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Myanmar

Urban Development and Water Sector Assessment, Strategy, and Road Map

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August 2013

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Currency Equivalents

(as of 1 July 2013)

Currency unit	=	kyat (MK)
MK1.00	=	\$0.001
\$1.00	=	MK973

Abbreviations

ADB	-	Asian Development Bank
ASEAN	-	Association of Southeast Asian Nations
DDA	-	Department of Development Affairs
DHSHD	-	Department of Human Settlements and Housing Development
GDP	-	gross domestic product
GMS	-	Greater Mekong Subregion
JICA	-	Japan International Cooperation Agency
MOC	-	Ministry of Construction
NGO	-	nongovernment organization
NRW	-	nonrevenue water
PRC	-	People's Republic of China
UN-HABITAT	-	United Nations Human Settlements Programme
UNICEF	-	United Nations Children's Fund

Acknowledgments

This report was prepared by a team led by Rudolf Frauendorfer, lead urban development specialist, Urban Development and Water Division (SEUW) of the Southeast Asia Department (SERD); and Florian Steinberg, senior urban development specialist (SEUW, SERD). Guidance and support was provided by Amy Leung, director of SEUW; and Richard Bolt, advisor (Office of the Director General, SERD). The team wishes to thank the Department of External Relations and Jocelyn M. Narciso, senior operations assistant (SEUW, SERD), for their support in preparing and editing the report.

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I Sector Assessment: Context and Strategic Issues

A. Introduction

1. This assessment, strategy, and road map of Myanmar's urban development and water sector reviews the current status of the sector in Myanmar, and the government's priorities for the sector. It also outlines—in a preliminary manner—possible areas for international assistance, including by the Asian Development Bank (ADB). The assessment will be periodically revised based on new information, reflecting the evolving development partnership with Myanmar.

2. Like most other development partners, ADB has not extended loan or technical assistance to Myanmar since the late 1980s. However, ADB has maintained limited involvement with the government through the Greater Mekong Subregion (GMS) Program of Economic Cooperation, 10 working groups of which have provided some information relevant to Myanmar's urban development and water sector. Regular economic monitoring missions and participation by ADB staff in the damage and needs assessment following a major cyclone in 2008 provided additional information.

3. To gain a better understanding of the urban development and water sector, ADB missions to Myanmar were undertaken in 2012. These included consultations with the government and development partners. To more fully determine the current status and needs of the urban development and water sector, a more detailed review will be required.

B. The Country Context

4. Myanmar is the largest country in mainland Southeast Asia,¹ and is strategically located as a potential land bridge between South and Southeast Asia. It shares borders with Bangladesh, the People's Republic of China (PRC), India, the Lao People's Democratic Republic, and Thailand. In addition to its strategic location, Myanmar has extensive energy and other natural resources. The emergence of Myanmar after decades of political and economic isolation, following liberalization and normalization of relations with its neighbors, will be transformational both for the country and for the region.

5. The country is divided into seven states and seven regions. The seven states—Chin, Kachin, Kayah, Kayin, Mon, Rakhine, and Shan—mainly encompass the hilly and mountainous areas and are predominantly populated by ethnic communities. The seven regions (previously called divisions)—Ayeyarwady, Bago, Magway, Mandalay, Sagaing, Tanintharyi, and Yangon—encompass the plains and are predominantly populated by people of Bamar ethnic origin.

¹ Myanmar has a land area of 676,577 square kilometers (km²). ADB. 2011. *Key Indicators for Asia and the Pacific*. Manila.

6. Myanmar's population is approximately 60 million, and is increasing at about 1.3% annually, which is one of the lowest rates in Southeast Asia.² Two-thirds of the population lives in rural areas, and these people are largely dependent on subsistence farming. Some 26% of the population lives below the poverty line, compared to 5% in the PRC and 13% in Viet Nam. Poverty is heavily concentrated in rural areas (85%), and disparities are pronounced across states. Per capita gross domestic product (GDP) is about \$850, or less than one-quarter of per capita incomes in Thailand and the PRC. Myanmar's ranking on the United Nations Human Development Index is near the bottom of the list (149 of 187 countries).³ In 2010, the mortality rate of children under 5 years of age (66 per 1,000 live births) was considerably higher than elsewhere in Southeast Asia (i.e., 13 in Thailand, 35 in Indonesia, and 54 in the Lao People's Democratic Republic).⁴ A large segment of the population is highly vulnerable to adverse weather and natural disasters and experiences transitory bouts of impoverishment.

7. The imposition of economic sanctions by many countries in the late 1980s, in response to Myanmar's suspension of democratic liberties, clearly hampered its development. During nearly 3 decades, Myanmar lost most access to international investment and assistance, including from ADB and the World Bank. Nonetheless, Myanmar was able to sustain modest economic growth of an estimated 5.5% in 2011 and 2012, and by an average of just under 5.0% during most of 2000–2010. Slow economic growth in 2008 reflected the impact of Cyclone Nargis that devastated large areas of the country.⁵

8. The economy is predominantly agriculture based, with rice being the main crop and staple food. The agriculture sector accounts for 60%–70% of total employment and 38% of GDP, down from 57% in 2001. In contrast, the share of GDP accounted for by the industry sector more than doubled during this period, to 25%. Liberalization of the economy and opening up to foreign direct investment has prompted rapid growth of the industry sector, notably exports of natural gas. A parallel increase in employment generation in the industry sector is unlikely, as the mining and energy sectors are capital-intensive rather than labor-intensive. While the agriculture, fisheries, and resource industries have considerable potential for expansion, Myanmar will need to broaden the economic base beyond primary industries. The services sector has been expanding strongly in recent years, and the opening of the economy offers great scope for tourism and related services.

