



URBAN DEVELOPMENT AND WATER SECTOR ASSESSMENT, STRATEGY, AND ROAD MAP MYANMAR

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Sule Pagoda, according to the legend more than 2,500 years old. Its present size is from the late 15th century. The City Hall was completed in 1936 (photo by Gerhard Joren/ADB); People crossing the boardwalk in Myanmar (photo by Myo Thame/ADB); Intha fishermen use a one-leg rowing technique at work in Inle Lake. In Myanmar, it is estimated that aquaculture and fisheries directly employ more than 3 million people and that 12 million to 15 million people benefit from the sector (photo by Lester Ledesma/ADB).

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Abbreviations

ADB	-	Asian Development Bank
CHDB	-	Construction and Housing Development Bank
DUHD	-	Department of Urban and Housing Development
GAD	-	General Administration Department
GDP	-	gross domestic product
GMS	-	Greater Mekong Subregion
JICA	-	Japan International Cooperation Agency
MOC	-	Ministry of Construction
MFI	-	microfinance institution
NLD	-	National League for Democracy
PRC	-	People's Republic of China
UN-HABITAT	-	United Nations Human Settlements Programme
YCDC	-	Yangon City Development Committee

Unless otherwise stated, \$ refers to United States dollar.

As of July 2017:

Currency unit	=	kyat (MK)
MK1.00	=	\$0.00074
\$1.00	=	MK1,355.5

I Sector Assessment: Context and Strategic Issues

A. Introduction

The main focus of programs of the Government of Myanmar over the past decades has been rural development, health, and education. Appreciation of the function of cities as a main source of value added, with them having a disproportionate concentration of industrial production and the services sector, appears until recently to have had little impact on policy. In 2015, the distribution of value added to the gross domestic product (GDP) was 26.7% for agriculture, 34.5% for industry, and 38.7% for services.¹ Despite the value added being disproportionately generated in urban areas, scant attention has been paid to the development of urban plans, until recently. To understand better what changes are proposed, it is necessary to understand the current institutional and legal setting for urban planning and land management.

This assessment, strategy, and road map of Myanmar's urban development and water sector provides (i) a review of the government's policies and regulatory framework for the water and other urban infrastructure and services sector, (ii) a review of the current level of urban infrastructure and municipal service delivery, (iii) an identification of development needs, and (iv) recommendations for the sector forward strategy of the Asian Development Bank (ADB). It also outlines—in a preliminary manner—possible areas for further assistance by ADB, while identifying proposals and commitments by other members of the donor community. This assessment is a revision of the Urban Development and Water Sector Assessment, Strategy, and Road Map based on the work of ADB's mission to Myanmar from 4 to 15 December 2016, reflecting the evolving development partnership of ADB with Myanmar.

B. The Country Context

Myanmar is the largest country in mainland Southeast Asia,² 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 for both the country and the region.

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)—

¹ ADB. 2016. *Key Indicators for Asia and the Pacific*. Manila.

² Myanmar has a land area of 676,577 square kilometers. ADB. 2011. *Key Indicators for Asia and the Pacific*. Manila.

Ayeyarwady, Bago, Magway, Mandalay, Sagaing, Tanintharyi, and Yangon—encompass the plains and are predominantly populated by people of Bamar ethnic origin.

According to the 2014 census, the population of Myanmar is 51.5 million. This is considerably lower than the quoted population in 2010, which was close to 60 million. The last official census undertaken by the government was in 1983, when the population was 35.3 million, and before that in 1973, when the population was 28.9 million. The growth rate in the 1970s was 2.02%. However, the recent 2014 census, analyzed by the Ministry of Immigration and Population, suggests that the population of Myanmar has grown by less than 1% per year since 2010. Therefore, the official population data suggest there was marked negative growth in the previous 4 years.

Over two-thirds of the population still lives in rural areas and is largely dependent on subsistence farming. Some 26% of the population lived below the poverty line in 2010, but the government aimed to reduce this to 16% by 2015. This may well have been achieved, as the gross national income per head increased from \$830 in 2010 to over \$1,160 in 2015.³ However, this is less than one-eighth of the average gross national income for Southeast Asia and the Pacific region.⁴ The level of poverty in Myanmar is quite high compared to Thailand, with a rate of 10%; and Viet Nam, with 13.5%.⁵ Poverty is heavily concentrated in rural areas (85%) and disparities are pronounced across states. Myanmar's ranking on the United Nations Human Development Index is 148 of 188 countries.⁶ In 2013, the mortality rate of children under 5 years of age (50.5 per 1,000 live births) was considerably higher than elsewhere in Southeast Asia (12 in Thailand, 27 in Indonesia, and 22 in Viet Nam), but better than in the Lao People's Democratic Republic (67).⁷ A large segment of the population is highly vulnerable to adverse weather and natural disasters, and experiences transitory bouts of impoverishment.

The economy is predominantly agriculture-based, with rice as the main crop and staple food. The agriculture sector accounts for 60%–70% of total employment and 29% of GDP, down from 57% in 2001. In contrast, the share of GDP accounted for by the industrial sector was 29%, more than double during this period. Liberalization of the economy and opening up to foreign direct investment prompted rapid growth of the industry sector, notably the export 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 needs to broaden its economic base beyond primary industries. The services sector, which accounts for 41% of GDP, has been expanding strongly in recent years, and the opening of the economy offers great scope for tourism and related services.

On 29 July 2016, the economic policy announcement of the National League for Democracy (NLD) stressed a number of principles that impact urban development, such as equitable distribution of resources; improved and more transparent financial management; privatization of state-owned enterprises to improve efficiency and effectiveness; the importance of infrastructure development, particularly power distribution, roads, and port facilities; job creation through the development of special economic zones; liberalizing the banking sector to provide easier access to all to loans; and, for all sectors to work on inclusive development “to enable our country to escape poverty and achieve the prosperity our people deserve.”⁸

³ World Bank. Data for Myanmar. <http://data.worldbank.org/country/myanmar> (accessed 2016).

⁴ World Bank. Myanmar, East Asia, and Pacific. <http://data.worldbank.org/?locations=MM-Z4> (accessed 2016).

⁵ World Bank. Poverty Headcount Ratio at National Poverty Lines (percentage of population). <http://data.worldbank.org/indicator/SI.POV.NAHC?locations=MM-Z> (accessed 2016).

⁶ United Nations Development Programme. 2015. *Human Development Report*. New York.

⁷ UNICEF et al. 2014. *Levels and Trends in Child Mortality Report*.

⁸ A. T. Kyaw and C. Hammond. 2016. Government Reveals 12-Point Economic Policy. *Myanmar Times*. 29 July.

The November 2015 elections saw the first internationally recognized government led by the NLD gain a substantial majority in both houses of the Union Assembly. The government, under the Presidency of Htin Kyaw and the leadership of the newly created State Counsellor, Daw Aung San Suu Kyi, who took office in March 2016, continued with the reforms of the outgoing administration, with the implementation of the following: (i) Minimum Wages Act of 2016, which provides greater security to workers; (ii) Arbitration Law 2016, which will bring Myanmar in line with the international community on arbitration and improve investor confidence; (iii) revisions to the Union Tax Laws, which lowered taxes on construction and transport; (iv) Condominium Law 2016, which allows foreigners to own a greater share of condominiums and, hence, encourages international investment in this sector; and, (v) Myanmar Investment Law 2016, which puts national and international investors on an even playing field. Further, the State Counsellor established a new agency, the Development Assistance Coordination Unit and the Cooperation Partners Group, to ensure that government assistance is demand-driven and not donor-driven. This will also ensure that duplication of services and waste of money are minimized. The aim is to facilitate the implementation of the country's Economic Development Policy announced in October 2016.

Most of the economic sanctions were lifted or suspended due to the previous government reforms and election of the new administration. This opened the way for extensive international assistance for Myanmar, including for its urban development and water sector. However, the failure of the new administration to resolve violence in Rakhine State, and accusations of severe human rights violations by some members of the armed forces, put into question the success of the changes. This made some international investors wary of getting involved, and some governments to consider carefully their assistance.⁹

1. Urban Planning and Development

Urbanization. Based on the government's estimates, the proportion of the population in urban areas was thought to be near 32% before the 2014 census. However, the census showed it to be less than 30%, or 14.88 million, compared with 24%, or 8.47 million in the 1983 census.¹⁰ For over 31 years, between the official 1983 and 2014 censuses, the total population increased by 16.2 million, or 46%, with an average growth rate of 1.22% per year. The urban population has grown by 6.4 million, or 79.9%, with an annual growth rate of 1.91% for over 31 years. Based on the information given by the Myanmar Ministry of Immigration and Population, the current national population growth rate is 0.89%, which suggests that the urban growth rate is more than twice that of the rural.¹¹ Given these facts, most of the national population growth will take place in urban areas, hence, the government needs to focus as much on urban areas as on rural areas.

