staff.** Current government salary structures and working conditions do not help to retain trained staff. There is a risk that qualified staff, that have been trained using public sector budget, will leave their positions for employment in the private sector. The transfer of these qualified staff members out of the public sector will be detrimental to the capacity of the supported offices and will necessitate further capacity building and training efforts. The government is trying to address this issue through implementation of its Priority Operating Costs Program.

30. **Impact of climate change.** There is an emerging concern about the impacts of climate change. At 40 kilograms per capita, Cambodia has one of the lowest per capita carbon emissions in the world.[28] However, it has been reported that food resources, biodiversity, water resources, the coastal ecosystem, and agricultural land will become "highly vulnerable" to the effects of climate change in Cambodia with negative effects projected to accelerate in the next few decades.[29] Changes in seasonality and the volume of flow in the Mekong River and its related river systems are likely to occur, increasing flooding in the wet season and water shortages during the dry season.

31. While climate change may have a bigger impact on Cambodia's coastal zone, there is concern that the effects will be felt throughout the country due to (i) impacts on the Tonle Sap ecosystem resulting from changing flow patterns in the Mekong River, (ii) reduced groundwater recharge and aquifer viability, and (iii) increased dry season water shortages affecting the viability of household rainwater storage facilities. (See country partnership strategy linked thematic document on environment and climate change for more information.)

32. Suitable measures could be taken to help minimize project impacts on carbon emissions. A recent sector study of rural water supply and sanitation reviewed the feasibility of linking sanitation facilities to biogas digesters, especially in households that have received a biogas digester through the National Biogas Program with the Ministry of Agriculture, Forestry and Fisheries, and those with the potential for generating sufficient waste to consider investment in a biogas digester.[30]

33. **Private sector participation.** It will be important to increase private sector participation, particularly for the construction of water facilities and pour–flush toilets in both urban and rural areas. External assistance could help support private sector operators through capacity development programs or project support for initial investment in supplies (e.g., credit). For instance, ADB's Second Rural Water Supply and Sanitation Sector Project[31] is helping to support local entrepreneurs in the construction of latrine parts; water storage facilities (e.g., water jars); and desludging activities through capacity development activities and seed financing for equipment and molds. The project is also helping to train registered rig contractors to improve their capacity to drill wells. Assistance assumes that an overall framework is in place, including key regulatory or quality checks.

34. **Limited role of women.** Women's role in the sector could be further recognized and opportunities incorporated for gender equity and women's empowerment. For instance, women's roles in the operation and management of water supply authorities (WSAs) are important, especially in the areas of finance and administration. Similarly, in urban and rural sanitation, women have a significant role in disseminating public awareness information among peers in communities. In Cambodia, societal norms have been difficult to break in enhancing women's roles in decision making and planning. Based

[28] Per capita carbon emissions for Australia and the United States exceed 20 tons. The world average is 4.37 tons. Source: *Atlas of Carbon Emissions.* 2009. http://www.scribd.com/doc/2402784/Atlas-of-Carbon-Emissions.

[29] Intergovernmental Panel on Climate Change. 2007. *Fourth Assessment Report.* Geneva.

[30] ADB. 2011. *Feasibility of Sanitation-Linked Biogas Options in Rural Cambodia.* Consultant's Final Report. Manila.

[31] ADB. 2009. *Proposed Grant Assistance to the Kingdom of Cambodia for the Second Rural Water Supply and Sanitation Sector Project*. Manila (Grant 0156-CAM).

on implementation experience of ADB's Tonle Sap Rural Water Supply and Sanitation Sector Project,[32] although women officially occupied at least two positions in the five-person water and sanitation user group boards, real decision making is limited to the socially accepted domain of village leaders. Village leaders are mostly older, literate men. Female illiteracy also remains a core constraint to participation in technical aspects of community-managed procurement, which supports the need to develop more visual materials for education and instruction. (See country partnership strategy thematic assessment on gender for more information.)

2. Subsector Constraints

35. The subsectors identified follow (i) the distinction made by the CMDGs, (ii) the differences in technical and social approaches for rural and urban communities, and (iii) the institutional division of responsibilities across different ministries. The subsectors include urban water supply, urban sanitation and wastewater management, and rural water supply and sanitation. The challenges with such identification are that it leaves gaps in responsibility, includes overlapping responsibility, and provides lack of clarity for water supply and sanitation in the gray areas (i.e., peri-urban areas).

36. All three subsectors require substantial assistance in infrastructure funding. Rural water supply and sanitation has benefited from donor assistance in developing strategies and investment plans, and to some extent capacity building. This assistance needs to be continued in order to result in sustainable improvement, especially when considering the low retention rates of government staff. Urban water supply has received some assistance focused on management and policy development in the past, but this has not resulted in substantial capacity buildup. Current capacity building is mainly focused on improving the technical capacity of WSA staff. Assistance to the urban wastewater sector is minimal. Infrastructure investments will only be effective when a proper regulatory and implementation framework can be formulated.

37. Key issues and constraints for each subsector are now discussed in further detail. See Tables 5 and 6 for a summary of these and other issues.

a. Key Urban Water Supply Issues

38. **Institutional reforms.** The MIME supports the reform of the regulatory framework and the move toward more autonomy for the WSAs which, combined with the deconcentration and decentralization process and the limited human resources capacity of the WSAs, constitute a tremendous challenge. The MIME recognizes this and has started two pilot projects that essentially try to duplicate the Phnom Penh Water Supply Authority (PPWSA) model in Battambang and Siem Reap provinces.[33]

39. **Limited human resources.** Despite a very high level of competence within the PPWSA, many WSAs have limited human resources. It is noted that the PPWSA is already providing technical assistance to the Siem Reap WSA and the opportunity exists to extend this form of assistance to other WSAs. Through a possible domestic water operators' partnership, such an exchange is being considered between PPWSA and other WSAs.

40. **Low levels of government funding.** Public funding for urban water supply is limited and financing is predominantly from official development assistance. The WSAs do not generate sufficient

[32] ADB. 2005. *Proposed Grant Assistance to the Kingdom of Cambodia for the Tonle Sap Rural Water Supply and Sanitation Sector Project.* Manila (Grant 0018-CAM).

[33] The PPWSA provides management support to the Siem Reap WSA through a service contract.

internal revenues to finance service expansion and improvement works. Continued efforts toward cost recovery are essential, especially among WSAs. The PPWSA example has shown that autonomous service providers can operate with full cost recovery and self-fund extensions of their operations.

41. **Private sector financing.** The private sector is relied on to provide substantial financing for urban water supply. The Research and Technology Exchange Group (GRET) has developed a model for private sector partnership in urban water supply which operates with government regulation. Care must be taken to avoid putting entrepreneurial private operators out of business, and arrangements to sell them bulk-treated water for distribution to their existing consumers should be considered. An evaluation was completed on the sustainability of these operations and published in 2010.[34]

42. **Limited coverage and substandard service.** Despite ongoing reforms, limited budgets and capacity resulted in only about 37% of the urban population having access to water supply by means of a metered network connection, according to 2005 estimates. Provincial centers are also underserviced. There are 13 WSAs in provincial towns in Cambodia.[35] As well as the WSA in the provincial capital, there are two district towns in Kampong Cham Province with WSAs. WSAs, generally, have recorded steady increases in the amount of water supplied since 2004.[36] There are 10 provincial towns that are not served by a WSA; however, many of these towns are partly or fully served by private water supply operators. Privately operated water supply schemes also operate in urban clusters outside provincial capitals throughout the country. These private operators often do not treat water and reticulate raw water to their customers. In some instances, private operators sell bulk water to local suppliers for resale to consumers (e.g., in Kratie Province).

43. The Phnom Penh, Siem Reap, and Preah Sihanouk WSAs all deliver water to their consumers on a 24-hours-per-day basis. The others provide a service for 7–18 hours per day except for a WSA in a district town of Kampong Cham Province which provides water for 3 hours per day.[37] One of the problems associated with a discontinuous supply is that water stored in the home can harbor mosquitoes, which can increase household exposure to malaria, dengue, and Japanese encephalitis. A discontinuous supply can also result in contamination of the water supply system from infiltration when pipes are empty or devoid of pressure.

44. **Low efficiency.** Non-revenue water is less than 6% of that pumped in the PPWSA system but rises as high as 30% in the Kratie WSA system (footnote 36). Non-revenue water for the Siem Reap WSA is 10%, but in most of the other WSAs it ranges between 18% and 25%. Non-revenue water remains a key challenge for WSAs outside of Phnom Penh.

b. Key Urban Sanitation and Wastewater Issues

45. **Lack of regulation.** Phnom Penh and the larger provincial towns are becoming increasingly well serviced by small private operators who will respond to a telephone call and send a small truck with a tank of about 4,000 liters to pump out septic tanks and remove the septage. In Phnom Penh, it is possible on payment of a fee for operators to discharge the contents of the tanker at a sanitary landfill site where the contents are covered with earth in a managed private sector operation. Alternatively, tanker operators

[34] J. P. Mahé. 2010. *Building Water Utilities with Local Private Entrepreneurs: The Example of MIREP Program in Cambodia 2000–2010.* Phnom Penh: GRET and WSP. Original publication in December 2006.