9. The government that took office in March 2011 has introduced sweeping reforms, both to the political process and the economic system. Among the economic reforms, the new Land Law and Foreign Investment Law address issues fundamental to development, as does unification of the former multiple exchange rate system. The government is in the process of finalizing its 5-year National Development Plan, 2012–2016, which consists of five sections: (i) Regions and States Development Plan; (ii) Villages, Townships, and Districts Development Plan; (iii) Industrial Development Plan; (iv) Investment Plan; and (v) Financial Sector Development Plan. The government has also prepared a framework for economic and social reform to guide implementation of the National Development Plan.

10. In response to the government's reforms and development plans, especially those concerning democratic representation, economic sanctions are now being lifted or suspended. This opens the

² There has not been a census for the past 2 decades, hence the demographic estimates are only approximate.

³ United Nations Development Programme. 2011. *Human Development Report: Sustainability and Equity: A Better Future for All*. New York.

⁴ ADB, United Nations Development Programme, and United Nations Economic and Social Commission for Asia and the Pacific. 2012. *Asia-Pacific Regional Millennium Development Goal (MDG) Report 2011/12: Accelerating Equitable Achievement of the MDGs*. Bangkok.

⁵ Economic growth slipped to about 3.6% in 2008, reflecting the impact of Cyclone Nargis. Official growth figures released by the government indicate GDP growth rates in excess of 12% during 2000–2010, but this record is considered overstated. ADB. 2012. *Myanmar in Transition*. Manila; ADB. 2012. *Asian Development Outlook*. Manila; International Monetary Fund. 2012. *Article IV Consultation with Myanmar*. Washington, DC.

possibility of extensive international assistance for Myanmar, including for its urban development and water sector. For example, an urban development program for Yangon is being prepared with technical and financial support from the Japan International Cooperation Agency (JICA).

C. Overview of the Urban Development and Water Sector

11. Approximately one-third of Myanmar's population is classified as living in urban centers, comparable to Thailand (34%) but much lower than in Malaysia (72%).⁶ The official capital is Nay Pyi Taw, located midway between Myanmar's two largest cities—Yangon, with a population of about 4.6 million, and Mandalay, with a population of about 1.0 million. Large parts of Yangon and Mandalay consist of resettlement areas, reflecting the relocation and housing programs in the 1960s and early 1990s. The facts that these areas by design only have water points for every 80 households and lack proper drainage or sewerage networks illustrate the poor state of urban services.

12. The third-largest city is Mawlamyine (with a population of 500,000), after which city size rapidly falls; as of 2009, there were only 31 urban centers with populations of more than 100,000 (Appendix 2). The urban centers are largely concentrated in the low-lying regions of the central dry zone and the coastal areas. Only three sizable towns in Shan state are located in mountainous areas—Kengtone, Lashio, and Taunggyi. The northernmost town of Myitkyina (the capital of Kachin state) provides a gateway to the far north. Outside of the two main centers of Yangon and Mandalay, there is close interdependence between towns and their rural hinterlands.

13. Chronic underinvestment in urban infrastructure—including in water supply, sanitation, drainage, wastewater, and solid waste management—has resulted in seriously deficient urban services throughout Myanmar. As noted earlier, large resettlement areas in Yangon and Mandalay have urban services that are well below acceptable levels, and the situation is worse in the poor regions and states of the country.

14. Water services do not reach a large proportion of the urban population. Consumers have adapted to inadequate provision by improvising self-supply, as demonstrated by the large number of small private systems, usually involving a tube well. In rural and peri-urban areas, rainwater catchment provides a partial solution to water needs. Reliable data are limited, but it is estimated that nonrevenue water (NRW) accounts for at least 40% of Yangon's water supply, and the figure is probably higher elsewhere.

15. In contrast to the above description of water and sanitation services in Myanmar, official statistics related to its Millennium Development Goals indicate high achievement (see table). Access to "improved water" is indicated as 83% (urban 93%, rural 78%) and to sanitation as 76% (urban 83%, rural 73%).⁷ However, piped water supply systems in the main cities of Yangon and Mandalay include untreated surface water from open reservoirs, thereby falling between the Joint Monitoring Programme definitions of "improved water" and "unimproved water,"⁸ and hours of supply are highly variable. Most people in urban areas rely on untreated private water supplies, which are unlikely to meet bacteriological guidelines for drinking. An additional problem is arsenic contamination, which occurs in the groundwater of the Ayeyarwady delta and, to some extent, in surface water of the lower reaches of the Sittaung River.

⁶ ADB. 2011. *Key Indicators for Asia and the Pacific*. Manila.

⁷ United Nations Environment Programme and United Nations Children's Fund–World Health Organization. 2012. *Progress in Drinking Water and Sanitation*. Joint Monitoring Programme. New York.

⁸ Peter Gleick. 2012. *The World's Water*. Volume 7. Washington, DC: Island Press.

Achievement of Selected Millennium Development Goal Targets (%)

Year	Water Supply			Sanitation		
	Urban	Rural	Total	Urban	Rural	Total
1990	80	48	56
2000	85	60	67	79	56	62
2010	93	78	83	83	73	76

... = no data available.

Source: United Nations Environment Programme and United Nations Children's Fund–World Health Organization. 2012. *Progress in Drinking Water and Sanitation*. Joint Monitoring Programme. New York.

16. Urban areas lack proper storm water drainage networks, resulting in often-severe flooding during the monsoon season. With the exception of a limited sewage system in the old business district of Yangon, there is no systematic collection and treatment of domestic wastewater. Most households in formal residential areas have some form of septic tank, but these are not routinely serviced and treatment of the sludge is questionable. Informal settlements primarily depend on improvised latrines, and storm water drains carry untreated sewage in open channels.

17. Solid waste collection is undertaken in the major cities and towns, but the collection and disposal process involves intermediate street-corner depots, informal recycling through scavenging, and considerable manual handling. Residual waste is deposited in open dump sites. Inevitably, waste often accumulates in open drains, leading to stagnant wastewater and breeding opportunities for mosquitoes.