The level of urbanization in Myanmar is one of the lowest in Southeast Asia, comparable to Viet Nam (34%), but much lower than in Malaysia (74%).¹² The official capital is Nay Pyi Taw (population of 1.16 million),¹³ located midway between Myanmar's two largest cities—Yangon, with a population of about 5.1 million; and Mandalay, with a population of about 1.2 million. Large sections of Yangon and Mandalay consist of resettlement areas, reflecting the relocation and housing programs in the 1960s

⁹ Parliament of Canada. 2016. Report of Subcommittee on International Human Rights of the Standing Committee on Foreign Affairs and International Development. *Sentenced to a Slow Demise: The Plight of Myanmar's Rohingya Minority*.

¹⁰ World Data Base. <https://knoema.com/>

¹¹ Republic of the Union of Myanmar. 2014. *Population and Housing Census*. Nay Pyi Taw.

¹² ADB. 2016. *Key Indicators for Asia and the Pacific*. Manila.

¹³ Footnote 11. This includes all eight townships that make up the Union Capital Region, and so is not a contiguous urban area; if the urban population within the district only would be 377,000.

and early 1990s. They also contain 500,000 people living in informal settlements and slums.¹⁴ That the resettlement areas by design only have water points for every 80 households and lack proper drainage or sewerage networks, and the informal settlers have no infrastructure apart from what they provided themselves, illustrates the poor state of urban services.

After Yangon, Mandalay, and Nay Pyi Taw, the next-largest city is Taunggyi with a population of 265,000, followed by Bago with 254,000, and Mawlamyine with 254,000.¹⁵ Excluding Yangon, Mandalay, and Nay Pyi Taw, there are 32 districts with urban populations of over 100,000, and 15 townships. Of the 15 townships, five have urban populations of over 200,000. There are 22 other townships with urban populations of more than 50,000 but less than 100,000.¹⁶ The urban centers are largely concentrated in the low-lying regions of the central dry zone and the coastal areas. Only four of the sizable towns, three in Shan State—Lashio, Taunggyi, and Kengtone, and the northernmost town of Myitkyina (the capital of Kachin State), which provides a gateway to the far north—are in mountainous areas. However, the development of the transnational road network in the Greater Mekong Subregion (GMS) is likely to have a substantial impact on the growth rate of some towns, in particular, the border towns and towns along the corridors.

Urban planning in Myanmar, with the exception of Yangon, is undertaken centrally by the Ministry of Construction (MOC) under the Department of Public Works and the Department of Urban and Housing Development (DUHD). Generally, the 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.

The Department of Highway, Department of Building, and Department of Bridge of the MOC are responsible for construction and maintenance of 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.

The specific urban planning-related tasks of the DUHD are (i) developing concept plans for urban areas; (ii) planning and designing public housing, mainly to house government servants; (iii) developing site and services schemes; (iv) preparing urban upgrading and development schemes; (v) selling residential and industrial plots; and (vi) 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 the DUHD, 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, such as the “Transformation of Urban Management” funded by the ADB and completed in November 2016. This aimed to strengthen the capacity of national and local authorities to implement sustainable urban development, mainly for the staff of the General Administration Departments (GADs) at the local level, and the regional staff of the DUHD, now headed by a person at director level and soon to be boosted with staff with training

¹⁴ Based on surveys in both cities undertaken with the assistance of the United Nations Human Settlement Programme (UN-HABITAT) in 2016, Yangon has 400,000 and Mandalay 100,000 people living in informal settlements and slums.

¹⁵ These include all urban areas within the district and not the contiguous urban area population, which is closer to 300,000. The urban populations of these townships are as follows: Bago with 254,424, Mawlamyine with 253,734, and Taunggyi with 264,804.

¹⁶ Footnote 11.

in urban planning.¹⁷ To date, only the Yangon City Development Committee (YCDC) has its own urban planning section under the Planning and Land Management Department.

Urban governance and decentralization. The seven regions and seven states, with the union territory of Nay Pyi Taw, the capital, are divided into a number of districts, and within each district, are a number of townships. Each township has a development committee¹⁸ with a chairperson. A further level of local government is the ward, an indirectly elected committee chosen by the representatives of streets. However, Mandalay, Nay Pyi Taw, and Yangon are exempted because each has its own form of government, and a city development committee with responsibility for the development and management of land within all the townships included in the “city.” The city development committees are chaired by the mayors.

Under the previous government, the chief minister established the city development committees, with the mayor as the minister within the regional government. Since the NLD formed a new government, at least half of all the Yangon and Mandalay committee members are to be elected, and now all the townships have development affairs organizations that play an advisory role. However, these changes “are partial experiments at more representative local government structures. They have some community representation in their management bodies and specific responsibilities but are effectively part of the state and region governments.”¹⁹ Nevertheless, this is part of the new government’s policy of democratization and decentralization. While this commenced by devolving duties and responsibilities from the union level to the regions and states, it is clearly a high priority for the new government, with an increasingly greater impact on the sphere of urban development.

Town planning. A development committee governs each township. The 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 implementers of the programs and plans designed by the respective ministries at the union level. The new government’s policy of decentralization has commenced by devolving duties and responsibilities from the union level to the regions and states.

The main types of plans produced by the MOC by working with the respective townships, state or regional government, are “concept plans” that provide the direction of growth based on assumptions of population growth and location-related economic development factors. These plans must be approved by the regional Ministry of Development Affairs and the chief minister before final approval by the minister of Construction. The present system provides limited opportunities for “stakeholders” to be involved in the process. The GAD is responsible through the Township Development Affairs Committees to oversee the implementation of the plan. However, there is often no more precise or legally binding plan to give the local officials or investors clearer guidance as to the use of land in a specific location, and the development affairs organizations do not have the capacity to develop such plans. However, the government has now developed a Draft Urban and Regional Planning Law that goes some way to identifying the forms and hierarchy of plans and the responsibilities for preparing

¹⁷ In interviews of DUHD by the consultant on 15 December 2016, 29 engineers and architects were recruited to be trained in urban planning by the department itself, with the objective of sending them out to the regional offices.

¹⁸ In 2013, the then-President issued notification 27/2013 that instructed state and regional governments to draft municipal and state laws to establish Township Municipal Committees in all townships. Its administrative apparatus, with their own staff and budget is known as the Department of Municipal Affairs or the Development Affairs Organization (DAO). The DAO has a Township Development Affairs Committee made up of seven members, elected and appointed, who act as the final decision makers on issues relating to the town’s development and the use of its budget. The DAOs are fully self-funded and have considerable discretion in the use of funds. ADB. 2016. *Draft Final Report CDTA-8456: Transformation of Urban Management - Part 1: Capacity Building for Urban Management*. Manila.

¹⁹ M. Arnold. 2016. The Right Questions to Start Local Governance Reforms. *Myanmar Times*. <http://www.mmmtimes.com/index.php/opinion/20613-the-right-question-to-start-local-governance-reforms.html>

and approving them, including the system of appeal. This draft is currently with the Office of Attorney General for review and is expected to become a law in 2017.

The draft law defines the responsibilities for planning of the different levels of government and the DUHD. This is based on the principle of separation of powers where the central government is responsible for policy making, regulations, and oversight of the system and its application. Responsibility for the preparation, initial approval, and implementation of the plans lies with the districts or cities. However, the draft law also recognizes the lack of capacity at the local level, which allows the central government to provide technical assistance where required. In effect, there is almost zero capacity at the local level except in Yangon, which has its own Urban Planning Division; and Mandalay, which has a lower level planning unit, both under the respective Planning and Land Administration Departments. In the case of Yangon, which was the beneficiary of various donor-funded training initiatives from the Japan International Cooperation Agency (JICA) and the European Union, the division has the capacity to prepare plans, including zoning plans. The main problem is that the division does not have the same status as a department, thus, it operates through the head of the City Planning and Land Administration Department, thereby giving it less influence on the decisions of the YCDC. In Mandalay, the unit is primarily a mapping and surveying unit, which, while very necessary for the development of plans, is not qualified to handle planning issues. Furthermore, its status is too low to influence the Mandalay City Development Committee's decisions. The newly created Urban and Housing Development directorates within the regional and state administrations are not yet qualified to provide assistance to the Township Development Affairs Committee that will be responsible for town planning. However, the DUHD is planning to take on 29 trainee planners (mainly architects and engineers) who will be "taught" urban planning skills through on-the-job-training before being assigned to the regions or states.