[35] Apart from Phnom Penh, WSAs have been established in the provinces of Preah Sihanouk, Pursat, Battambang, Siem Reap, Kampong Cham, Kampong Thom, Kampong Chhnang, Kampot, Prey Veng, Svay Rieng, Kratie, Ratanakiri, and Stung Treng.

[36] Royal Government of Cambodia, Ministry of Industry, Mines and Energy, Department of Potable Water Supply. 2009. *Cambodia Water Data.* Phnom Penh.

[37] Non-revenue water figures are much higher when supply is continuous.

may dump the contents at an unregulated site where no fee payment is required and the travel distance is shorter. In provincial towns, it is common for the dumping of waste to be completely unregulated despite the existing legal and institutional framework.

46. The proper disposal of septage, sludge, and sewage is probably the area in which external support can have the biggest impact in improving environmental health and hygiene. In undertaking this activity, care must be taken to encourage the continued inputs of entrepreneurial operators, who have commenced a collection service unassisted. However, there is an urgent need for intervention in terms of increasing awareness about appropriate septage treatment, providing managed dumping sites, and improving regulation and enforcement.

47. In addition, enforcement of existing regulations is also necessary to ensure individuals do not construct over existing drains or encroach on open land (e.g., green space, stormwater retention areas, or waste stabilization ponds). A mechanism for monitoring sustainable urban development is necessary to ensure regulations in place are followed.

48. **Lack of cost recovery systems.** Although the population of Phnom Penh pays for wastewater management through a surcharge on their water bill, no other town has a similar system in place. The waste stabilization pond in Preah Sihanouk was constructed under the assumption that the population would see the benefits of wastewater management and voluntarily connect and pay operating fees. This did not happen, and the government has agreed to finance the operating costs from state budget. During preparation of the waste stabilization pond in Siem Reap, discussions were held with the government on how to charge environmental fees to the population (the polluter pays principle versus the user pays principle). However, charging through the water bill was not possible because of the low coverage ratio, while a general tax cannot be raised because Cambodia lacks a system of real estate tax.

49. **Limited system coverage.** The lack of regulation and user fee systems results in urban sanitation throughout the country being served almost universally by household systems. These range from septic tanks to unimproved latrines. Often, households have no sanitation facility and either share facilities with neighbors or defecate in an adjacent field. It appears that attempts to reticulate sewerage or septage collection have been generally unsuccessful. Sewerage reticulation in Phnom Penh mixes with stormwater, resulting in large, treatable—albeit diluted—quantities of wastewater discharged to retention basins during rainstorms. These retention basins do not have a storage capacity sufficient to provide effluent of a quality suitable for discharge to natural water courses.

c. Key Rural Water Supply and Sanitation Issues

50. **Limited coordination under deconcentration and decentralization.** Subnational ministerial lines and responsibilities for rural water supply and sanitation are clearly defined, with some overlap among the different agencies. The government's deconcentration and decentralization policies and the Organic Law, formulated by the Ministry of Interior, require the transfer of some responsibilities for planning and implementing rural water supply and sanitation activities. However, *prakas* (subdecrees) are not yet in place to support implementation. Interministerial Prakas No. 2391 on the Formation and Functioning of Committees for Village Development (22 December 2010), has helped to ensure coordination at the village and commune levels. The responsibilities and functions assigned to the three levels of government (i.e., national, provincial, and commune) by the deconcentration and decentralization process is shown in Table 7, together with complementary responsibilities at the district and village levels.

51. **Limited focus on rehabilitation.** A limited focus on the rehabilitation of water supply facilities could contribute to the government missing its CMDGs for rural water supply. In the absence of sufficient funds, one step would be to allocate sufficient budget and resources for repairing existing water points. Failure to rehabilitate facilities may be attributed to a lack of clarity over the legal ownership of water

Table 7 Devolved and Deconcentrated Rural Water Supply and Sanitation Responsibilities

Responsibility	Function
National: Ministry of Rural Development—Department of Rural Health Care, Department of Rural Water Supply • Policy and strategic development • Strategic plans and medium term development plans • Financial resource mobilization • Coordination and cooperation • Overall management and technical supervision • Monitoring	• Technical departments, responsible for strategic planning and sector management
Provincial: Provincial Department of Rural Development—Deconcentration • Project (subproject) site selection • Annual work plans • Project implementation management • Project monitoring • Water quality monitoring • Technical support to subprovincial levels	• Annual work plans • Program implementation management
District: District Department of Rural Development • Delegated responsibilities of Provincial Department of Rural Development • Oversight of village level toilet construction	• Management and supervision on behalf of Provincial Department of Rural Development
Commune: Commune Council—Decentralization • Village and commune action plans • Community mobilization • Owners of water points • Local resources management • Information and education campaigns	• Commune action plans • Oversight of commune-level operation and maintenance • Implementation of information and education campaigns with schools • Community mobilization • Representatives attend district integration workshops
Village: Village development committees (water and sanitation user groups) • Coordinates water and sanitation activities in the villages • Water point operators and managers • Construction of household toilets	• Village and household mobilization • Representatives are members of commune council

Source: Asian Development Bank assessment based on government consultations.

facilities and insufficient government financing for operation and maintenance (or recurrent costs). During the preparation of the Second Rural Water Supply and Sanitation Sector Project, ADB found that about 5% of the 300,000 water facilities in eight northwest provinces of Cambodia (six project provinces, Oddar Meanchey, and Preah Vihear) were inoperative. If half of the facilities are rehabilitated, close to 300,000 households (1.5 million people) could be provided with access to an improved water source.[38]

52. **Limited private sector participation.** Increased access to improved rural water supply and sanitation facilities, particularly household latrines, relies heavily on the private sector. Entrepreneurs in the districts and communes are keen to manufacture sanitation parts and construct water supply facilities, but they usually lack the basic knowledge and equipment. Furthermore, the established contracting firms, which have their own well-drilling rigs, lack competent rig supervisors, and some rigs have limited performance. There is room for improvement to help enhance private sector involvement in rural water supply and sanitation.

[38] This is an estimate based on the assumption that about 15,000 water facilities are in need of rehabilitation and each facility could supply water to about 20 households (or 100 persons).

53. **High percentage of negative wells.** A high percentage of negative wells (low- or non-yielding wells) is possible when groundwater conditions are unpredictable in many locations. The Tonle Sap Rural Water Supply and Sanitation Sector Project[39] delivered 3,169 successful drill wells with 550 abandoned wells. The negative well incidence was 14.8%—comparable to that of the Isan region of Thailand.[40] Support to improve well-drilling technology by providing "on-the-drilling-rig" training to rig operators could help reduce the number of negative wells. Simultaneously, relying on local knowledge through the participation and decision making of communities in site selection can also help reduce the number of negative wells.

54. **Sanitation approach and options.** Achieving sanitation coverage in Cambodia remains a challenge. As the Ministry of Rural Development (MRD) has tested different approaches with the support of development partners,[41] the following key issues have become clear:

i. a set of triggers for changing hygiene and sanitation behavior is needed;
ii. households should have access to a range of sanitation options and be allowed to choose the best option;
iii. sustainability should not be compromised on the account of affordability; and
iv. targeted sanitation support is required for poor households, as the market alone cannot take care of all segments of the population.[42]

55. In relation to targeted sanitation support, while proponents of community-led total sanitation and sanitation marketing approaches advocate against subsidies for latrine construction, the Department of Rural Health Care in the MRD believes that

i. support is required to help sustain the behavior change and overcome the social, economic, technical, and institutional barriers to the construction of sanitation facilities;
ii. support for latrine construction may start before a village achieves 100% open defecation-free status, as there is a "learning by seeing" effect;
iii. sanitation subsidies should target the poor and vulnerable groups; and
iv. the total cost of the latrine should not include the cost of the superstructure.

56. An ADB review of sanitation approaches in Cambodia revealed the importance of multiple choices for environmentally safe and sustainable sanitation technologies, and a case for sanitation hardware subsidies for the poor and vulnerable groups.[43]

57. The issue of sanitation technology and sustainability is crucial. The operation of pour–flush latrines relies on liquids permeating the soil, which may impact the groundwater. This concern could be mitigated by the parameter that no water point using a shallow aquifer as its source should be located within 30 meters of a pit latrine.[44] However, little has been reported on the likely time taken for the single pit pour–flush latrine to fill and the action that should then be taken. Environmental and management

[39] ADB. 2005. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Kingdom of Cambodia for the Tonle Sap Rural Water Supply and Sanitation Sector Project.* Manila (0018-CAM).