18. Inadequate water, drainage, and sanitation services, combined with underinvestment in preventative health care, have resulted in severe health threats at many levels. The incidence of diarrhea among children under 5 years of age is considerably higher than elsewhere in Southeast Asia, contributing to the high child mortality rate. The high prevalence of debilitating water-related vectorborne diseases—such as malaria, dengue, and Chikungunya fever—are directly related to the poor state of critical urban services.

19. Apart from grassroots private sector responses to household water provision and some other small-scale local services, private sector participation in the provision of urban infrastructure has been largely lacking. This is in contrast to many Southeast Asian countries where the private sector is an important stakeholder in, and driver of, economic activities in urban development.

20. Myanmar's urban infrastructure challenges are compounded by its vulnerability to natural disasters. In May 2008, Cyclone Nargis hit the western edge of the Ayeyarwady delta and moved east-northeast to Yangon. An estimated 140,000 people were killed and 1 million–2 million people left homeless.

21. Myanmar is considered to be the second hardest-hit country by climate change-related extreme weather events during 1991–2010;⁹ its overall climate vulnerability factor to 2030 is classified *acute*.¹⁰ As a consequence, the rural population, largely surviving at subsistence levels, is exposed to more frequent drought occurrences, especially in the central dry zone. The heavily populated coastal and delta areas are exposed to more frequent severe storms, floods, and seawater intrusion. Damage to urban infrastructure could seriously hamper efforts to improve current services.

⁹ S. Harmeling. 2011. *Global Climate Risk Index 2012*. Bonn: Germanwatch.

¹⁰ Institute for Sustainable Futures. 2011. *WASH Sector Brief*. Sydney: University of Sydney.

D. Core Sector Issues, Causes, and Effects

1. Urban Development

22. Only about one-third of Myanmar's population lives in townships and cities.¹¹ In contrast to Thailand and a number of other Association of Southeast Asian Nations (ASEAN) countries, where urban centers account for 50% or more of GDP, urban centers in Myanmar account for little more than 20%.

23. Each township is governed by a development committee, chaired by the mayor. Functions of township development committees include town planning; water supply, sanitation, and sewage services; road construction and maintenance; and markets and other public buildings. In practice, however, township development committees are effectively implementers of the programs designed by the respective ministries at the national level. The new government's policy of decentralization has commenced by devolving duties and responsibilities from the national level to the regions and states.

24. Urban planning in Myanmar is undertaken centrally by the Ministry of Construction (MOC) under the Department of Public Works and the Department of Human Settlements and Housing Development (DHSHD). Generally, MOC is tasked with (i) preparing and implementing urban and regional plans, (ii) overseeing property development activities, (iii) managing government buildings and housing estates, (iv) planning and developing water and sanitation systems, (v) overseeing budget preparations of development works under the ministry, and (vi) assisting in the implementation of development projects in border town areas.

25. The primary function of the Department of Public Works is to construct and maintain public infrastructure identified in the development plans such as roads; bridges; certain airfields as assigned by the Ministry of Transport; and other public buildings such as schools, hospitals, and government offices.

26. The specific urban planning-related tasks of DHSHD are (i) developing site and services schemes, (ii) preparing urban upgrading and development schemes, (iii) selling residential and industrial plots, and (iv) planning and implementing communications systems. Included in the preparation and implementation of these tasks is planning and implementing water and sanitation projects, managing estate land, and overseeing foreign-funded projects. Under DHSHD, the Urban Research and Development Institute was established in 2012 with support from the United Nations Human Settlements Programme (UN-HABITAT) to help strengthen policy formulation and provide urban planning and management training programs.

27. Responsibility for urban planning does not rest exclusively with MOC, as there is some overlap of functions with other ministries and departments. The Ministry of Development of Border Areas and National Races also has urban planning-related responsibilities: (i) preparing and implementing master plans for communities in border areas, and (ii) implementing development projects including urban infrastructure and services. Also, the Department of Archaeology of the Ministry of Culture is responsible for managing areas and structures of historical or cultural significance (designating these as ancient monumental zones, ancient site zones, or preserved zones).

28. The new government has begun the process of land reform. Responsibility for land management, particularly land acquisition in urban areas, has been delegated to the Ministry of Home Affairs. Responsibility for acquisition of lands with historical and cultural significance has been delegated to the Ministry of Culture.

¹¹ ADB. 2010. *ADB Myanmar Fact Sheet*. Manila.

2. Water Supply

29. Myanmar has abundant water resources, although with marked seasonal and regional variability. Mean annual rainfall is around 2,100 millimeters, but this varies from as high as 5,000 millimeters along the coastal areas of Rakhine and Tanintharyi states to less than 1,000 millimeters in the central dry zone. Most rain falls during the months of the southwest monsoon (May–October). Total renewable annual water resources are estimated at 1,100 cubic kilometers. Water endowment (i.e., the total sustainable water per inhabitant) is about 24,000 cubic meters per year.¹²

30. Total water withdrawal is less than 5% of the renewable resource available; around 89% of this is for agriculture, 10% is for municipalities, and 1% is for industries. Approximately 91% of the total water withdrawal comes from surface water and 9% from groundwater. Groundwater is mostly used for domestic purposes. Less than 3% of Myanmar’s vast hydropower potential (estimated to be more than 100,000 megawatts) has so far been harnessed, but a number of hydropower projects are planned. Impact assessments will be needed to ensure that these projects do not compromise other uses, notably for agriculture.