Overall, the draft law is a great move toward establishing a rational planning system, with clear lines of authority and responsibility. It still needs some clarification especially in the structure of plans and in clarifying the different types of plans and their contents. While much of this, along with the need for stakeholder involvement in the process, can be defined in implementing regulations, these need to be referred to in the law. Specifically, regulations are needed to identify the types and contents of the different levels of plans, the process to be followed during preparation of the plans, zoning regulations, and building regulations. The latter have already been developed and approved by Parliament. Under the proposed law, the regulations would become the responsibility of the minister of Construction, under the guidance of the DUHD. Developing the zoning and planning regulations must be done carefully to ensure the three main implementing regulations do not contradict nor overlap with each other.

Land. Land management is critical in meeting the challenges of urbanization. The process of land reform is continuing. Responsibility for land management, particularly land acquisition and allocation in urban areas, is delegated to the Ministry of Home Affairs, through the GAD. Responsibility for acquisition of lands with historical and cultural significance is delegated to the Ministry of Culture. The GAD acts as the secretariat of the regional governments, which distributes land and approves development proposals. However, while they should take account of the plan for the cities, they do not have the training to do this. The concept plans do not provide sufficient guidance to these decision makers. There is a lack of understanding of land management and land use planning, which may facilitate the town's economic development, and of environmental and social impacts of decisions made. At present, there is no formal shared responsibility between the GAD and the newly established Directorates of DUHD at regional level for urban and regional planning. Furthermore, with emphasis on "decentralization," responsibilities of the former Department of Land and Estates Management were handed over to the GAD, except in Mandalay, Yangon, and Nay Pyi Taw. Therefore, the Land Management Committees headed by the mayor, with the Regional Secretary, the Secretary of the

City Development Committee, and the Head of the Department of Planning and Land Management as members, are responsible for the allocation of land.

With rapid growth of urban populations, the main opportunities for low-cost and affordable housing lie in the development of peripheral, formally agricultural, areas. For conversion of land from agricultural to urban uses requires the Ministry of Agriculture's approval. Rights over land being farmed within the boundary of the urban plan area is on the basis of usufruct, which entitles the user to farm the land but not to transfer that right or any other rights to other owners. The procedure requires the GAD at the township level to pay compensation to the farmer and for the local Land Management Committee to allocate the land to another user who will receive a lease for up to 60 years. However, the GAD rarely has resources to compensate the farmer, thus, the farmer either "sells" the land illegally to individuals, by subdividing the land without benefit of an approved plan; or the Township and Land Management Committees agree that a specified developer can take the land and pay compensation to the farmer.²⁰ While the law states the basis for compensation to the farmer, it does not state clearly the basis for the developer's "payment" to the township. The Land Management Committee makes this decision. This often takes the form of requiring the developer to provide some infrastructure to connect the site to the existing trunk systems or to undertake other infrastructure works related to the site. There are two weaknesses in the system. First is the value of the compensatory infrastructure or other works is not specified in the law and does not need to reflect the real value of the land acquired, hence, this is prone to corruption. Second is under the colonial administration, land was rarely registered by the farmers, hence, the compensation provided is often far lower than the law might suggest, resulting in considerable frustration from the displaced farmers.²¹

In the last administration's final years, developers acquired much of the farm land on the peripheries of the two main cities, Mandalay and Yangon, but much of it remains undeveloped. This speculative land purchase resulted in inflated land prices, putting the land beyond the reach of low-income, would-be house owners. The preferred option often cited by government is the need for land banking.²² But land banking faces the problem of how the funds will be raised to purchase land ahead of demand. Clearly, there are advantages for the local government to buy back the farmers' rights in the peri-urban areas ahead of their urbanization as it allows government to capture the increased value of the land following its change of use, thereby providing additional funds to open up new areas. This strategy requires the local authority, who has the funds, to establish a fair and equitable compensation system, and possibly go over and above the compensation indicated in the law.

There is little appetite in government circles for slum or squatter upgrading that transfers ownership to the squatter.²³ Such an approach is seen to encourage professional squatters who claim one or more plots, and once land titles are confirmed, they sell the lands to a private developer and make a windfall gain. The concept of community ownership of the whole project area is yet to be accepted, where a community forms an association to acquire the rights to such land, and where individual members have rights to the dwellings, but not individual rights to the land. The advantage of this

²⁰ The Land Acquisition Act of 1894 states that compensation is fixed by Chief Revenue Officer and should be based on the market value for land plus an additional 15% for the inconvenience of compulsory acquisition plus the value of crops and trees planted before the order and taking into account loss of earning, diminution of profit, and reasonable expenses (Clauses 23 (2) and 23 (1) of the Land Acquisition Act 1894. The Act states that the beneficiary of the transfer (in this case presumably a future developer) should pay the compensation Part VII, Clause 41 (1).

²¹ S. Lewis and Y. Snaing. 2014. *Farmers Travel to Rangoon to Decry Land Seizures, Trespassing Charges. The Irrawaddy*. <https://www.irrawaddy.com/news/burma/farmers-travel-rangoon-decry-land-seizures-trespassing-charges.html>

²² A. Myint. 2014. *National Urban Development Policy and Development Strategies*. Presentation for the YCDC-JICA Seminar on Spatial Planning and New Town Development. 11-12 December 2014. Yangon.

²³ Conclusion of consultant following discussions on 18 July 2014 with A. Myint, Director of Urban and Regional Planning; M. Tan, Deputy Director; DHSF finance director; and member of Housing Department, regarding TA 8251. ADB. 2014. *Draft Final Report on the Inclusive Cities*. Manila (TA 8251 MYA).

system of land ownership is that the individual beneficiary does not have the right to sell the unit without the community's approval, and any proposed development must also be approved by the community association. This limits the chances of professional squatting. The disadvantage of the said practice is that it requires considerable investment of time by the authorities or initiators (such as a nongovernment organization) to develop the capacity of the poor community to manage such a scheme. Further, this form of communal ownership should not be confused with the purchase of land by an existing squatter community, as in an upgrading project, where the individual rights to land are recognized and individual titles are issued.²⁴

Another issue that needs to be resolved is how to ensure that land titles are accurately recorded. At present, land ownership records in Mandalay and Yangon are the responsibility of their Planning and Land Administration Departments. The current practice is to record land ownership on hand-drawn paper copies without georeferencing. The Land Administration and Mapping Programme of the Settlements and Land Records Department (SLRD), assisted by UN-HABITAT, successfully undertook mapping and georeferencing of land ownership in some rural pilot areas. The system included dispute resolution procedures, procedures for computerizing cadastral maps, and using system of georeferencing. While the work in cities is more complex, such a system could be applied in the peripheral areas of the major cities and then rolled on into the existing built-up areas. Initially, the process is complicated and costly, but will greatly facilitate the development of plans for the cities, resolve ownership disputes, and provide potential investors with greater security, thus encouraging future investments.

Gender issues. Households headed by women make up about 21% of all households in Myanmar, with Mandalay at 24% and Yangon at 26%, showing a greater proportion.²⁵ The absence of any reasonable form of environmental infrastructure in poor communities places a particular burden on women. Women are the primary collectors, users, and managers of domestic water; and are responsible for waste disposal and environmental management. Failure to include gender issues in water and urban infrastructure planning and implementation affects the quality and sustainability of local infrastructure investments and may exacerbate women's work burden and time poverty, harm their health and well-being, and limit their capacity to pursue economic opportunities.

Climate change. 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 1–2 million people were left homeless.

Myanmar is considered in second place among countries hardest hit by climate change-related extreme weather events during 1995–2014;²⁶ its overall climate vulnerability factor to 2030 is classified as acute.²⁷ Consequently, the rural population, largely surviving at subsistence levels, is exposed to more frequent droughts, especially in the central dry zone. The heavily populated coastal and delta areas are exposed to more frequent severe storms, floods, and sea water intrusion. Damage to urban infrastructure could seriously hamper efforts to improve current services.

²⁴ ADB. 2015. *Discussion Paper on Inclusive Cities Concept for Myanmar (Draft)*. Manila.