[40] Well drillers in the Isan region report a negative well rate of 12.5% using sophisticated equipment, groundwater data, and expertise. The region shares the same complex hydrogeological regime as the Tonle Sap Basin.

[41] Development partners that support household sanitation improvements in Cambodia include ADB, the Water and Sanitation Program of the World Bank, International Development Enterprise, the World Toilet Organization, LienAid, GRET, the Department for International Development of the United Kingdom, UNICEF, and smaller nongovernment organizations.

[42] ADB. 2011. *Feasibility of Sanitation-Linked Biogas Options in Rural Cambodia.* Consultant's Final Report. Manila; K. Sok and R. N. F. Catalla. 2009. *Community-Led Total Sanitation in Cambodia: Final Evaluation Report.* Phnom Penh: UNICEF.

[43] ADB. 2011. *Feasibility of Sanitation-Linked Biogas Options in Rural Cambodia.* Consultant's Final Report. Manila.

[44] This 30-meter parameter was adopted and followed by the Tonle Sap Rural Water Supply and Sanitation Sector Project and is supported by the World Health Organization's Fact Sheet 3.6 on pour–flush latrines.

concerns encourage the use of a two-pit (offset) pour–flush latrine (e.g., Sulabh International Social Services). Once the first pit has filled to within 20 centimeters of the top, it is sealed with earth, and sewage is diverted to the second pit. Once the first pit has been left for 1 year, its contents become biologically stable and can be removed for use as fertilizer.[45] The pit is then available for reuse once the second pit is full. Based on a recent sector study, different options have been reviewed with recommendations for promotion in "normal" conditions (i.e., flood-prone areas require different technology) (footnote 39).

[45] World Bank. 2005. *Toolkit on Hygiene, Sanitation and Water in Schools.* Washington, DC.

II Sector Strategy

A. Government Sector Strategy, Policy, and Plans

58. **Policy and planning framework.** Overall policy is guided by the Rectangular Strategy for Growth, Employment, Equity, and Efficiency and the National Strategic Development Plan Update (2009–2013). Water supply and sanitation has been an integral part of the government's overall strategy for poverty reduction. The government has committed to providing all citizens with clean and safe water, protecting all citizens from water-related diseases, and providing adequate water supply to ensure food security economic activities and appropriate living standards.[46] The Cambodian Millennium Development Goals (CMDGs) adopted by the government as 2015 targets include increasing the proportion of the rural population with access to safe water to 50%, and the proportion with access to sanitation facilities to 30%.[47] These commitments and targets demonstrate the high priority placed on water supply and sanitation improvements by the government. The sector is served by a sound policy and legal framework complemented by strategies and investment plans.

59. The government considers improved access to water supply and sanitation to be a prerequisite for poverty reduction.[48] The National Policy on Water and Sanitation was jointly prepared by the Ministry of Industry, Mines and Energy (MIME) and the Ministry of Rural Development (MRD) (footnote 25). The policy was ratified by the Council of Ministers on 7 February 2003 and consists of three parts: an urban water supply policy, an urban sanitation policy, and a rural water supply and sanitation policy.

60. The national policy outlines the following important principles:

i. it sets the role of the government as sector facilitator enabling other organizations to deliver the actual services;
ii. it prioritizes services for poor people;
iii. it defines the role of the private sector in service delivery and the role of the government to enable the private sector to achieve this, including promoting "transparency and competition in sector service provision;" and
iv. it establishes the role of communities in managing their water supply and sanitation facilities and services, i.e., communities are to choose the type and level of service based on information about the technical and financial aspects of the service options.

61. However, several shortcomings in the policy impact related projects. These include

i. lack of definition of terms, such as "safe," "improved," "access," "sustained," "sanitation," and "hygienic environment," which has impeded effective monitoring and comparisons between geographic areas and the outputs of implementers;

[46] Royal Government of Cambodia, Council for Social Development. 2002. *National Poverty Reduction Strategy, 2003–2005.* Phnom Penh.

[47] Figures correspond to CMDG targets 7.10 and 7.12.

[48] Royal Government of Cambodia. 2010. *National Strategic Development Plan Update 2009–2013.* Phnom Penh.

ii. lack of definition of a minimum level of service for both water supply and sanitation, which has made it difficult to assess coverage and make effective comparisons; and
iii. unclear distinction between urban and rural, which is essential for delineating responsibilities of the MIME and the MRD.

62. Since the drafting of the policy framework, the government has clarified a number of issues through subsequent agreements such a memorandum of understanding. For instance, the MIME and the MRD clarified their responsibilities on urban and rural water supply systems in 2005 through a joint memorandum of understanding.

63. **Urban water supply and wastewater management.** A sector strategy for urban water supply and wastewater management is still nonexistent for the subsectors. In March 2010, the MIME finalized its action plan for 2009–2013, focusing on three programs: (i) facilitating private sector partnerships, (ii) strengthening the management of the publicly owned WSAs, and (iii) integrating urban water supply with urban environmental management. The MIME is seeking partnership with international finance institutions to help implement the plan.

64. **Rural water supply and sanitation.** The MRD has developed the national Rural Water Supply, Sanitation and Hygiene Strategy for 2010–2025, which was approved on 1 March 2011. During the preparation of the Second Rural Water Supply and Sanitation Sector Project, ADB supported an update of the sector investment plan in 2008. To attain the 2015 CMDG target, an additional 13,000 rural people would require access to safe drinking water and about 1.477 million would need access to improved sanitation, costing about $37 million for infrastructure alone, assuming an average cost of $16 per capita for water and $25 per capita for sanitation (Table 8).[49]

Table 8 Rural Water Supply and Sanitation Required Investments (Infrastructure Only) by 2015

Description	2008 (million)	2015 (million)	Target Population (million)	Average Cost per Capita ($)	Total Investment ($ million)
Infrastructure					
Rural population	10.774	11.963			
Population with access to improved water	5.969	5.982	0.013	16	0.21
Population with access to improved sanitation	2.112	3.589	1.477	25	36.93
Subtotal Infrastructure Only					37.14

Sources: Royal Government of Cambodia, Ministry of Planning. 2008. *General Population Census of Cambodia.* Phnom Penh; and Ministry of Rural Development. 2009. *Update of the 2005 Rural Water Supply and Sanitation Sector Investment Plan for Preparation of the Second Rural Water Supply and Sanitation Sector Project.* Phnom Penh.

65. Approximately $49.6 million is committed for investment in rural water supply and sanitation (including infrastructure, capacity development, and administration and management) for 2008–2015 (Table 9).

66. These estimates differ from those of the Sector Investment Strategy for Urban and Rural Water Supply and Sanitation (2010–2028), which was prepared with support by the Water and Sanitation Program (WSP). The draft investment strategy indicates that the estimated investment needs to 2028 are

[49] The assumption of $125 per household latrine is on the high side in light of recent efforts in sanitation marketing to develop lower cost pour flush latrines.

Table 9 Rural Water Supply and Sanitation Investments (Committed and Planned), 2008–2015

Project	Agencies	Amount ($ million)	Period
13 Provinces Rural Water Supply and Sanitation Project	MRD, IMF	18.00	2008–2011
Tonle Sap Rural Water Supply and Sanitation Sector Project	MRD, ADB	6.00	2008–2010
Second Rural Water Supply and Sanitation Sector Project	MRD, ADB	25.58	2010–2015
Total Investment		49.58	

ADB = Asian Development Bank, IMF = International Monetary Fund, MRD = Ministry of Rural Development.

Note: The amount for the Tonle Sap Rural Water Supply and Sanitation Sector Project excludes investment made before 2008.

Sources: ADB. 2005. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Kingdom of Cambodia for the Tonle Sap Rural Water Supply and Sanitation Sector Project.* Manila; and Ministry of Rural Development. 2009. *Update of the 2005 Rural Water Supply and Sanitation Sector Investment Plan for Preparation of the Second Rural Water Supply and Sanitation Sector Project.* Phnom Penh.

$19 billion. The study identified financing gaps, development scenarios to reduce financing requirements, and funding sources.

67. **Deconcentration and decentralization.** Cambodia has an evolving process of deconcentration and decentralization of administrative responsibilities for planning, implementing, and financing infrastructure. In April 2008, the Organic Law[50] was passed, giving legal responsibility to provinces, districts, and commune councils to administer their affairs including development plans. This implies a stronger role in the oversight and evaluation of projects. In particular, the functions of three statutory commune-level committees—the Technical, Procurement, and Women's and Children's committees—established under the Organic Law provide for project planning, management, and implementation in the future. Every year, commune councils plan and formulate their needs and submit them to donors in the form of a district workshop or implement them with the commune funds provided by the government through the Commune or *Sangkat* Fund which provides every commune council with about $15,000 per annum for development projects. Although the analyses of commune plans show that water supply and sanitation receives less consideration than other infrastructure such as roads and irrigation, all commune councils report on the number of water supply and sanitation facilities in the commune through the annual commune database questionnaire implemented by the Ministry of Interior. Rationalization of the commune database as a planning tool for MRD reporting will be an important role for commune councils.