31. No single institution is responsible for the overall management of Myanmar’s water resources. Currently, the Ministry of Agriculture and Irrigation is the main ministry involved in water resources, with the mandate to develop agriculture and irrigation. Departments include Water Resources Utilization (responsible for groundwater), Irrigation, Settlement and Land Records, and Agricultural Planning. Indirectly, the Ministry of Agriculture and Irrigation plays an important role in rural water supply through its responsibility for groundwater resources. In the three largest cities, water supply and sewage treatment is the responsibility of the respective city development committees. In smaller peri-urban centers, the Department of Development Affairs (DDA) is responsible for water supply and sanitation.

32. As shown in the table, official data for 2010 report that about 93% of the urban population has access to “improved water supply.” Drawing from the earlier description of shortcomings in the urban water supply systems, both in terms of coverage and quality, it appears that the actual level of coverage and service quality is less than this.

33. Urban water supply systems in Myanmar are generally very old, with only intermittent supply and poor water quality. Both Yangon and Mandalay distribute partly treated water, but the coverage is far from complete. In a study conducted by ADB in 1997 on water and sewage utilities in Asia and the Pacific, Yangon was found to have consumer coverage of only 60%.¹³ A study conducted in 2011 found that water supply coverage was still about 60% (footnote 10); further, water is available for less than 12 hours a day. This suggests that there has been little improvement since 1997. High levels of NRW in Yangon and Mandalay reflect that, in addition to the use of public water taps, there are high levels of leakage due to lack of maintenance of the aging water supply network.

34. The Yangon water supply system, operated by the Water and Sanitation Department of the Yangon City Development Committee, provides piped water to probably 40%–50% of the urban population. The committee has approximately 230,000 connections on record, of which about 70% are metered. Water originates from a number of surface water reservoirs that have been built over the years, at increasing distances from the city center. The water is distributed without any form of treatment, except from the Nyaungnapin (Ngamoeyeik) treatment plant, commissioned in 2005 with a capacity of 200,000 cubic meters per day. The rest of Yangon’s population relies on tube wells, operated either by the Yangon City

¹² A country with an annual per capita water endowment of less than 1,700 cubic meters is considered to be under water stress.

¹³ ADB. 1997. *Second Water Utilities Data Book*. Manila. pp. 10–2, 146–9.

Development Committee or privately. The main challenges affecting service include the aging network, low delivery pressure, saline intrusion to some well fields, and degradation of water quality.

35. The Mandalay water supply system consists of 28 tube wells, reservoirs, pumping stations, and the associated distribution network. A feasibility study prepared by JICA in 2003 estimated that 400,000 people, or 50% of the urban population, were supplied through the system; NRW was more than 50%. The study proposed a 10-year program, consisting of improvement of groundwater facilities and development of surface water systems, leading to a more than tripling of the volume of drinking water available to Mandalay residents. The total cost for the program (in 2003 prices) was estimated at \$140 million; the project has not been implemented.

36. Although water resources in Myanmar are generally abundant, localized pollution threatens to render water sources unsuitable for future or downstream uses. This threat results from the virtual absence of any form of treatment of domestic or industrial wastewater and the failure to conduct environmental impact assessments for major development projects.

3. Drainage, Wastewater, and Solid Waste Management

37. Drainage and flood control in urban centers is the responsibility of local government. The drainage network should be capable of preventing flooding during the monsoon season. In Yangon, however, monsoon seasons are usually accompanied by flooding because of the inadequate tertiary network and blocked or overwhelmed primary and secondary drains. Low-lying downtown areas are particularly prone to flooding. Inundations are frequently up to 0.5 meter deep, with depths of more than 1.0 meter not uncommon. A system of 22 major channels forms the drainage network; all of these channels are tidal and lack gates to prevent backflow during high tides. Siltation, accumulation of waste, and encroachment on the channel areas contribute to reduced drainage capacity.

38. Except for the Yangon central business district, there is no conventional central sewerage system. In most parts of the city, effluent and seepage from septic tanks and latrines flow into open rainwater drainage and natural waterways. As noted above, these waterways are frequently blocked or flooded. Water bills for residents do not include surcharges for sewage collection.¹⁴

39. At the neighborhood and household level, effective drainage of rainwater and wastewater is important in helping reduce vectorborne diseases, such as malaria and dengue. However, rather than being a responsibility of city or town development committees, responsibility for the tertiary network (i.e., roadside drains) is largely left to households. As a result, drains are made for short stretches with different materials for lining. Further, the inclines are often poorly coordinated, and the drains fail to function as an interconnected network with a suitable final disposal point. Water can remain stagnant, providing a breeding ground for mosquitoes. In the absence of any central wastewater collection system, storm water drainage systems usually function as de facto open sewers, further aggravating health risks.

40. Solid waste management is a principal function of township development committees. Each committee has a pollution control department, which is responsible for household solid waste management, as well as for industrial and hazardous waste. For the most part, collected solid waste is disposed of in open (uncontrolled) dump sites. Domestic nongovernment organizations (NGOs) are involved in solid waste management initiatives, in partnership with international organizations such as the United Nations Environment Programme and United Nations Children's Fund (UNICEF).

¹⁴ ADB. 1997. *Second Water Utilities Data Book*. Manila. pp. 146–9.

4. Housing

41. MOC, through DHSHD, has long been active in housing projects. From 1951 to 1988, DHSHD undertook a series of initiatives resulting, in the case of Yangon, in about 14,000 apartments for rental housing, 3,000 units for joint housing, and approximately 800,000 serviced plots.¹⁵ However, these public housing initiatives were not sustained; subsidies were too low and the cost of materials too high.

42. Informal settlements have rapidly developed in the major cities. In response, the government has implemented large-scale infrastructure development and resettlement programs. During the past 2 decades, DHSHD has developed around 250,000 sites and serviced plots for approximately 1 million inhabitants in Yangon (footnote 15). In 1993, the government began developing industrial zones as a strategy to generate employment and livelihood opportunities, especially for relocated families.