²⁵ World Bank. *Myanmar Regional Statistics*. <https://knoema.com/marpqmg/myanmar-regional-statistics-2013?tsld=1040050>

²⁶ S. Kreft, et al. 2016. *Global Climate Risk Index 2016*. Bonn: Germanwatch.

²⁷ Institute for Sustainable Futures. 2011. *WASH Sector Brief*. Sydney: University of Sydney.

2. Urban Infrastructure

Water supply. 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 (the total sustainable water per inhabitant) is about 24,000 cubic meters per year.²⁸

Total water withdrawal is less than 5% of the renewable resource available; around 89% of this is for agriculture, 10% for municipalities, and 1% 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 been harnessed so far, but a number of hydropower projects are planned. Impact assessments will be needed to ensure these projects do not compromise other uses, notably for agriculture.

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 is responsible for water supply and sanitation.

Improved water sources are available to almost 70% of the union’s population. The percentage of the population served by these improved water supply systems has steadily increased since 1990. However, use of different sources for drinking suggests that only 16% use tap water, while almost double this number use bottled water in the urban areas. In the rural areas, both options are limited, and the majority (55%) use either tubewells, protected wells, or springs. About 11% of households in urban areas have no improved water supply while the same is true for about 34% of those in rural areas.²⁹ As piped water does not reach or is considered to be insufficiently reliable, consumers adapted to inadequate provision by improvising self-supply, as demonstrated by the large number of small private systems, usually involving a tubewell. In rural and peri-urban areas, rainwater catchment provides a partial solution to water needs.

However, true access to “improved water” is deceptive and less impressive, considering that almost a third of urban dwellers rely on bottled water for drinking. Piped water supply systems in the main cities of Mandalay and Yangon include untreated surface water from open reservoirs, thereby falling between the Joint Monitoring Programme definitions of “improved water” and “unimproved water,”³⁰ and the 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. The Yangon water supply system, operated by the Water and Sanitation Department of the YCDC, provides piped water to probably 40%–50% of the urban population. The YCDC has approximately 230,000 connections

²⁸ A country with an annual per capita water endowment of less than 1,700 cubic meters is considered to be under water stress.

²⁹ Footnote 11.

³⁰ P. Gleick. 2012. *The World’s Water Volume 7*. Washington, DC: Island Press.

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 Nyaunghnapin (Ngamoeyeik) treatment plant, commissioned in 2005 with a capacity of 200,000 cubic meters per day. The rest of Yangon's population relies on tubewells, operated either by the YCDC 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.

Recent data for Mandalay indicate that, on average, the water supply system serves 55% of the city's population for 10 hours. The remaining residents use mainly private shallow wells. The piped system, fed by tubewells (90%) and surface water, delivers about 100,000 cubic meters per day into a network of about 400 kilometers. Currently, water is not treated. Nonrevenue water is estimated at approximately 52%, of which at least 35,000 cubic meters per day (about 70% of total nonrevenue water) is due to physical losses from faulty meters and leaks; the remainder is due to uncertainties in meter reading and authorized, unbilled consumption.³¹ An additional problem is arsenic contamination, which occurs in groundwater of the Ayeryawady Delta and, to some extent, in surface water of the lower reaches of the Sittaung River.

Sanitation. As for sanitation systems, 74.3% of the population has access to improved sanitation, either a flush toilet or water-sealed latrine. In the urban areas, 92% have improved sanitation systems while this is true for 67% in the rural areas. The figures suggest a steady improvement in the performance in the sanitation sector related to its Millennium Development Goals (see table). However, Myanmar cities, with the exception of the old business district of Yangon, which has a small piped sewerage system and a recently repaired treatment plant, have neither a piped sewerage system nor a centralized wastewater treatment. Sanitation consists of septic tanks draining largely to the roadside drains, and latrines of varying designs. There is no systematic collection and treatment of domestic wastewater. Small-scale enterprises often allow chemical waste to run into the roadside drains and, hence, into rivers and lakes, polluting them and the flora and fauna in these river systems. In Mandalay, the runoff from small-scale industries, such as dyeing silk and weaving cloth, drains into Kandawgyi Lake, a tourism spot and a source of fishing. 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 stormwater drains carry untreated sewage in open channels. Environmental and health impacts are consequently high, with high pollution levels in water courses and groundwater. Waterborne disease outbreaks, such as cholera and diarrhea, are quite common in many areas, especially urban slums, and towns and cities with dense populations. Fifteen percent of all deaths of children under 5 are due to diarrheal diseases and a further 4% are due to malaria.³²

Responsibility for managing sanitation systems lies with the Department of Water and Sanitation in the two main cities, including the collection of any fees related to the collection and treatment or disposal of septage and use of sewage systems. However, the campaign to introduce improved sanitation systems is the responsibility of the Department of Health. The Department of Water and Sanitation collect fees for the emptying of septic tanks. However, because there are no sewerage systems in urban areas, there is no sanitation charge related to water use.

Tariffs and fees for water and sanitation. The Water and Sanitation Department is responsible for installing meters for water use, and all meters are registered by the CDC Computerization Department. The Revenue and Administration Department is responsible for the collection of charges and fees.

³¹ Includes consumption by public institutions such as monasteries and military users.

³² World Health Organization. 2013. *Maternal, Newborn, Child, and Adolescent Health*. http://www.who.int/maternal_child_adolescent/epidemiology/profiles/neonatal_child/mmr.pdf

Table: 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
2014	87	66	70	92	67	74

– = not available.

Source: United Nations Environment Programme and United Nations Children’s Fund–World Health Organization. 2012. *Progress in Drinking Water and Sanitation*. Joint Monitoring Program adjusted using Union of Myanmar Population and Housing Census 2014.

The level of fees must be approved by the City Development Committee. In Mandalay, the fees were over by 55% from the rate set in 2007, which was only 85 Myanmar kyat (MK) per cubic meter. Comparing with the estimated willingness to pay (WTP) established in Yangon of MK560 per cubic meter for water and sewerage charges, MK311 would be used for water supply.³³ It is doubtful whether the increase in the Mandalay water tariff is sufficient to cover the full operational costs.³⁴ The problem is the reluctance of the authorities to raise water charges while using a flat rate unit charge, which is not progressive and does not discourage abuse by more wealthy or wasteful consumers.³⁵

For most cities and towns in Myanmar, the sole form of sewage collection and disposal is done using vacuum trucks, for which a charge is levied. However, where piped systems are used, the charges for water and sewerage probably need to be combined using the principle of the direct relationship between water use and sewage production. The question of tariffs and charges is a critical part of the sustainability of improved water and sanitation systems, which is critical to encourage private sector investment in the future.

Drainage and flood control. Drainage and flood control in urban centers are the responsibility of the townships: the Mandalay City Development Committee for Mandalay and YCDC for Yangon. The drainage network should be capable of preventing flooding during the monsoon season. However, urban areas often lack proper stormwater drainage networks, often resulting in severe flooding during the monsoon season. Reasons for seasonal floods differ depending on the geological and meteorological conditions of the cities. In Yangon, 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 meters deep, with depths of more than 1.0 meter. A system of 22 major channels forms the drainage network; 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 a reduced drainage capacity. The problems found in Yangon are typical. Seasonal floods are caused mainly by (i) lack of canal maintenance—dumped garbage combined with vegetation in the surface water system); (ii) inadequately sized culverts or small bridge openings at the crossings of drains and roads, reducing the discharge capacities of the drains; (iii) insufficient capacities of pumping stations

³³ JICA. 2014. *The Project for the Improvement of Water Supply, Sewerage and Drainage System in Yangon City Vol. VI Sewerage and Drainage System Master Plan*. Tokyo.

³⁴ Government of France. 2015. *Sustainable Development of Urban Infrastructures and Services in Mandalay City*. Paris.

³⁵ It should be noted that the reluctance to raise the charge on water was a political decision coming just prior to the Union Assembly elections.

to discharge excess water out of the city area; and (iv) lack of maintenance and dredging in the storage ponds. Therefore, the main causes of flooding are blocked drainage systems and lack of solid waste management systems. Low public awareness of the impact of dumping of waste into drains, canals or rivers is also a cause for flooding in cities.

Solid waste. Solid waste is collected in the townships; however, large amounts are dumped in nearby drains and canals. Primary collection uses the bell system and wastes are transported to final disposal sites through transit stations.³⁶ Transit stations are typically located along streets. Regulated landfill sites do not exist and untreated solid waste is disposed at open dump sites. Solid waste is managed mainly by municipal governments with limited budgets and facilities, and private sector involvement is at a very early stage. Solid-waste collection is undertaken manually, without adequate safety equipment for the handlers. Recycling is undertaken mainly by the informal sector. Residual waste is deposited in open dump sites. Inevitably, waste often accumulates in open drains leading to stagnant wastewater and breeding opportunities for mosquitoes.