68. **National Drinking Water Quality Standards.** The national drinking water quality standards issued by the Ministry of Health in 2004 are generally in line with those promoted by the World Health Organization (WHO) and are well known by all water supply operatives. These standards include 12 parameters.[51] They have been adopted by the MIME and are used in its role as regulator of the Phnom Penh Water Supply Authority (PPWSA) and other water supply authorities (WSAs). The PPWSA self-monitors water quality for 200 parameters.

69. **Pollution Control.** The subdecree on pollution control states the role and responsibilities of the Ministry of Environment, and its provincial-level Department of Environment, in monitoring and regulating wastewater and septic sludge transport and discharge.

[50] The Organic Law, 2008—Royal Kram No. NS/RKM/0508/017.

[51] The twelve parameters are: pH, color, turbidity, manganese, zinc, iron, copper, chlorides, arsenic, lead, selenium, and cyanide.

B. Other Development Partner Support

70. ADB, the World Bank, and a few bilateral aid agencies (notably France and Japan) have supported the PPWSA and other WSAs in the larger provincial towns (Appendix 2). ADB provided three loans to the PPWSA between 1997 and 2001, followed by a loan to the government to finance water supply rehabilitation and extension works in six provincial towns (Battambang, Kampong Cham, Kampong Thom, Kampot, Pursat, and Svay Rieng) and construction of a central wastewater treatment system in Preah Sihanouk.[52] Another central wastewater treatment system was recently completed in Siem Reap under the Greater Mekong Subregion (GMS) Mekong Tourism Development Project,[53] financed by ADB. Apart from the major projects listed in Appendix 2, there have been a significant number of programs, many of which are associated with the major projects. These programs have provided assistance in the development of the policies and strategy framework.

71. A number of development partners provide external assistance to the water supply of small towns. Significant among the current projects is the MIREP program[54] which has been operating in small towns in Cambodia since 1999. The MIREP program is promoting public–private partnerships for the development, construction, and management of small towns' water supplies. The program is supported by Syndicat des Eaux d'Ile de France (SEDIF) a major water utility in France and managed by the Research and Technology Exchange Group (GRET), an organization experienced in the development of small-scale piped water systems with private sector participation.[55] GRET, in association with Bremen Overseas Research and Development Association, is soon to embark on a pilot project to collect, pump, and centrally treat effluent from septic tanks using a small-bore sewerage and small treatment systems developed by the Bremen Overseas Research and Development Association. The United States Agency for International Development (USAID) is supporting small water supply and sanitation enterprises through its Micro, Small and Medium Enterprise Project. An evaluation of the program was completed in 2010.[56]

72. The United Nations Human Settlements Programme (UN-HABITAT) has a three-part water and sanitation initiative program. Training is provided at seven schools on health and hygiene issues, water conservation, and good sanitation practice. They have provided 700 household toilets at a commune in Kandal Province, with related user education on sanitation and hygiene and household solid waste and dumping practices. UN-HABITAT has also extended a water pipe to serve part of Kampot town. A new water supply and sanitation program has been signed with the MRD and the MIME in Siem Reap, Kampong Cham, Kampong Thom, and Pursat provinces.

73. WHO, the WSP, the United Nations Children's Fund (UNICEF), and nongovernment organizations have also played a significant role in peri-urban and rural water supply and sanitation activities. ADB has been engaged in the rural water supply and sanitation sector since the Tonle Sap

[52] Works included reticulation system, trunk sewers, and wastewater stabilization pond system with capacity of 5,700 cubic meters per day.

[53] ADB. 2002. *Report and Recommendation of the President to the Board of Directors on Proposed Loans to the Kingdom of Cambodia, Lao People's Democratic Republic, and Socialist Republic of Viet Nam for the Greater Mekong Subregion: Mekong Tourism Development Project.* Manila.

[54] MIREP (Mini Réseau d'Eau Potable) is a French acronym that stands for small-scale water supply system.

[55] Typically, the schemes supported by MIREP serve communities in the range of 500–1,000 households. SEDIF provides technical assistance for most aspects of water supply system establishment but the financing of the capital cost of the system is the responsibility of a private investor, consortium, or cooperative. SEDIF cost inputs are financed by a levy on French water consumers of 0.10 euros per cubic meter. This is an interesting concept of cross scheme subsidization between consumers in France and consumers in small schemes in Cambodia.

[56] J. P. Mahé. 2010. *Building Water Utilities with Local Private Entrepreneurs: The Example of the MIREP Program in Cambodia 2000–2010.* Phnom Penh.

Rural Water Supply and Sanitation Sector Project, but has also engaged in the sector through its rural development projects. The project operated in five provinces around the Tonle Sap basin (Battambang, Kampong Chhnang, Pursat, Siem Reap, and Kampong Thom) and closed in June 2010. The second ADB grant-funded sector project, the Second Rural Water Supply and Sanitation Sector Project, works in the same five provinces and includes an additional province—Banteay Meanchey. The MRD is implementing a project funded by the International Monetary Fund's Multilateral Debt Reduction Initiative in 13 provinces roughly based on the original design and procedures of ADB's Tonle Sap Rural Water Supply and Sanitation Sector Project. UNICEF is supporting community-led total sanitation, which is a demand-triggering approach designed to promote basic household sanitation facilities, then progressively investing in upgrading these facilities with the long-term goal of the household having its own improved facility. Other agencies, such as International Development Enterprises (IDE), the USAID-supported Water, Sanitation, and Hygiene Enterprise Development (WaterSHED), Lien Aid, the World Toilet Organization, and the WSP are supporting initiatives in sanitation marketing. External assistance for rural water supply and sanitation is listed in Appendix 3.

C. ADB's Sector Support Program and Experience

74. **ADB's current program.** ADB's assistance to the urban water supply and sanitation sector in Cambodia started in 1993 when ADB approved a small-scale technical assistance (TA) project to assess the needs of the water supply and sanitation subsectors.[57] The TA project's recommendations led to assistance for an urban water supply and sanitation project, and subsequently, the preparation of the Phnom Penh Water Supply and Drainage Project.[58] At the same time, ADB provided TA for the Urban Development Strategy Study.[59] To improve the institutional capacity of the Department of Potable Water Supply under the MIME, ADB approved a TA project[60] to provide essential training on technical, financial, and management skills necessary to operate a water supply utility. The TA project also helped the Department of Potable Water Supply develop a database on provincial waterworks covering physical and financial assets as well as human resources. In 1996, ADB approved TA for preparing an integrated urban development project[61] that eventually led to the approval of the Provincial Towns Improvement Project,[62] under which water supply works were constructed and rehabilitated in the provinces of Battambang, Kampot, Kampong Cham, Kampong Thom, Pursat, and Svay Rieng; and a centralized wastewater treatment plant constructed in Preah Sihanouk. A second wastewater treatment plant was constructed in Siem Reap Province through the GMS Mekong Tourism Development Project, which was completed in 2010.

75. Since 2005, ADB has supported rural water supply and sanitation through the Tonle Sap Rural Water and Sanitation Sector Project (completed) and the Second Rural Water Supply and Sanitation Sector Project (ongoing). It has also supported the Government of Cambodia through a number of project preparation technical assistance projects, and smaller sector studies such as the Feasibility of Sanitation-Linked Biogas Options in Rural Cambodia (completed) and the Sanitation Microfinance pilot demonstration activity (ongoing).

[57] ADB. 1995. *Water Supply and Sanitation Sector Needs Assessment Study.* Manila (TA 2031-CAM).

[58] ADB. 1996. *Phnom Penh Water Supply and Drainage Project.* Manila. (Loan 1468-CAM [SF]).

[59] ADB. 1995. *Technical Assistance to the Kingdom of Cambodia for the Urban Development Strategy Study.* Manila. (TA 2281-CAM).

[60] ADB. 1996. *Institutional Support to the Water Supply Subsector.* Manila. (TA 2669-CAM).

[61] ADB. 1996. *Technical Assistance to the Kingdom of Cambodia for the Integrated Urban Development Project.* Manila. (TA 2689-CAM).

[62] ADB. 1999. *Report and Recommendation of the President to the Board of Directors for a Proposed Loan to the Kingdom of Cambodia for the Provincial Towns Improvement Project.* Manila (Loan 1725/2013).