43. The focus for the major cities has shifted to construction of high-rise apartments and condominiums. These new developments, however, further stress the capacity to provide adequate services, such as water supply, sanitation, and flood control. Rural–urban migration, fueled by perceived employment opportunities in the major cities, has led to further increases in informal settlements.

5. Rural Water and Sanitation

44. DDA under the Ministry for Progress of Border Areas and National Races is responsible for drinking water supply for small towns and rural areas. Specific roles and responsibilities in this regard may change under the new government. In practice, water supply in rural areas is the combined result of private initiatives, community initiatives, DDA projects, and aid agency programs and projects. The systems range from constructed ponds to deep wells with solar-powered pumping to elevated tanks, and sometimes a reticulation system to houses. In some villages and rural communities, water meters have been installed, and the systems are operating efficiently. Many houses have rainwater-harvesting systems on their roofs conveying water to ponds that serve as the main source of water during the rainy season.

45. Sanitation in rural areas is a household responsibility. The Ministry of Health promotes and subsidizes latrine construction. Drainage and solid waste disposal is the responsibility of village authorities, although often funds are insufficient and the necessary services are poorly provided.

46. Arsenic contamination of groundwater has been mapped in eight townships (where the risk was estimated as highest). The Water Resource Utilization Department of the Ministry of Agriculture has worked with UNICEF since 2002 to map these and other areas. The Ministry of Health, with UNICEF support, tested over 12,000 people in the high-risk areas but found only few people with symptoms of arsenic exposure. People in high-risk areas alternate between drinking groundwater in the dry season and rainwater in the wet season, hence arsenic accumulation in the body is less than experienced in other countries with similar geological conditions.

47. In collaboration with UNICEF, for several decades the Ministry of Health (through its Environmental Sanitation Division and the Central Health Education Bureau) has been organizing community engagement events, such as the Four Cleans campaigns (i.e., clean food, clean water, clean toilet, and clean hands) and the annual National Sanitation Week. These and other programs promote good sanitation practices and have contributed to increased latrine use throughout the country.

¹⁵ Aung Win. 2006. Housing Situation in Megacity Yangon. In F. Kraas, H. Gaese, and Mi Mi Kyi, eds. *Megacity Yangon: Transformation Processes and Modern Developments*. Second German–Myanmar Workshop in Yangon, Myanmar. Ladenburg, Germany: Gottlieb Daimler and Karl Benz–Stiftung. pp. 155–7.

48. Environmental management is undertaken by the line ministries, notably the Ministry of Agriculture and Irrigation and the Ministry of Forestry. Responsibility for urban environmental management is shared by the city or township development committees, the Government Affairs Department, DHSHD (MOC), Department of Health, and Directorate of Industrial Supervision and Inspection. There is no clear central responsibility for monitoring or preserving the quality of water and air. The National Commission for Environmental Affairs was created in 1990 to act as a central agency for environmental management. In 2005, the commission was moved to the Ministry of Forestry.¹⁶

6. Sector Issues and Constraints

49. Further analytical preparatory work will be required to establish the policy basis for government planning and investment concerning urban infrastructure. Appendix 1 sets out a problem tree for the urban development and water sector, but at this juncture it is very general. The absence of reliable and adequately disaggregated socioeconomic data is widely acknowledged as a major obstacle to formulating policy and monitoring progress. In principle, urban governments have the authority to raise local revenue through a broad range of taxes and charges, including property taxes. Surveys and analysis are required to determine the actual income and expenditure of local governments and their subsidiary agencies. In the absence of such information, it is not possible to determine the financial strength of urban agencies responsible for water supply and other key infrastructure services.

50. Public sector accountability in Myanmar for essential infrastructure services is weak. This is the case whether the services are urban or rural, or fee based or not. Myanmar residents, especially those living in informal settlements, have grown accustomed to enforced self-sufficiency for the most basic needs.

51. There is strong demand for improved urban services and infrastructure, in particular for electricity and reliable water supply. The government is well aware of the urgent need to improve services. It also recognizes that the prevalence of NRW must decrease in parallel with investment in system expansion. Consumers would possibly accept significant increases in tariffs if matched by a gradual but noticeable improvement in the quality of service. Investment in wastewater management is urgently needed in high-density areas and should be considered a priority. Improved urban drainage is yet another priority to reduce the incidence of severe flooding and the public health risk posed by stagnant water.

7. Key Sector Development Needs

52. Myanmar's poverty and low health indicators underscore the urgent need to improve basic public services. Only a small percentage of the population in Yangon receives treated water, and even then for only part of the day. Elsewhere in the country, water, if supplied at all, is untreated. Diarrhea-related diseases—including cholera, dysentery, typhoid, and viral hepatitis—occur widely and are spread through unsanitary urban environments and contaminated water. Vectorborne diseases such as dengue, hemorrhagic fever, and malaria are common, together with cases of Chikungunya and Japanese encephalitis.

53. Urban water supply needs include improvements in system capacity, water quality, and coverage. Even in Yangon, only an estimated 40%–50% of the population is served by a municipal piped water system. There is no piped supply provision for most of the highly populated resettlement areas, informal settlements, and slums or squatter areas. NRW is estimated at 40% or worse. System pressures are low, and leakage will increase as water pressures improve. An NRW reduction program will need to include

¹⁶ National Commission for Environmental Affairs. 2006. *Myanmar: National environmental performance assessment report*. ADB–United Nations Environment Programme. Bangkok.

capacity building of the water supply departments so that they operate on business principles, with a consumer service focus and the necessary performance information.

54. Effective storm water drainage systems should form the basis of urban environmental infrastructure. In the absence of a working sewerage system, the urban drainage system acts as a de facto open sewer. Raw sewage and septic tank effluent flow through the roadside drains. Existing conditions in urban areas in Myanmar create a direct public health risk, with stagnant wastewater serving as breeding places for mosquitoes and other sources of disease. A well-functioning network of interconnected drains, designed with appropriate slopes and discharging to a safe disposal area, is essential.