Transport. The Regional Minister of Transport is responsible for transportation planning. This is mainly interpreted as the management of bus routes, the licensing of motor vehicles and the planning of improved road systems in urban areas. The exceptions are for Mandalay, where the French Government funded a study of urban mobility,³⁷ and Yangon, where JICA has prepared a Transportation Master Plan. Also in Yangon, the Yangon Regional Transport Authority (YRTA) is responsible for the rationalisation and permitting of bus companies and the routes they must take. For greater efficiency, the YRTA are trying to reduce the number of independent bus companies from 50 to 18.

Almost 10% of conventional households in all urban areas own a car, truck, or four-wheeled tractors, compared with just 4% in rural areas. The most popular form of private transport is the motor cycle, with 41% of urban and 37% of rural households owning one.³⁸ In Mandalay, motorcycle ownership is at 73%. Whereas in Yangon, where motorcycles have been banned from the city, the ownership is less than 9%. The heavy use of motorcycles in many urban areas and the growing access to private cars is increasing the level of air and noise pollution in the cities. Furthermore, inadequate provision of parking means that motorcycles are frequently parked on pavements, reducing access to pedestrians.

Housing. The MOC, through the Department of Human Settlements and Housing Development (DHSHD, now the DUHD), has long been active in housing projects. From 1951 to 1988, the 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.³⁹ However, these public housing initiatives were not sustained, subsidies were too low, and the cost of materials were too high.

Informal settlements rapidly developed in the major cities. In response, the government implemented large-scale infrastructure development and resettlement programs. In 2 decades, up to 2010, the DHSHD developed around 250,000 sites and serviced plots for approximately 1 million inhabitants in Yangon. In 1993, the government began developing industrial zones as a strategy to generate employment and livelihood opportunities, especially for relocated families.

³⁶ Primary waste collector rings bell and waits at specified locations for residents to bring wastes.

³⁷ Footnote 34.

³⁸ Footnote 11.

³⁹ A. 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*. Yangon, Myanmar. Ladenburg: Gottlieb Daimler and Karl Benz-Stiftung. pp. 155-7.

In the past 5 years, 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. The capacity to meet the demand through formal housing is illustrated in Mandalay where it is estimated that each year, 6,000 to 7,000 units are needed. The Mandalay City Development Committee and the Regional UHD are building approximately 1,500 units a year, and the formal private sector building another 1,500 units, leaving a shortfall of around 3,000 units a year.⁴⁰ This is mainly filled through the informal private sector and the rental sector. There is a similar situation in most major urban areas, and this will continue to lead to the development of informal settlements.

The nongovernment sector developed alternative approaches to providing simple but adequate housing for the poorest sections of urban society. However, these approaches require considerable preparation of the target community and the local township administrations' cooperation to facilitate accessing the land. These types of solutions have become harder because of the failure of the last administration to control abuses of the Farmland Act of 2012.⁴¹

In 2013, the government established the Construction and Housing Development Bank (CHDB). This bank aimed to stimulate the housing construction sector by providing affordable loans to potential developers and house owners. Currently, the CHDB provides loans to (i) the lower middle income sector, particularly those with steady employment and an income of at least MK300,000 per month; (ii) people who already have certain (not yet fixed) level of savings with the CHDB; and (iii) people borrowing to access one of the units in the government's housing projects. Borrowers are expected to provide 30% of the cost of the housing themselves and borrow the remaining balance of 70%. Loans are mainly for housing of 40 square meters built at a cost of MK10 million, excluding the land cost, which the government subsidizes.

The major issue of financing the poor in self-build housing developments is the lack of suitable models and mechanisms. In part, this is the result of the restrictive regulatory environment in which microfinance institutions (MFIs) must operate, and partly due to the lack of a program that encourages the link between the MFIs and the formal banking system. A review of the laws and regulations affecting the operation of MFIs in this field should include a review of (i) the minimum level of interest to be paid on deposits and the cap on the lending rates as applied to MFIs; (ii) rights of international MFIs to borrow from local banks; (iii) the possible option of the bundling by MFIs of loans for microenterprises with basic financial management and business development skills; (iv) easing the CHDB's regulations to lower or remove the requirement for borrowers to retain a deposit with the CHDB of 20%–30% of the loan value for the duration of the loan through the establishment of a loan guarantee fund; and (v) consideration of assistance being provided to CHDB to develop a lending line for low-income housing with an extended repayment time of at least 5–15 years.

The urgency to improve the basic urban infrastructure and services is highlighted by Myanmar's poor record in health and poverty. Inadequate environmental infrastructure and underinvestment in preventive and curative medical care contributed to severe health threats across the country. In 2013, the mortality rate of children under 5 years of age (50.5 per 1,000 live births), often resulting from water-related vector-borne diseases—such as malaria, dengue, and Chikungunya fever—was the highest within Southeast Asian countries, except for the Lao People's Democratic Republic.⁴² Inadequate water, drainage, and sanitation services, combined with underinvestment in preventative

⁴⁰ ADB. 2016. *Technical Assistance to Myanmar for Towards a Green Mandalay. Scoping Study for a Strategic Development Plan for Mandalay*. Manila.

⁴¹ ADB. 2015. *Discussion Paper on Inclusive Cities Concept Applied to Myanmar*. Manila.

⁴² World Health Organization. 2013; ADB. 2015. *Inclusive Cities Concept Applied to Myanmar*. Manila. ADB. 2016. *Key Indicators for Asia and the Pacific*. Manila.

health care, resulted in severe health threats at many levels. The high prevalence of debilitating diseases is directly related to the poor state of critical urban services.

3. Sector Issues and Constraints

The majority of issues affecting the performance of the urban and water sectors are outlined in the problem tree provided in generic form in Appendix 1. Given the growth of the urban population and the importance of the value added to the economy from urban areas, as stated in the Introduction and Urban Planning and Development sections above, greater focus is needed on improving the efficient functioning of urban areas.

The major issues identified include (i) lack of an adequate legal and institutional basis for managing urban growth, (ii) shortage of trained manpower, (iii) lack of funding or the lack of incentives for private sector investment in infrastructure, (iv) lack of sufficient research data to support policy changes, and (v) lack of preparedness for the consideration of the impact of climate change.

A clear development strategy is required for all urban areas, which would include programs and projects to improve the provision of all urban services. However, this requires both the legal foundation for development of the plans, which does not exist; and the adequate capacity of the responsible institutions. The draft Urban and Regional Planning Law outlines the hierarchy of plans, the institution responsible for the plans, and enforcement measures. However, to be effective, the law also needs implementing regulations, including guidelines for the development of the plan, and for both zoning regulations and planning standards to be followed. Further, the agencies responsible need greatly increased capacity in preparation of the plans. The lack of suitable training institutes or capacity within the country is likely to slow this.

With the exception of Yangon City and a small unit within the department of Planning and Land Management in Mandalay, there are no functioning institutional arrangements for planning at any level of local government. The regional government must approve plans prepared by the DUHD staff.⁴³ However, regional governments do not currently have any planning capacity. The DUHD's regional offices are now headed by a director and should shortly receive their first planners. These planners will have on-the-job training by the current planners working in DUHD. However, if plans are to be prepared for all 35 townships with populations of over 50,000, excluding Mandalay, Nay Pyi Taw, and Yangon, the capacity of the DUHD or the regional offices needs to be greatly enhanced. Furthermore, planning does not end with the development of the plan but continues through implementation. Additional technical capacity will be needed to approve planning applications.

In the past 3 years, there was major growth in the information available and analysis undertaken for the development of the policy basis for government planning and investment in urban infrastructure. A number of studies were completed or are under way and expected to be available shortly, including the development of a planning policy and a housing policy.⁴⁴ The 2014 Census of Population and Housing has provided a more reliable basis for planning infrastructure and urban growth. However, more detailed studies are generally available where international donor-funded projects were prepared. But most of these studies focus only on the two main cities, Mandalay and Yangon.

A major problem for future investment in infrastructure is the acceptance of a tariff system that would be attractive to investors while not exerting an undue burden on the users. A potential problem is

⁴³ Regional in this context also includes states.