76. The Water Supply and Sanitation Sector Road Map, which was annexed to the Country Operations Business Plan[63] for Cambodia, focused primarily on rural water supply and sanitation. It listed the following lessons for the water supply and sanitation sector:

i. It is necessary to encourage private sector cooperation in the management of piped water supplies.
ii. An integrated approach to water, sanitation, and hygiene education is necessary in rural water supply and sanitation projects.
iii. ADB catalyzes the government decentralization and deconcentration process by communes that plan and manage water supply and sanitation facilities.
iv. Successful operation of urban water supplies is possible when the MIME provides leadership, and utilities are able to provide incentives to their staff.
v. Generally, few local government organizations place a high priority on sanitation and drainage activities.
vi. Development of the water supply and sanitation sector is limited by a lack of qualified and skilled professional staff, especially in the more remote provinces.

77. Although decentralization and more autonomy of the WSAs has been a focus of ADB's early involvement in the urban water supply sector, little has been achieved. The evaluation report of the Provincial Towns Improvement Project[64] concludes that institutional restructuring requires government support and participation. The recommendations on the legal and institutional reforms required for decentralized urban development and management were never implemented, since they encountered resistance from the government, and the project did not include any triggers or incentives to encourage their implementation.

78. The same evaluation report concluded that the cost recovery mechanisms of wastewater services should be reviewed. Revenue mobilization approaches should focus on formulating the benefits, identifying the beneficiaries, developing the charging mechanism, and implementing a comprehensive connection program.

79. Probably the most comprehensive set of lessons on rural water supply and sanitation are those from the Tonle Sap Rural Water Supply and Sanitation Sector Project. These lessons fall into five broad categories: (i) community mobilization and behavior change, (ii) contract supervision, (iii) water supply improvements, (iv) sanitation improvements, and (v) human resources/capacity. These lessons were incorporated into the design of the Second Rural Water Supply and Sanitation Sector Project.

[63] ADB. 2008. *Country Operations Business Plan: Cambodia, 2008–2010.* Manila.

[64] ADB. 2008. *Completion Report: Provincial Towns Improvement Project in Cambodia.* Manila.

III ADB's Sector Experience and Assistance Program

80. Based on ADB's experience in the sector thus far, the main lessons may be summarized as follows:

i. It is necessary to encourage private sector cooperation in the management of piped water supplies.
ii. An integrated approach to water, sanitation, and hygiene education is necessary in water supply and sanitation projects.
iii. The development of the water supply and sanitation sector is limited by a lack of qualified and skilled professional staff, especially in the more remote provinces.

The sector results framework in Appendix 5 looks at ADB's planned and ongoing sector operations in comparison with country sector outcomes and outputs.

A. ADB's Strategy in the Sector

81. The previous ADB country strategy and program (CSP)[65] for Cambodia presented ADB's overarching goal for Cambodia as sustainable poverty reduction. To achieve this, the CSP focused on three strategic pillars: (i) broad based economic growth, (ii) inclusive social development, and (iii) improved public service delivery.

82. An August 2007 midterm review of the CSP concluded that its strategic thrust to address sustainable poverty reduction remained appropriately targeted but the first strategic pillar was restated as broad-based, private sector–led growth. The CSP considered rural water supply and sanitation facilities to be one of the means by which economic growth and inclusive social development could be achieved. Further, the previous CSP considered the stimulation and facilitation of private sector investment as essential for increasing the coverage of facilities, while hygiene education was a precondition for the improvement of public health.

83. The ADB targets were compatible with and supportive of the government's strategy and commitments in the sector. The CSP supported the government focus on deconcentration and decentralization which brings about the progressive devolution of project responsibilities to subnational levels. As a signatory of the Paris Declaration on Aid Effectiveness,[66] ADB also supports the transfer of ownership from project specific project management offices or units, to routine government agencies.[67] In supporting the principles of devolution, decentralization, and transfer of ownership, the CSP recognized the need for significant levels of capacity building necessary to support sustainable change.

[65] ADB. 2005. *Country Strategy and Program: Cambodia, 2005–2009.* Manila.

[66] ADB and the Government of Cambodia are signatories of the 2005 Paris Declaration for Aid Effectiveness.

[67] Indicator 6 of the Paris Declaration is the reduction in numbers of parallel project implementation units to two-thirds of the 2005 number, by 2010.

84. The Water Supply and Sanitation Sector Road Map, annexed to the country operations business plan[68] describes the ongoing ADB targets for the sector as

i. catalyzing donor confidence by the initiation of effective risk management through a proposed public financial management program involving the MRD;
ii. making medium-term operational commitments and mobilizing additional donor funding in water supply and sanitation sector rural infrastructure based on a sector-wide strategy;
iii. developing a rural water supply and sanitation strategy[69] based on the analytical and sector commitment of other donors, and the 2007 commitment of the government for a future joint monitoring indicator on water supply and sanitation; and
iv. heavily supporting community mobilization efforts on the linkage between safe water and sanitation and health by means of rural water supply and sanitation monitoring.

85. ADB's long-term strategic framework for 2008–2020[70] (Strategy 2020) recognizes that the lack of effective infrastructure is undermining the well-being of rural communities and acknowledges the need to continue to invest in rural infrastructure. Strategy 2020 also supports the principles of the Paris Declaration on Aid Effectiveness and commits ADB to meeting the declaration's 2010 targets. Strategy 2020 commits ADB to assisting with the unavoidable impacts of climate change by "climate proofing" projects and supporting carbon sequestration as part of the global contribution to the offset of greenhouse gas emissions. ADB's results framework helps it monitor and report on its effectiveness in line with four key measures: (i) Asia and Pacific outcomes (e.g., Millennium Development Goals); (ii) contribution to country outcomes through its key areas of focus, including water supply; (iii) operational effectiveness; and (iv) organizational effectiveness.

86. All activities in the water supply and sanitation sector will support Water for All, ADB's water policy,[71] which advocates a participatory approach to help conserve and protect water resources and foster integrated water resource management. Sectoral support will also address ADB's focus on poverty reduction enunciated in its enhanced Poverty Reduction Strategy.[72] This takes into account the United Nations General Assembly decision on 28 July 2010 recognizing that safe and clean drinking water and sanitation is a human right.[73] As part of Strategy 2020, ADB is refocusing its efforts in its core areas of specialization, including the environment and climate change.

87. **Alignment of the Government of Cambodia's and ADB's strategy and plans.** The ADB targets are compatible with and supportive of the government's strategy and commitments for the sector. The National Strategic Development Plan Update (2009–2013), in addition to the sector strategies, also outlines the importance of water supply and sanitation in rural and urban areas. It also emphasizes the importance of rehabilitation and repair and highlights key challenges where improvement is necessary. Further, it emphasizes the importance of water supply and solid (and liquid) waste management as the types of physical infrastructure necessary for the development of the tourism sector.

[68] ADB. 2008. *Country Operations Business Plan: Cambodia, 2008–2010.* Manila.

[69] The Ministry of Rural Development completed the national water, sanitation, and hygiene sector strategy in 2011. This work is supported by ADB, UNICEF, and other development partners.

[70] ADB. 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank, 2008–2020.* Manila.

[71] ADB. 2003. *Water for All: The Water Policy of the Asian Development Bank.* Manila (adopted in 2001).

[72] ADB. 2004. *Enhancing the Fight against Poverty in Asia and the Pacific: The Poverty Reduction Strategy of the Asian Development Bank.* Manila.

[73] It is important to note that this decision does not imply that water should be free, nor does it counter support for privatization.

88. **Current ADB assistance.** ADB support for rural water supply and sanitation includes the Tonle Sap Rural Water Supply and Sanitation Sector Project (2006–2010)[74] and the Second Rural Water Supply and Sanitation Sector Project (2009–2015). These projects focus on expanding access to rural water supply and sanitation in six provinces in the Tonle Sap Basin. ADB has been assisting the urban water supply and sanitation sector since 1993. It supported the Phnom Penh Water Supply Authority (PPWSA) with capacity building and investment in 1996. Since then, it has supported a number of additional projects, including the Provincial Towns Improvement Project, which constructed and rehabilitated water supply works in six provinces in the Tonle Sap Basin and a centralized wastewater treatment plant in Preah Sihanouk Province, and the Greater Mekong Subregion (GMS) Mekong Tourism Development Project that financed the construction of a wastewater treatment plant in Siem Reap Province. Other support includes completed regional project preparatory technical assistance (PPTA) for water supply and sanitation along the GMS economic corridors (2010), and ongoing PPTA for the GMS Corridor Towns Development Project. ADB is also facilitating water operators' partnerships within the region through a regional TA project approved in 2007[75] and a Phase II TA project approved in 2011.[76] The latest partnership includes one between the PPWSA and the Nam Papa Lao Vientiane (or Vientiane Capital water utility), and discussions are ongoing regarding a domestic twinning arrangement in Cambodia between the PPWSA and a few selected public water supply authorities (WSAs).

B. ADB's Future Direction

89. ADB has established clear leadership in assisting the development of the rural water supply and sanitation subsector and is now implementing a second sector project. As part of the new strategy, the government has defined new coverage targets for 2025. ADB's support needs to continue with a focus on (i) infrastructure financing to achieve these targets, (ii) sanitation subsidy schemes for the poor rural population, and (iii) strengthening the capacity of local agencies and communities in line with the deconcentration and decentralization process.