II Sector Strategy

A. Government Sector Strategy, Policy, and Plans

55. **National and local plans and strategies.** As noted earlier, Myanmar’s 5-year National Development Plan consists of five sections: (i) Regions and States Development Plan; (ii) Villages, Townships, and Districts Development Plan; (iii) Industrial Development Plan; (iv) Investment Plan; and (v) Financial Sector Development Plan. Despite the emphasis in the new Constitution on decentralization of economic planning, the necessary legislative and administrative instruments for implementation of this policy are not yet in place. Similarly, the government has not yet determined a country-wide strategy for urban development. An urban development program is being formulated for Yangon, with technical and financial support from JICA. The program will include urban transport, power, water and sewerage, and solid waste management.

56. **Institutional structure and capacities.** Institutional roles and responsibilities for planning, management, and regulation are not clearly defined. Although management of water supply and sanitation services in the three major cities is the responsibility of the respective city development committees, they have limited autonomy and effectively function as implementers of programs designed by the Government of Myanmar. In smaller urban centers, a central government department, DDA, is responsible for both water supply and sanitation services. Though the new government is in the process of decentralizing, starting with devolving duties and responsibilities from the national level to the regions and states, many governance functions remain centralized. Further, delineation of functions remains unclear. While MOC is responsible for urban planning, other central ministries have overlapping responsibilities. As another example of inadequate delineation, no single institution is responsible for managing water resources. Shortages of staff, skills, and data are obstacles to growth of the urban infrastructure and water sector. For the past 3 decades, staff of government agencies—in particular at the middle management and operational levels—have had little or no exposure to international best practices.

B. ADB’s Earlier Sector Support Program and Experience

57. Up to 1988, ADB’s cumulative lending to Myanmar totaled about \$531 million, of which about \$36 million (6.8%) was for water supply and other municipal infrastructure services. Water supply projects in Yangon (approved in 1973) and Mandalay (1982) achieved their respective objectives. However, cost overruns occurred, which were mainly attributed to implementation delays, underestimation of the civil works, and increases in materials because of design changes.

C. Other Development Partner Support

58. From the end of the 1980s until 2012, few development partners were active in Myanmar. Most agencies that kept a presence were involved in humanitarian aid, notably in response to the devastation caused by Cyclone Nargis in May 2008. UNICEF maintained involvement in rural water supply and sanitation, and has recently begun to conduct a water, sanitation, and hygiene sector review. UN-HABITAT is continuing post-Nargis rehabilitation of water and sanitation infrastructure in the delta, including concepts of community action planning. As noted earlier, in 2012 MOC, with support from UN-HABITAT, opened the Urban Research and Development Institute. Since 1988, Australia has provided humanitarian assistance through United Nations agencies and NGOs. JICA is contributing to Yangon's progress by assisting in preparing the Urban Development Program for Greater Yangon, covering all main infrastructure sectors.

59. The international response following cyclones Nargis (May 2008) and Giri (October 2010) has provided opportunities for development agencies, including NGOs, to re-engage with Myanmar. Information on rural water supply and sanitation conditions in Myanmar has benefited from this engagement.

60. As a reflection of growing involvement of development partners, the Central Working Committee on Foreign Aid has been constituted in the president's office, chaired by one of the two vice-presidents, to coordinate international assistance. The committee will include two advisory subcommittees: (i) one composed of ministers of the Government of Myanmar as well as representatives from states and regions, and (ii) a socioeconomic advisory committee with private sector representation and a selection of national experts bridging different sectors of the economy. The organizational lead for donor coordination has been assigned to the Foreign Economic Relations Department within the Ministry of Planning.

61. **Lessons learned and best practices from the region.** Based on lessons learned in other developing countries in Asia over the past 20 years or more, certain principles should be adopted to help shape international assistance programs and projects designed for Myanmar: (i) allow for an initial period of policy dialogue; (ii) design project implementation arrangements focusing on a single executing agency; and (iii) maintain a comprehensive and consistent focus on laying the foundations for the sustainable operation of key agencies, such as water and sewage companies. Best practices from successful urban water and sanitation utilities in the region should be the basis for future interventions in Myanmar's urban development and water sector. Examples of such utilities include the Phnom Penh Water Supply Authority in Cambodia, the Manila Water Company and Maynilad Water Services in the Philippines, and the Hai Phong Water Supply Company in Viet Nam. These utilities have showcased best practices in various aspects of service delivery and management, including (i) streamlining governance and institutional arrangements; (ii) improving operational performance; (iii) reducing NRW; (iv) improving financial performance; and (v) expanding service coverage, particularly to the poor.

D. ADB's Sector Forward Strategy

62. **Knowledge gaps.** The lack of background information and quantitative data for Myanmar is a serious constraint on effective and efficient development of the sector. The government and development partners will need a substantive joint effort to collect and verify information and data. In addition to reliable and disaggregated data on basic demographic and socioeconomic factors, information is required on the legal and institutional environments and on capacity-building requirements to expand and improve sector performance. UNICEF's intention to conduct a water, sanitation, and hygiene sector review is an

important initiative. Most fundamentally, data are required on coverage of water and sanitation services and on the performance of existing systems.

63. Data on water resources and future demand will need to be combined in a country-wide assessment. The water–food–energy nexus should be considered holistically, drawing from ADB’s Water Operational Plan,¹⁷ as part of formulating water-related policies with the government.

64. At a later stage, quantitative data will be required on the sustainable availability and quality of groundwater, an important component of both urban and rural water supply. Detailed information is also required on capacity-building needs at subnational levels of government in support of their increased role in the planning and delivery of drainage, wastewater management, and other critical urban infrastructure services.