⁴⁴ UN-HABITAT developed an urban policy with two reports: an Urban Diagnostic Report and an Urban Policy Framework. The MOC has accepted these. A Housing Policy paper should be ready in early 2018.

whether the political will exist for such arrangements, though in the case of water, the high proportion of people using bottled water as their main source of drinking water suggests the readiness of about 30% of the urban populations to pay considerably more for clean water.

In principle, urban governments have the authority to raise local revenue through a broad range of taxes and charges, including property taxes. Data from Mandalay suggests that land taxes are extremely low when compared to the market values.⁴⁵ This would suggest a need to review how land and property taxation is calculated; and to fashion a system that does not put an undue burden on the residential, commercial, or industrial users while acting as a disincentive to land speculators. Surveys and analyses are required to determine the actual income and expenditure of local governments and their subsidiary agencies. In the absence of such information, especially on nonrevenue water and tariff structures, it is not possible to determine the financial strength of urban agencies responsible for water supply and other key infrastructure services.

Land availability is becoming critical. It is clear there have been abuses of the farmland and vacant land per Fallow and Virgin Lands Management Laws of 2012, in which the purpose the land was given for has not been acted upon as owners predict the extension of the urban area will raise the land's value. This has contributed to a false shortage of land hence, land price inflation. This is one of the major issues limiting the options available to the poor to build their own houses, or for the union or regional and state governments to provide affordable housing for the lower-income population. Improved land management is possible with the introduction of digitized mapping and a common georeferencing system for all spatial land records. This would be a big step toward facilitating good land use planning and the mapping of hazardous areas due to natural disasters or climate change. It would also aid the improvement of revenue collection on property and land taxes, and facilitate the preparation and implementation of infrastructure projects. However, it is recognized that the introduction of such a land information system will require much careful thought and time, and require the cooperation and coordination of a number of ministries and agencies, including the international donor community.

4. Key Sector Development Needs

Although Myanmar's position has improved, poverty and low health indicators underscore the continuing need to improve basic public services. In Mandalay and Yangon, only a small percentage of the population receives water that has been treated, but only for a certain time of the day. In other parts of the country, the supplied water is untreated. Diarrhea-related diseases—including cholera, dysentery, typhoid, and viral hepatitis—occur widely and are spread through unsanitary urban environments and contaminated water. Vector-borne diseases such as dengue, hemorrhagic fever, and malaria are common, together with cases of Chikungunya and Japanese encephalitis.

The urban water supply needs to include improvements in system capacity, water quality, and coverage. In both Mandalay and Yangon, there is no piped supply provision for most of the highly populated resettlement areas, informal settlements, and slums or squatter areas. Nonrevenue water is estimated at 40% to 52%.⁴⁶ System pressure is low and leakage will increase since water pressure may improve. Nonrevenue water reduction programs are still needed and should include capacity building of the water supply departments so they can operate on business principles, with focus on consumer service and with necessary performance information.

⁴⁵ ADB. 2014. *Scoping Study for a Strategic Plan for a Green Mandalay*. Consultant's report. Manila (TA 8251-MYA).

⁴⁶ Footnote 34.

Effective stormwater drainage systems should form the basis of urban environmental infrastructure. While projects in Mandalay and Yangon are being developed and implemented, in the absence of a working sewerage system in all urban areas, the urban (stormwater) 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 diseases. A well-functioning network of interconnected drains, designed with appropriate slopes and discharging to a safe disposal area or treatment plant, is essential.

The failure to implement effective solid waste programs exacerbates flooding where waste is discarded into open drains and waterways. Therefore, final disposal arrangements can jeopardize groundwater sources through seepage. Recycling is rarely part of the official system of the Cleansing Departments, hence, the informal sector undertakes the said activity. The benefits of a well-functioning system of solid waste collection will improve the health of the citizens, reduce groundwater and surface water pollution, and lessen the risk of floods.

All proposed infrastructure improvements should be aligned with good urban planning. However, the planning system should recognize and take into account the relationship between spatial and social and economic plans, as guided by detailed regulations. The urban planning structure does not yet exist though work is in progress on developing a law on planning. Preliminary work was undertaken on the development of planning guidelines,⁴⁷ and a National Building Code⁴⁸ was developed. However, zoning regulations and planning standards are still required, along with further development of guidelines. The new system of planning will also require improved mapping with the introduction of a land use management system, based on digitized maps and a universal georeferencing system. Furthermore, the introduction and effective use of the proposed planning system will necessitate a substantial increase in the capacity of the institutions involved.

While growth of the major cities is likely to continue quickly, the development of the GMS road network is likely to impact greatly on the growth of towns within the identified corridors, especially the border towns and ones on the intersection of the different corridors. The issues affecting these towns will include the needs of all the key infrastructure development, and will require careful planning and local capacity to oversee implementation.

⁴⁷ UN-HABITAT. 2016. *Guidelines for Urban Planning*.

⁴⁸ Myanmar Engineering Society and UN-HABITAT. 2012. *Provisional Myanmar National Building Code*. Yangon.

II Sector Strategy

A. Government Sector Strategy, Policy, and Plans

National and local plans and strategies. The 2013 Framework for Economic and Social Reforms recognized that the role of urban centers as a growth engine for the nation's economic development and poverty alleviation will rapidly increase in importance.⁴⁹ Linked to the policy of balanced development, while recognizing a bipolar basic urban settlement structure, it sees the need for encouraging greater economic development in secondary cities, often through the development of special economic zones, and facilitated by the road network proposed as part of the GMS economic corridors and Association of Southeast Asian Nations highways.⁵⁰ The same is reflected in the NLD's 29 July 2016 economic policy. The government considers it essential to invest in urban centers, not only in critical infrastructure, but also through encouraging private investment and improving the efficiency of urban service delivery. The imperative needs for urban development are recognized through (i) formulation of urban development strategies linking urban centers with the rural hinterlands, (ii) development of necessary laws and regulatory frameworks, and (iii) institutional capacity strengthening in urban planning and management.

Institutional frameworks and capacities. Policy and strategic guidance is inadequate from central and local governments for the sector. Institutional roles and responsibilities for planning, managing, and regulating the sector are not clearly defined. While management of water supply and sanitation services is the responsibility of local governments, city development committees have limited autonomy, and function only as implementers of programs designed by the central government. Although the government is moving toward decentralization, many governance functions are still centralized. The DUHD recognizes the need to separate the central government's policy, standard setting, and monitoring role from the local government's plan preparation and implementation role. However, due to the shortage of planners and the lack of a clearly decentralized local governance structure, it remains responsible for urban planning, while other central ministries carry out similar sector planning functions at the local and central levels. There are also gaps, for example, no single institution is responsible for the management of national water resources. Skills shortages were identified as an obstacle to growth in the urban sector. Limited domestic opportunities for suitable education in urban planning, and water and other urban infrastructure sectors, meant that government staff at middle management and operational levels have little or no exposure to best practices.

Development partners. From the end of the 1980s until 2012, few development partners were active in Myanmar. Most agencies with a presence were involved in small-scale humanitarian assistance in kind or through small grants. Since 2013, few development partners have been active in water and other urban infrastructure and services in Myanmar. Among multilateral agencies, only ADB and UN-HABITAT are active in the sector. The Agence Française de Développement (AFD) and JICA are the

⁴⁹ The Government of the Republic of the Union of Myanmar. 2013. *Framework for Economic and Social Reforms: Policy Priorities for 2012–2015 toward the Long-Term Goals of the National Comprehensive Development Plan*. Nay Pyi Taw.

⁵⁰ DUHD. 2013. National Spatial Development Framework. Quoted Draft Final Report CDTA 8456: Transformation of Urban Management—Part 1, Capacity Building for Urban Management. November 2016.

major bilateral agencies supporting mainly water supply improvements. The Korean Export Import Bank is planning a \$1 billion investment in Myanmar between 2016 and 2020, primarily in power and urban infrastructure projects. Other bilateral assistance has been available in the sector, for example, the United States Agency for International Development for resilient cities, the Norwegian Ministry of Foreign Affairs in the development of the Building Provisional Building Code, the European Union in disaster resilience, and the Department for International Development of the United Kingdom in regional infrastructure program that will benefit Myanmar. ADB, AFD, Department for International Development of the United Kingdom, JICA, and UN-HABITAT are sharing information on planned and ongoing activities. Such coordination helps avoid duplication, ensures being complementary at the project level, and helps influence policy reforms. Furthermore, Daw Aung San Suu Kyi's recent initiative is the establishment of the Development Assistance Coordination Unit and the Cooperation Partners Group to ensure assistance is government demand driven and not donor-driven.