90. ADB has been absent from the urban water supply subsector since the closing of the Provincial Towns Improvement Project in 2008. An initial attempt at a slow return to this subsector was made through a regional water supply and sanitation project.[77] Considering the huge investment needs and the expectations of the national and local governments, ADB will conduct its due diligence in an attempt to return to this subsector.

91. Specific assistance in the urban water supply subsector may include (i) support to the MIME in developing action and investment plans based on the national strategy; (ii) decentralizing water supply tasks and capacity strengthening of WSAs, in collaboration with the PPWSA; (iii) a domestic twinning program to strengthen provincial WSAs through peer-to-peer knowledge exchange with the PPWSA; and (iv) investment financing, including cooperation with local private sector companies to finance water supply infrastructure. This proposed move into the urban water supply subsector will, however, need to be considered further, as some development partners have been historically more active in the sector. For instance, the World Bank is currently undertaking a sector review, covering both urban and rural water supply and sanitation. At the request of the government, ADB commissioned a rapid review of the regulatory framework for improved service delivery of urban water supply services, including private sector involvement. The results of this ADB study are expected by early 2012.

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[74] The project provided about 480,000 people with improved water and 214,000 with improved sanitation (household latrines).

[75] ADB. 2007. *Supporting Water Operators' Partnership in Asia.* Manila (TA 6396-REG).

[76] ADB. 2011. *Supporting Water Operators' Partnerships in Asia and the Pacific.* Manila (TA 7920-REG).

[77] An ADB regional technical assistance prepared a feasibility study for water supply and sanitation for provincial towns in Kratie and Stung Treng provinces (TA 6486-REG).

92. ADB has financed two wastewater treatment plants and has not been involved in the development of the urban wastewater management subsector. However, through the GMS Corridor Towns Development Project, ADB is reengaging in consultations with the government to determine the need and scope for future ADB involvement, and hence contributing to the government's interest in addressing environmental degradation and possibly climate change issues. This can be done under the urban focus, in combination with interventions in waste management and urban drainage and flood control.

93. Specific assistance in the urban wastewater subsector may focus on (i) support to the Ministry of Public Works and Transport and the Ministry of Environment to develop wastewater management policies, and action and investment plans, including studies on institutional strengthening, revenue mobilization and management, and regulation of dumping of septic waste and sewage at controlled land fill sites; and (ii) financing urban sanitation infrastructure.

94. **Future ADB interventions.** ADB should continue its involvement in rural water supply and sanitation given that (i) it is a lead agency in the sector; (ii) investment and capacity development assistance is required to help the government meet sector and Cambodian Millennium Development Goal targets; and (iii) more than 80% of the population is rural, with more than 35% of households below the poverty line. ADB's support to the sector has directly benefited women's health and reduced women's work and time burdens of collecting water. The proposed pipeline reflects this continued engagement, with a PPTA for the Rural Water Supply and Sanitation Project (Phase 3) proposed in 2012 and an ensuing loan in 2013.

95. Further, it is proposed that ADB review the possibility of a holistic approach to water supply and wastewater management, keeping in mind that responsibility for these two sectors falls between two line ministries (the Ministry of Industry, Mines and Energy and the Ministry of Public Works and Transport). Such a review will be part of the institutional analysis for the PPTA for the GMS Corridor Towns Development Project and the proposed PPTA for Sustainable Urban Development in the Tonle Sap. Additional rapid assessments, such as the one on the regulatory framework in urban water supply, will help shed light on the current institutional and regulatory situation and future needs.

96. By supporting water operator partnerships and Southeast Asian water utilities networks (together with other partners such as the International Water Association), ADB will continue to support regional partnerships; and will explore support to domestic partnerships where lead or champion agencies (e.g., the PPWSA) can collaborate with provincial WSAs in improving urban water supply delivery. In addition, partnership with Cities Development Initiatives for Asia, a consortium of partners such as ADB, the Swedish International Development Agency, and German development cooperation through GIZ, will continue to explore the possibility of conducting prefeasibility studies prior to project preparation.

Appendix 1
Improved Water Supply and Sanitation Facilities: Definitions for Use in National Surveys

1. Originally, Millennium Development Goals for water were expressed in terms of "safe" water. In 2002 "safe water" was changed to "improved water." Definitions for improved water and sanitation facilities have been prepared.[1]

A. Water Supply Definitions

2. For Cambodia, access to water supply services is defined as the availability of an improved water source within 150 meters of the user's dwelling. An "improved" water source is one that is more likely to provide "safe" water, such as a household connection or a borehole. Current information does not allow for links between access to safe water and access to an improved source, and the two should not be confused or used interchangeably.

3. The various technical options for sanitation and water supply have been classified as improved or unimproved (Table A1). These are based on the definitions of the United Nations Children's Fund (UNICEF) and World Health Organization Joint Monitoring Programme (JMP). For Cambodia, the water supply sources shown in Table A1 are linked to water supply technologies. These are based on the definitions of the JMP.[2]

B. Sanitation Definitions

4. Access to "improved" sanitation exists where one of the following options is available at the user dwelling:

- flush or pour–flush toilet connected to sewer, septic tank, or pit;
- pit latrine with slab; or
- ventilated improved pit latrine.

[1] Recommendations to the Joint Monitoring Programme prepared by the Ministry of Rural Development with the support of development partners. June 2008.

[2] Earlier discussion had indicated that an "improved" water source would provide the household with 20 liters of water per capita per day and that a point source should serve no more than 25 households.

Table A1 Improved and Unimproved Water Sources in Cambodia

Improved Water Source[a]	Remarks
Household connection	From piped water supply
Public standpipe	
Tube well or borehole	
Protected dug well	A "protected" well has all of the following: • lining, • headwall, • platform, and • cover
Improved rainwater collection	An "improved" rainwater tank will have all of the following: • completely closed, • tap to withdraw water, and • at least 3,000 liters capacity.
Pond connected to water filter	Fenced pond connected to a filtration system[b]
Unimproved Water Source	**Remarks**
Unprotected dug well	
Open pond, river, or stream	
Unimproved rainwater collection	
Vendor-provided water	These are considered unimproved sources because of cost and effort involved to deliver water to the home.
Bottled water	
Water provided from a tanker	

[a] The parameters do not mention a protected spring source.

[b] This has been included in the Ministry of Rural Development's Rural Water Supply, Sanitation and Hygiene Strategy, 2011.

Sources: Royal Government of Cambodia, Ministry of Rural Development. 2011. *Rural Water Supply, Sanitation and Hygiene Sector Strategy*; and UNICEF and WHO Joint Monitoring Programme. 2008. *Progress on Drinking-Water and Sanitation: Special Focus on Sanitation.* New York.

5. Unimproved sanitation facilities includes:

- public or shared toilet (of any type);
- flush or pour–flush toilet not connected to sewer, septic tank, or pit;
- open pit latrine without slab;
- latrine over water resource (river, pond, canal, sea, etc.); and
- no facilities.

Appendix 2
External Assistance for Urban Water Supply and Sanitation

Name of Project	Term of Project	Focus	Estimated Cost (million)	Source	Loan or Grant
Improvement of Distribution Network	1992–1993	Replacement of water distribution system in Sangkat Sras Chak, Daun Penh district	$1.63	French Protocol	Grant
Improvement of Water Supply Facilities in Phnom Penh	1993–1994	Rehabilitation of filter system in Phum Prek Water Treatment Plant	$3.26	French Protocol	Grant
Technical Assistance for the Rehabilitation of Water Utilities of Phnom Penh and Preah Sihanouk	1993–1995	Strengthen the managerial and operational capacities of the water utilities of the cities of Phnom Penh and Preah Sihanouk	$4.11	UNDP/ World Bank	Grant
Project for the Improvement of Water Supply Facilities in Phnom Penh Phase I (Stages I and II)	1994–1996	Extension of transmission pumps and distribution pumps, installation of transmission pipelines, and improvement of existing elevated tank	$25.00	JICA	Grant
Improvement of Water Supply Facilities in Phnom Penh	1995–1996	Extension of 10,000 m^3/day in Chamcar Morn Water Treatment Plant	$5.30	French Protocol	Grant
Improvement of Distribution Network	1995–1996	Replacement of water distribution system in Don Penh District	$4.90	World Bank and French Protocol	Loan and Grant
Improvement of Water Supply Facilities in Phnom Penh	1996–1997	Rehabilitation of existing Chamcar Mon Water Treatment Plant 10,000 m^3/day	$1.71	French Protocol	Grant
Project for the Improvement of the Water Supply Facilities in Phnom Penh (Phase II)	1997–1999	Rehabilitation of water distribution network in Seventh January District and part of Toul Kork District	$21.33	JICA	Grant