65. **Policy and strategy considerations.** In addition to becoming an important source of energy for neighboring countries, Myanmar has the potential to be a vital land bridge linking the PRC, South Asia, and Southeast Asia. Regional cooperation will need to be intensified and encouraged by improving essential infrastructure and services in the main urban centers along the east–west and other economic corridors. To build a sustainable and self-reinforcing network, infrastructure and services in smaller urban centers will also need to be improved. In both cases, attention to urban finance and management will be fundamental. Further requirements are electricity, communications (telephone and internet services), and improved banking and financial services. Private sector involvement should be extensive, including through public–private partnerships. However, urban infrastructure services—such as water supply, drainage, and wastewater management—will initially require subsidies and external support.

66. In light of these considerations, ADB’s involvement in the urban development and water sector should include (i) expanding water supply services by increasing overall capacity, reducing NRW, and extending the distribution system to cover low-income, high-density urban areas; (ii) improving storm water drainage systems as well as sanitation, to reduce the occurrence of stagnant polluted water and thereby the prevalence of vectorborne diseases; and (iii) helping establish urban government agencies capable of financing, managing, and maintaining newly improved infrastructure and services.

67. **Strategy outline.** Capacity development is of specific importance and relevance for Myanmar. Water supply and utility agencies—especially middle management and operational staff—have had little or no exposure to international best practices. Skills development and awareness should be advanced through experienced project management consultants, regional study tours, and twinning with successful ASEAN-based water companies.

68. Capacity building will need to focus on local governments and utility companies. International assistance should help subnational governments fulfill their responsibilities to extend essential urban services to resettlement areas, informal settlements, and other underserved areas. Civil society must play its part in helping raise awareness and expectations of the population for improved urban services, and of the need for well-structured and effective user fees.

69. **Lending and nonlending program and resource needs.** ADB’s interim support for Myanmar’s urban development and water sector can be expected to build upon the foundations of the GMS Program of Economic Cooperation. This would include strengthening essential infrastructure and services in main nodal urban centers along key GMS economic corridors—the Southern Economic Corridor and the East–West Economic Corridor.

¹⁷ ADB. *Water Operational Plan 2011–2020*. Manila.

70. Based on these considerations, ADB's program for the urban development and water sector could consist of the following components, subject to review and confirmation by the government and ADB Management:

- (i) technical assistance in support of an overall policy and legal framework for the sector, based on input by national and subnational government agencies, as well as by influential civil society organizations;
- (ii) strengthening sector-related information and data, as a basis for program and project formulation and for coordination of international assistance; this could include work with development partners to conduct and expand in-depth assessments of the water, sanitation, drainage, and hygiene subsectors;
- (iii) pilot implementation of community infrastructure upgrading, to test the potential and limitations for community-led, needs-based infrastructure improvement, including water supply, drainage, sewerage, and solid waste management; and
- (iv) in-depth assessments to address critical knowledge gaps.

71. **Risks and assumptions.** Initial development assistance to Myanmar will inevitably entail risks, particularly given that government agencies have had so little experience with international practices concerning project formulation and implementation. Social safeguard considerations, which are integral to ADB's operations, may present new concepts to counterparts in Myanmar. The capacity of implementing agencies in Myanmar to plan and implement programs in accordance with agreed specifications, within budget and on schedule, is as yet untested; this will require close monitoring and support.

72. These risks can be reduced by careful preparation, a clear development focus, and close alignment with existing government initiatives to ensure national acceptance and support. However, aligning program formulation with ADB's development goals—including poverty alleviation and sustainable and inclusive growth—will need to be explicitly supported (e.g., by ensuring basic needs in informal settlements are addressed).

Sector Road Map and Results Framework

Country Sector Outcomes		Country Sector Outputs		ADB Sector Operations	
Outcomes with ADB Contribution	Indicators with Targets and Baselines	Outputs with ADB Contribution	Indicators with Incremental Targets	Planned and Ongoing ADB Interventions	Main Outputs Expected from ADB Interventions
Enhanced capacity of central and local government agencies and urban utilities to plan and deliver good-quality water, sanitation, and solid-waste management infrastructure facilities and services	Proportion of population with sustainable access to improved urban services increased by end of 2016 ^a	<p>Improved provision and maintenance of urban services including water supply, sanitation, and drainage</p> <p>Greater efficiency through capacity development of urban utilities</p>	<p>At least 20% of selected utilities staff, particularly from middle management, trained in various aspects of utility management</p> <p>Capacity of water utilities in planning and managing operations efficiently increased</p>	<p>(i) Planned key activity areas Water supply, sanitation, drainage, urban development</p> <p>(ii) Pipeline projects CDTA: Transformation of Urban Planning (\$1.2 million) PPTA: Urban Services Improvement Project (\$1.0 million) Grant: Pro-Poor Community Infrastructure and Basic Services (\$4.0 million) Loan: Urban Services Improvement Project (\$60.0 million) Loan: GMS Corridor Towns Development Project (\$60.0 million)</p> <p>(iii) Ongoing projects PDA: Demonstrating a Community-Led Approach to Improved Sanitation in Yangon (\$50,000)</p>	<p>(i) Planned key activity areas Water supply, sanitation, and drainage improved in selected cities</p> <p>(ii) Pipeline projects Number of households with access to improved water supply, sanitation, and drainage systems increased Reforms for water utilities lead to improved performance and self-financing capacity</p> <p>(iii) Ongoing projects About 1,700 people in the Dawbon township will benefit from improved sanitation and solid-waste management</p>