B. ADB's Earlier Sector Support Programs and Experience

Experience and assistance in the sector. Previously, ADB funded water supply projects in Yangon, approved in 1973,⁵¹ and in Mandalay, approved in 1982.⁵² In 2013, the first capacity development technical assistance project⁵³ was provided to the then-DHSHD to assist in developing an urban development policy and to identify capacity building requirements. The work included proposals for a new planning law, and a revision in the structure and roles of the department. Further, it introduced the urban green growth concept. This was followed by a scoping study for a strategic development plan for Mandalay,⁵⁴ then the project preparatory technical assistance for the Mandalay Urban Services Improvement Project in 2014.⁵⁵ The implementation project started in December 2016.⁵⁶ In November 2016, a capacity development technical assistance project that developed the capacity of six cities to plan, budget, and prepare multisector urban development projects was completed.⁵⁷ ADB has assisted Mandalay and Yangon in improving water supply through a twinning partnership of urban water utility operators.⁵⁸ A grant project is being implemented that focuses on small-scale and tertiary infrastructure in Mandalay and Yangon.⁵⁹ ADB is also looking at assisting Yangon in the capacity development of the YRTA and in the development of a Bus Rapid Transport system.

⁵¹ ADB. 1973. *Report and Recommendation of the President to the Board of Directors: Proposed Loans to the Union of Burma for the Rangoon Water Supply Project*. Manila; and ADB. 1978. *Report and Recommendation of the President to the Board of Directors: Proposed Supplementary Loan and Technical Assistance Grant to the Union of Burma for the Rangoon Water Supply Project*. Manila.

⁵² ADB. 1982. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Technical Assistance Grant to the Union of Burma for the Mandalay Water Supply Project*. Manila.

⁵³ ADB. 2013. *Technical Assistance to the Republic of the Union of Myanmar for Capacity Development and Institutional Support*. Manila.

⁵⁴ ADB. 2013. *Technical Assistance to the Republic of the Union of Myanmar for Capacity Building Support for Project Identification-Strategic Development Plan for a Green Mandalay*. Manila.

⁵⁵ ADB. 2014. *Technical Assistance to the Republic of the Union of Myanmar for Preparing Mandalay Urban Services Improvement Project*. Manila.

⁵⁶ ADB. 2015. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Administration of Grant to the Republic of the Union of Myanmar for the Mandalay Urban Services Improvement Project*. Manila.

⁵⁷ ADB. 2013. *Technical Assistance to the Republic of the Union of Myanmar for Transformation of Urban Management*. Manila.

⁵⁸ ADB. 2011. *Technical Assistance for Supporting Water Operators' Partnerships in Asia and the Pacific*. Manila.

⁵⁹ ADB. 2014. *Grant Assistance to the Republic of the Union of Myanmar for the Pro-Poor Community Infrastructure and Basic Services Project*. Manila.

As part of the GMS project to develop transport corridors linking Myanmar to the PRC, Cambodia, the Lao People's Democratic Republic, Thailand, and Viet Nam, project identification has started in Hpa-An, Mawlamyine, and Myawaddy.

Lessons. The project completion reports for the Mandalay and Yangon water supply projects recommended to reduce the number of contracts and to reconsider entrusting the civil works to a parastatal organization as a large number of procurement packages and civil works carried out by force account had delayed project implementation.⁶⁰ Safeguards and land issues need to be dealt with in urban slum and community infrastructure projects. Based on recent experiences in processing and implementing technical assistance projects, grants, and loans, the following principles should be considered to make future programs more efficient: (i) allow an initial period of effective policy dialogue, (ii) develop sector indicators for institutional reform and financial performance of urban service operators, and (iii) enhance borrower commitment to tariff adjustments.

C. Other Development Partner Support

From the end of the 1980s until 2012, few development partners were active in Myanmar. Most agencies with a presence were involved in humanitarian aid, notably in response to the devastation caused by cyclone Nargis in May 2008. The United Nations Children's Fund (UNICEF) maintained involvement in rural water supply and sanitation, and recently undertook 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. In 2012, the MOC, with support from UN-HABITAT, opened the Urban Research and Development Institute.

Other key development partners have been active in the field during this time, including the AFD, which is providing parallel financing for the work in Mandalay; JICA, which helped develop the Strategic Urban Development Plan for Yangon and the urban transport master plan, and is involved in further water development projects in both Mandalay and Yangon; the Korean Export Import Bank, which is funding a major river crossing in Yangon and has \$1 billion for investment in the years 2016–2020; to name a few of the key players. In addition, the Department for Internal Development, with its small contribution to the Mandalay project, is scheduled to implement part of its \$160 million Infrastructure and Cities for Growth program in Myanmar, and requested to help restore the sewerage system in downtown Yangon, and assist in the improvements to 29 economic zones in Yangon.

D. ADB's Sector Forward Strategy

Priority assistance. With job creation as the government's central priority, the government aims to encourage investment by liberalizing the banking sector to provide easier access to loans and the establishment of special economic zones. This is expected to increase urbanization as most of the additional job opportunities will be in or around Myanmar's cities. The National Spatial Development Framework identifies the main urban areas where development is proposed. The growth of these cities will require additional investment in urban infrastructure and services. Furthermore, the system of service delivery will need to be enhanced. Government policy suggests this will be achieved through greater privatization which, as has been pointed out, will require a review of tariff structures. Modernized urban planning and management is key in ensuring that investment in urban infrastructure

⁶⁰ ADB. 1990. *Completion Report: Yangon Water Supply Project in Myanmar*. Manila; ADB. 1991. *Completion Report: Mandalay Water Supply Project in Myanmar*. Manila.

and services is used efficiently and achieves its aim, thus enabling urbanization to be a driving force for economic growth.

Support Area 1: Policy, Legal Framework, and Capacity Development. While much progress has been made in developing the Urban and Regional Planning Law, this will need further review and revision, with gaps being filled, as considered by the Union Assembly. For the law to be further effective, implementing regulations need to be established and staff members need to be trained to implement the law and regulations. Furthermore, the capacity of the appropriate central and local institutions needs to be enhanced. This, in turn, will require hiring additional staff members to be trained as planners, and placed initially in the DUHD's regional offices and later, in the townships; as well as redefining the central office's functions.

Support Area 2: Planning and Development of Corridor Towns. ADB support in water and other urban services and infrastructure will focus on the cities in strategic locations along the GMS East–West economic corridor that extends from Viet Nam through the Lao People's Democratic Republic and Thailand to Myanmar, and the GMS Northern economic corridor that connects Myanmar with India and the PRC. Linking urban development with GMS economic corridors will maximize the economic benefit of increased traffic and trade along the economic corridors by developing the cities as nodes of economic activities. This approach will provide an opportunity to create new growth poles to benefit their hinterlands and outlying regions, and the overall subregion. Accordingly, future projects in this sector will include the cities of Hpa-An, Mawlamyine, and Myawaddy as potential economic nodes along the GMS East–West economic corridor. In addition, ADB's investment will continue in Mandalay as it is strategically located on the Northern corridor linking India and the PRC; at the crossroads with the Mandalay–Nay Pyi Taw–Yangon highway; and in some limited assistance to Yangon. Furthermore, Bago will be included as it lies on the route connecting the East–West corridor with Yangon and is the planned site of a new international airport for the Yangon region.

Risks and assumptions. Assistance to Myanmar will inevitably entail risks. These include political, technical, institutional, and economic risks. The current government, led by the NLD, needs the support of the Armed Forces (Tatmadaw). Civil unrest in Rakhine Kachin, Kayin, and Shan States makes the current government vulnerable to moves by the Tatmadaw to reassert order and, in the process, usurp the elected government's authority.

There is a need for better mapping available to different users using a common georeferencing system. Preparing such maps requires time and resources. Maps used in cadaster require, in urban areas, a level of accuracy of less than a meter. Land use zoning maps also need to be highly accurate as these are legal documents. The maps based on satellite imagery are available but not cheap. Furthermore, the maps need to be auto-rectified, requiring skilled surveyors to carry out a number of field measurements. The introduction of such a system will take time, equipment, and manpower.

The lack of trained planners and people with exposure to improved methods of managing water supply will slow the introduction of the development of plans, which can be used to guide development and improve management of public utilities. Government must be willing to increase the number of staff members within the different responsible agencies and ensure they are properly trained. A possible complication is the restructuring and empowerment of local government. The roles and responsibilities of the townships and regions or states, versus those of the union ministries, need to be clarified. Clarification of the GAD's in the revised local governments will be needed. While this is being determined, it is likely that urban and regional planning, along with project preparation and implementation, will be affected.