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Table *Continued*

Name of Project	Term of Project	Focus	Estimated Cost (million)	Source	Loan or Grant
Phnom Penh Water Supply and Drainage Project. Part A—Water Supply	1997–1999	Replacement of water distribution system in Chamcar Morn District	$2.27	ADB	Loan
Phnom Penh Water Supply and Drainage Project. Part A—Water Supply	1997–1999	Supply of institutional supporting equipment (vehicles and machinery for pipe-laying team) and official equipment (computer, printer, etc.)	$0.44	ADB	Loan
Phnom Penh Water Supply and Drainage Project. Part A—Water Supply	1997–2001	Design and supervision of water transmission pipeline in the city of Phnom Penh (600–1,600 mm, 15 kilometers)	$1.07	ADB	Loan
Phnom Penh Water Supply and Drainage Project. Part A—Water Supply	1999–2001	Supply, delivery, and installation of water transmission pipelines in the city of Phnom Penh (600 mm to 15 kilometers)	$12.20	ADB	Loan
Cambodia Urban Water Supply Project	1998–2001	Replacement of water distribution system in Toul Kork District	$2.82	World Bank	Loan
Cambodia Urban Water Supply Project	1998–2001	Construction supervision consultant for the rehabilitation and extension of Chrouy Chang War Water Treatment Plant	$1.18	World Bank	Loan
Cambodia Urban Water Supply Project	1998–2001	Rehabilitation and extension of the Chruoy Chang War Water Treatment Plant (65,000 m^3/day)	$11.10	World Bank	Loan
Cambodia Urban Water Supply Project	1998–2002	Technical assistance to improve operational (water loss control, training) and financial (accounting software expert) performance	$1.06	World Bank	Loan
Cambodia Urban Water Supply Project	1998–2002	Supply of leakage detection, training equipment, computer for accounting system equipment	$0.63	World Bank	Loan
Cambodia Urban Water Supply Project	1998–2002	Pilot program for financing domestic connections to the poor family as revolving fund	$0.26	World Bank	Loan

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Table *Continued*

Name of Project	Term of Project	Focus	Estimated Cost (million)	Source	Loan or Grant
Cambodia Urban Water Supply Project	1998–2002	Training to the Phnom Penh Water Supply Authority	$0.38	World Bank	Loan
Cambodia Urban Water Supply Project	2000–2001	Replacement of additional distribution system in Phnom Penh City	$1.30	World Bank	Loan
Cambodia Urban Water Supply Project	2001–2003	Extension of distribution system to suburban area	$4.70	World Bank	Loan
Cambodia Urban Water Supply Project	2003–2008	Not available	$4.69	World Bank	Loan
Extension of Phnom Penh Suburb Water Supply System	2003–2008	Extension of Phnom Penh Suburb Water Supply System	€4.00	AFD	Grant
Extension of Phnom Penh Suburb Water Supply	2007–2009	Extension of Chroy Changva Water Treatment Plant (Phase II) for supporting equipment and contract supervision	€11.10	AFD	Loan
Name not available	2007–2010	Clean Water for All Project (household connection)	€0.15	France	Grant
Extension of Phnom Penh Suburb Water Supply System	2009 (4 months)	Feasibility study of the south branch of Phnom Penh transmission main	$0.10	AFD	Grant
Nirot Water Supply Project	2009–2013	Raw intake station and raw water transmission mains	€16.00	AFD	Loan
Nirot Water Supply Project	2009–2014	Nirot contract works	€23.77	JICA	Loan

… = data not available, € = euro, ADB = Asian Development Bank, AFD = Agence Française de Développement, IDA = International Development Association, JICA = Japan International Cooperation Agency, m^3 = cubic meter, mm = millimeter, UNDP = United Nations Development Programme.

Note: The above list is not exhaustive. It includes large projects and key assistance for sector policy development. It does not cover all sector studies and rapid assessments.

Source: Staff consultants report, 2010.

Appendix 3
External Assistance for Rural Water Supply and Sanitation

Project Title	Duration	Funding	Objective	Amount ($ million)	Area of Operation
Seila Program	1996–2007	Bilateral development partners, IFAD, NGOs, PLG, UNDP, World Bank	To achieve economic development through demand-driven investments, including institutional capacity building and decentralization, effective delivery of services and infrastructure for local development, and an enhanced policy and regulatory environment	5.6 in 2006	Nationwide
Agricultural Development Support to Seila	2000–2006	AusAID, IFAD, UNDP	To increase food and income security through a more diversified pattern of crop and livestock production and better access to credit services, leading to capital formation at household and local levels	10.4	Banteay Meanchey, Battambang, Pursat, Siem Reap
Community-Based Rural Development Project	2001–2007	IFAD, World Bank	Various interventions, including improved access to water supply and sanitation through wells, water use, and hygiene education	2.2	
Rural Infrastructure Development	2001–2008	IFAD	To provide water management infrastructure and promote establishment of the institutional and community capacity to manage irrigation and drainage systems and infrastructure	4.0	Kampong Thom
Northwest Rural Development	2002–2007	ADB	To reduce poverty through accelerated rural development	35.3	Battambang, Banteay Meanchey, Oddar Meanchey, Siem Reap

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Table *Continued*

Project Title	Duration	Funding	Objective	Amount ($ million)	Area of Operation
Tonle Sap Environmental Management	2005–2008	ADB, GEF, UNDP	To develop the capacity for natural resources management coordination and planning, community-based natural resources management, and biodiversity conservation in the Tonle Sap Biosphere Reserve	18.7	Tonle Sap Basin provinces
Master Plan of Water Resources Development in Cambodia	2006–2008	KOICA	To establish a master plan and action plan for water resources development, conduct feasibility studies, and improve human resources capacity for water resources development	1.5	Nationwide
Water Resources Sector Project	2007	ADB, AFD	Project preparatory technical assistance to (i) design an irrigation investment project in the Northwestern provinces, based on comprehensive river basin studies; (ii) provide capacity building assistance to MOWRAM; and (iii) establish a Tonle Sap Basin Management Organization	1.3 (anticipated follow-up loan for irrigation of ~20.0)	Tonle Sap basin
Tonle Sap Sustainable Livelihoods Project	2005–2010	ADB	To improve livelihoods by reducing poverty and conserving biodiversity in the project area	15.0	Five provinces surrounding the Tonle Sap Basin
Tonle Sap Rural Water Supply and Sanitation Sector Project	2006–2010	ADB	To provide sustained access to improved water and sanitation, and better hygiene to all communities and their members, including the poorest	18.0	Battambang, Pursat, Siem Reap, Kampong Chhnang, Kampong Thom
Economic and Social Relaunch of the Northwest Provinces	2006–2010	European Union	To reduce poverty by intensifying and diversifying agricultural, livestock, and fisheries production; creating jobs; empowering communities; improving access to social amenities, markets, water, and credit; and providing access to land and social infrastructure	~37 (€26 million)	Banteay Meanchey, Battambang, Siem Reap
MRD Rural Development Policy and Strategy	2007–2009	KOICA	To formulate government policy and strategy for rural development	…	Nationwide
Enhancement to Commune- and Village-Level Organizations	2007–2010	ADB	Capacity development for commune councils, women and children's affairs committees, and village development committees	1.5	Provinces in the Tonle Sap Basin