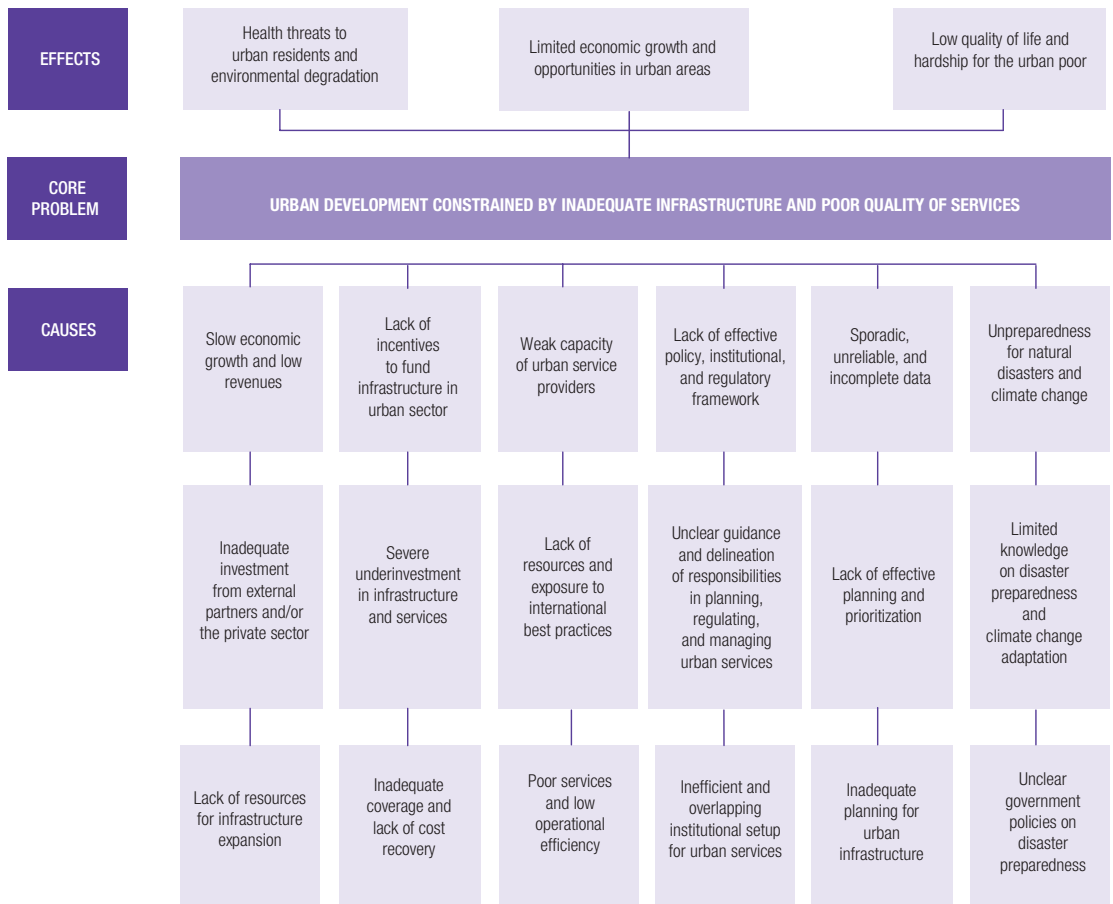
ADB = Asian Development Bank, CDTA = capacity development technical assistance, GMS = Greater Mekong Subregion, PDA = pilot demonstration activity, PPTA = project preparatory technical assistance.

^a Baseline to be established by the end of 2014.

Source: ADB.

Appendix 1

Problem Tree for Urban Development and Water Sector



Appendix 2

Urban Centers with Populations Greater than 100,000 (2009)

Urban Center		2007	2009	No. of Centers	Population Size
1	Yangon (Municipality)	4,425,292	4,570,160	1	More than 4.5 million
2	Mandalay (Municipality)	932,012	963,350	1	500,000–1.0 million
3	Mawlamyine	420,181	435,422	1	400,000–500,000
4	Bago	276,535	283,786	3	250,000–300,000
5	Mon Ywa	263,287	271,906		
6	Meikhtilar	244,088	252,294		
7	Patheingyi	247,150	249,961	4	200,000–250,000
8	Nay Pyi Taw (Municipality)	236,898	244,863		
9	Sittwe	218,852	224,899		
10	Myin Chan	195,491	202,063		
11	Myeik	185,818	192,525	9	150,000–200,000
12	Pyaw Oo	179,420	184,124		
13	Lashio	175,001	179,190		
14	Pyin Oo Lwin	161,343	166,768		
15	Hinthada	161,390	163,226		
16	Myittha	149,517	154,334		
17	Pakkoku	147,704	152,409		
18	Dawae	146,575	151,865		
19	Mogoke	145,617	150,512		
20	Mu Doan	129,784	134,491	12	100,000–150,000
21	Tha Htone	128,497	133,158		
22	Yai Nan Chaung	128,633	132,731		
23	Thanlyin	123,755	127,719		
24	Ka Lay	113,791	117,517		
25	Shwe Bo	112,824	116,518		
26	Magway	112,811	116,407		
27	Keng Tone	106,923	109,483		
28	Chauk	105,730	109,098		
29	Hlegu	101,040	104,277		
30	Sagaing	99,914	103,186		
31	Taungtha	98,299	102,660		
Total		10,274,172	10,600,902	31	

Source: Ministry of Immigration and Manpower, 2011.

Myanmar: Urban Development and Water Sector Assessment, Strategy, and Road Map

This publication documents the current assessment and strategic investment priorities for the urban development and water sector in Myanmar. It highlights sector performance, priority development constraints, plans and strategies, past Asian Development Bank (ADB) support and experience, support of other development partners, and future ADB support strategy.

The document assesses the key development needs of urban development and the water sector in Myanmar, and outlines key ADB initiatives to improve access of the population, including poor urban communities, to basic urban services. The main urban thrusts of ADB's investments program are rehabilitation and expansion of water supply, sanitation, solid-waste management, drainage, and other basic urban infrastructure in the main cities, complemented by capacity development for urban planning and improved performance in urban services.

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ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.7 billion people who live on less than \$2 a day, with 828 million struggling on less than \$1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

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