The added financial burden on the union and the local governments of the reforms proposed and expected will depend, to a certain extent, on the continuing growth of the economies of Southeast

Asia and the PRC. While economic stagnation or collapse are not seen as likely scenarios in the future, there is a small risk that economic sanctions might be reimposed. If political reforms continue, these could accelerate the introduction of structural changes considered necessary for the long-term success of the ADB strategy.

III Sector Road Map and Results Framework

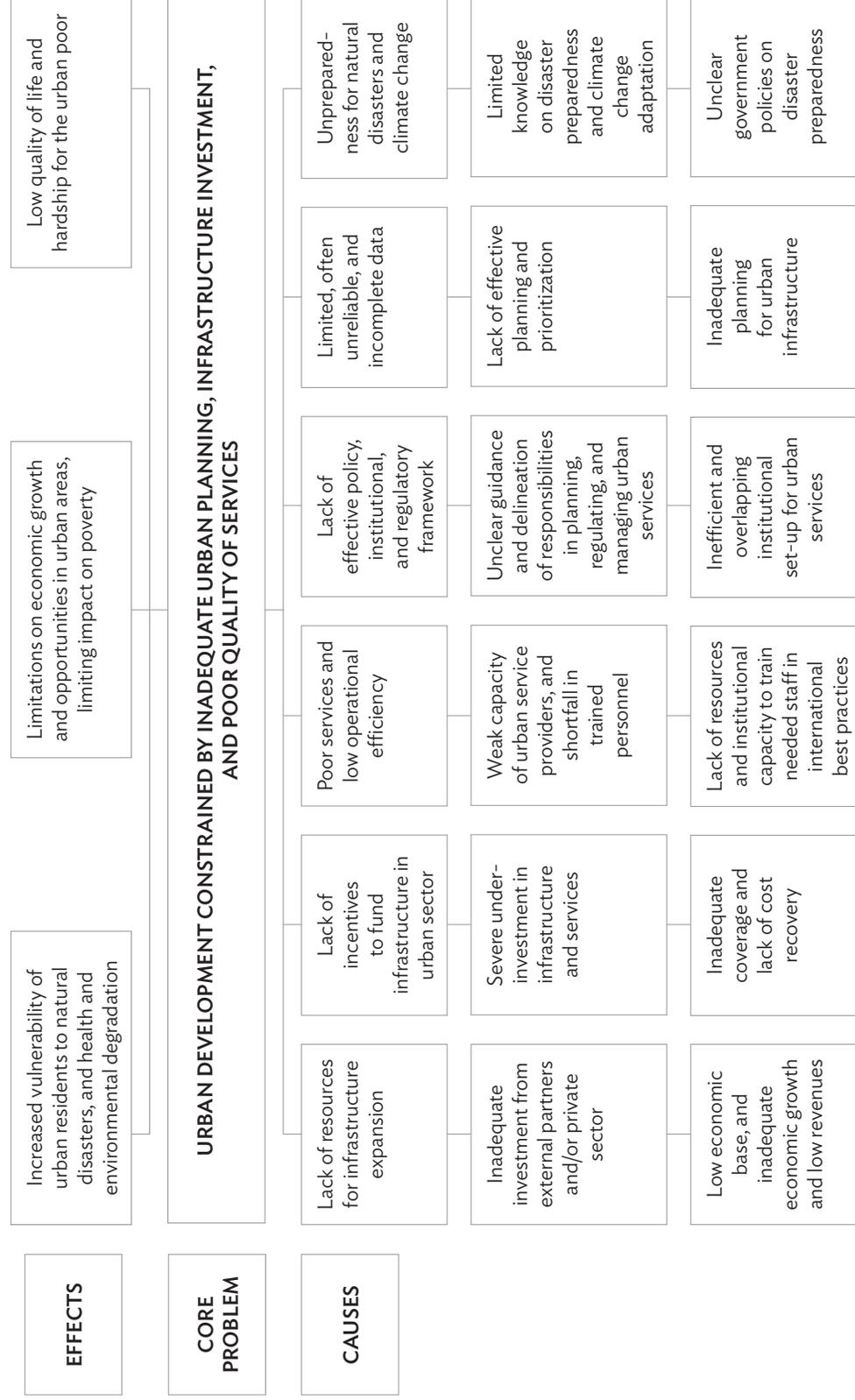
Country Partnership Strategy				ADB Sector Operations
Objectives and Related Impacts	Priority Areas	Key Outputs that ADB Contributes to	Outcome Indicators	Planned and Ongoing ADB Interventions
Improved access and connectivity	Link business to regional and global markets	Urban centers serving as growth poles along economic corridors	<p>Population with access to safe water increases to 90.0% in 2021 (80.6% in 2015)</p> <p>Population with access to sanitation increases to 90.0% in 2021 (79.6% in 2015)</p>	<p>Ongoing portfolio</p> <p>Grant: Pro-Poor Community Infrastructure and Basic Services (\$4 million)</p> <p>Loan and Grant: Mandalay Urban Services Improvement Project (\$60 million and \$4 million)</p> <p>Planned operations and contribution</p> <p>Loan and Grant: Third Greater Mekong Subregion Corridor Towns Development Project (\$80 million and \$10 million)</p> <p>Loan and Grant: Second Mandalay Urban Services Improvement Project (\$150 million and \$15 million)</p> <p>KSTA: Improved Urban Planning and Management in Yangon City (\$3 million)</p> <p>KSTA: Housing Sector Strategy (\$225,000)</p>

ADB = Asian Development Bank, KSTA = knowledge and support technical assistance, PPTA = project preparatory technical assistance.

Source: Asian Development Bank.

APPENDIX 1

Problem Tree for Urban Development and Water Sector



Source: Asian Development Bank.

APPENDIX 2

Urban Centers with Populations Greater than 50,000 (2014)

	Urban Center	2014	Number of Centers	Population Size
1	Yangon (Municipality)	5,160,512	1	More than 5 million
2	Mandalay (Municipality)	1,305,628	1	1 million plus
3	Nay Pyi Taw Capital Region	375,189	1	300,000 to 500,000
4	Taunggyi	264,804	5	200,000 to 300,000
5	Bago	254,425		
6	Mawlamyine	253,734		
7	Myitkina	243,031		
8	Mon Ywa	207,489		
9	Lashio	174,335	10	100,000 to 200,000
10	Patheingyi	169,773		
11	Pyin Oo Lwin	158,783		
12	Pyaw	134,861		
13	Kalay	130,506		
14	Myeik	115,141		
15	Myawady	113,155		
16	Meitkila	111,522		
17	Toungoo	108,589		
18	Sittway	100,948		
19	Magway	94,038	22	50,000 to 100,000
20	Pakkoku	90,842		
21	Myingyan	87,708		
22	Hinthada	83,762		
23	Sagaing	81,432		
24	Dawei	80,117		
25	Mogon	77,609		
26	Hpa-An	75,141		
27	Muse	74,313		
28	Shwe Bo	69,036		
29	Pyu	63,880		
30	Phakant	60,123		
31	Myaungnya	58,698		

continued on next page

Appendix 2 Table *continued*

Urban Center	2014	Number of Centers	Population Size
32 Bhamo	58,696		
33 Dela	53,258		
34 Kawthoung	57,949		
35 Thanbyuzayat	57,208		
36 Thaton	55,047		
37 Mudon	52,514		
38 Augla	52,487		
39 Tachileik	51,553		
40 Loikaw	51,349		

Source: Department of Population, Ministry of Immigration and Population. 2015. Township Urban Populations. *Population and Housing Census*. Nay Pyi Taw.

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

Myanmar

This assessment, strategy, and road map of Myanmar's urban development and water sector provides (i) a review of the government's policies and regulatory framework for the water and other urban infrastructure and services sector, (ii) a review of the current level of urban infrastructure and municipal service delivery, (iii) an identification of development needs, and (iv) recommendations for the sector forward strategy for the Asian Development Bank (ADB). It outlines possible areas for further assistance by ADB, while identifying proposals and commitments by other development partners. This assessment is a revision of the Urban Development and Water Sector Assessment, Strategy, and Road Map, and reflects the evolving development partnership of ADB with Myanmar.

About the Asian Development Bank

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 a large share of the world's poor. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