continued on next page

Table *Continued*

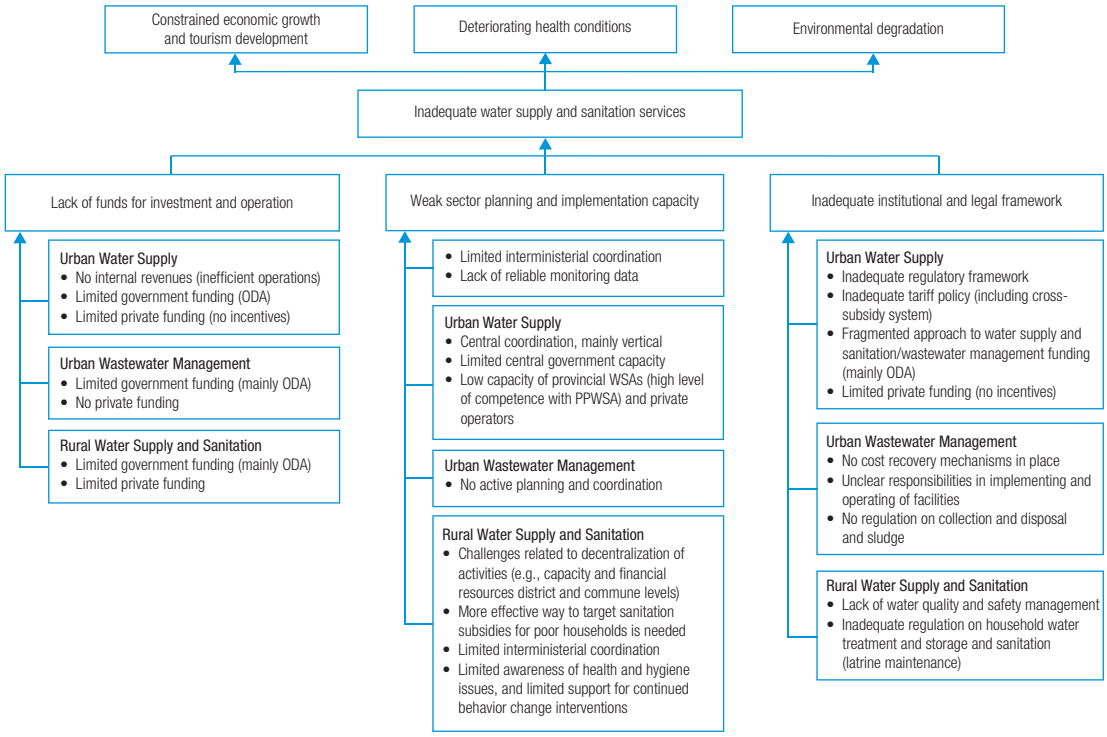
Project Title	Duration	Funding	Objective	Amount ($ million)	Area of Operation
Sector Investment Strategy for Urban and Rural Water Supply and Sanitation	2009	WSP	To prepare a sector investment strategy for urban and rural water supply and sanitation for 2010–2028	…	Nationwide
National Rural Water Supply, Sanitation, and Hygiene Sector Strategy	2009–2011	ADB, UNICEF	To prepare a sector strategy for rural water supply and sanitation for 2010–2025	0.25	Nationwide
MRD Rural Water Supply and Sanitation Project	2009–2011	Government (IMF debt relief funds)	To increase access to improved water and sanitation in the project area	18.6	Oddar Meanchey, Preah Vihear, and eight other provinces
Enhancement to Commune- and Village-Level Organizations (JFPR 9114)	2009–present	JFPR administered by ADB	Capacity enhancement to commune councils, commune council women and children's committees and village development committees		Provinces in the Tonle Sap Basin
Second Rural Water Supply and Sanitation	2009–2014	ADB	To provide sustained access to improved water and sanitation, and better hygiene to all communities and their members, including the poorest	21.0	Battambang, Pursat, Siem Reap, Kampong Chhnang, Kampong Thom, Oddar Meanchey
Water Supply and Sanitation Review	2010–2011	World Bank	Review the water supply and sanitation sector		Nationwide

… = data not available, ADB = Asian Development Bank, AFD = Agence Française de Développement, AusAID = Australian Agency for International Development, GEF = Global Environment Facility, IFAD = International Fund for Agricultural Development, IMF = International Monetary Fund, JFPR = Japan Fund for Poverty Reduction, KOICA = Korean International Cooperation Agency, MOWRAM = Ministry of Water Resources and Meteorology, MRD = Ministry of Rural Development, NGO = nongovernment organization, PLG = Partnership for Local Governance, UNDP = United Nations Development Programme, UNICEF = United Nations Children's Fund, WSP = Water and Sanitation Program.

Note: The above list is not exhaustive. It includes large projects and key assistance for sector policy development. It does not cover all sector studies and rapid assessments.

Source: Staff consultants report, 2010.

Appendix 4
Problem Tree: Water Supply and Sanitation Sector



ODA = official development assistance, WSA = water supply authority, PPWSA = Phnom Penh Water Supply Authority.

Source: Asian Development Bank.

Appendix 5
Sector Results Framework: Water Supply and Sanitation Sector

Country Sector Outcome		Country Sector Outputs		ADB Sector Operations	
Outcomes with ADB Contributions	Indicators with Targets and Baselines[a]	Outputs with ADB Contributions	Indicators with Incremental Targets (Baselines)	Planned and Ongoing ADB Interventions	Main Outputs Expected from ADB Contributions
All Cambodians have access to safe water supply and sanitation by 2025.	**Long-term target:** By 2025, meet sector targets: • 100% of the rural population with access to safe water • 100% of rural population with improved sanitation • 100% of the urban population with access to safe water • 100% of urban population with improved sanitation **Intermediate target:** By 2015, meet MDGs: • 50% of the rural population with access to safe water • 30% of the rural population with access to improved sanitation • 80% of the urban population with access to safe water • 74% of the urban population with access to improved sanitation **Baseline (Census 2008):** • 40.5% of the rural population with access to safe water • 23.0% of the rural population with access to improved sanitation • 75.8% of the urban population with access to safe water • 81.0% of the urban population with access to improved sanitation	Improved rural water supply and sanitation services in six provinces around the Tonle Sap Urban water supply and wastewater management systems expanded and operational in urban areas	By 2015, in six provinces around Tonle Sap: • 100% of rural residents in 40 communes (400 rural villages) have access to improved water supply coverage in 40 communes (baseline: 13% in 2008); • 80% of residents in 40 communes (400 rural villages), especially women, have access to improved sanitation (baseline: 8% in 2008). • 100% of the households in targeted rural villages adopt improved hygiene practices. • Women's time in collecting water decreased by 30%. • Average distance to the nearest improved water source is reduced (baseline: average 228 meters). • Wastewater management in Preah Sihanouk and Siem Reap • Water operators' partnership development between the PPWSA and another utility in the region (domestic twinning arrangements)	**(i) Planned Key Activity Areas:** **Rural** • PPTA for the Third RWSSP ($0.8 million, 2012) **Urban** • PPTA for the Sustainable Urban Development in the Tonle Sap Basin Project ($0.7 million, 2011) **(ii) Projects in the Pipeline with Estimated Amounts:** **Rural** • Third RWSSP ($20 million, 2013/2014) **Urban** • Sustainable Urban Development in the Tonle Sap Basin ($37 million, 2012) • GMS Corridor Towns Development Project ($16.17 million [Cambodia], 2012) **Regional** • Supporting Water Operators Partnership in Asia and the Pacific, Phase II ($2 million, 2011) **(iii) Ongoing Projects with Approved Amounts:** **Rural** • Second RWSSP ($25.8 million, approved 2009, 2009–2015, Grant 0156-CAM) **Regional** • Technical assistance for Water Operators' Partnerships ($2 million, 2007, RETA 6396) • Project preparatory technical assistance for GMS Corridor Towns Development Project ($2 million, approved 2010)	**(i) Planned Key Activity Areas:** • Policy and implementation recommendations for improved wastewater management (PPTA GMS Corridor Towns Development Project and PPTA Sustainable Urban Development in the Tonle Sap) • In-country water operators' partnership agreements between the PPWSA and other provincial operators (Water Operators' Partnerships, Phase 2) **(ii) Ongoing Projects with Approved Amounts:** *Second RSSWP* • Water facilities are rehabilitated and upgraded • New water facilities are constructed • Regular water quality tests are conducted for each facility • Public and household sanitation are improved, with sanitation grants for poor households • Health and hygiene practices are improved • Sector planning and development is strengthened • Capacity for project implementation is strengthened *Technical Assistance for Water Operators' Partnerships:* • Water operators' partnership agreement between the PPWSA and the NPVL

ADB = Asian Development Bank, GMS = Greater Mekong Subregion, MDG = Millennium Development Goal, NPVL = Nam Papa Vientiane Lao, PPTA = project preparatory technical assistance, PPWSA = Phnom Penh Water Supply Authority, RETA = regional technical assistance, RWSSP = Rural Water Supply and Sanitation Sector Project.

[a] Targets are based on discussions with sector government officials government documents: Royal Government of Cambodia. 2009. *National Strategic Development Plan 2010–2013.* Phnom Penh; Royal Government of Cambodia. 2010. *Achieving Cambodia Millennium Development Goals. Update.* Phnom Penh; Royal Government of Cambodia. 2003. *National Policy on Water and Sanitation.* Phnom Penh; and Royal Government of Cambodia, Ministry of Planning. 2008. *General Population Census of Cambodia.* Phnom Penh.

Cambodia: Water Supply and Sanitation Sector Assessment, Strategy, and Road Map

Access to improved water supply, sanitation, and hygiene results in economic development and poverty reduction; ensures food safety and better livelihoods; preserves the environment; reduces health burden; improves school enrollment and retention rates, especially for girls; and empowers communities and provides opportunities for women.

The Asian Development Bank (ADB) has prepared a sector assessment, strategy, and road map for the water supply and sanitation sector in Cambodia. Aside from a current assessment, the document outlines the strategic investment priorities of ADB and the Government of Cambodia in said sector. It highlights overall sector performance, development constraints, government plans and strategy, past ADB support and experience, other development partners' support, and the strategy for future ADB support. This working document, prepared as an input to ADB's Cambodia Country Partnership Strategy 2011–2013, will be updated as the strategic program and developments of ADB and the government in the sector are refined and/or changed. It is intended to provide sector background information for ADB's investment and technical assistance operations.

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