

SECTOR ASSESSMENT (SUMMARY): MULTISECTOR (IRRIGATION, DRAINAGE, AND FLOOD PROTECTION; ROAD TRANSPORT; SOLID WASTE)

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. The urban population of the People's Republic of China (PRC) reached 711.8 million in 2012, or about 53% of the overall total of 1.354 billion.¹ The country's urban population has grown 2.9%–4.5% annually during 2002–2012. The trend is projected to continue even after the population hits its projected peak of 1.458 billion in 2030. By then, the urban population is expected to reach 1 billion, or 69.0% of the total. In 2012, two-thirds of the growth in the urban population was attributed to migration from rural to urban areas. Most of migrants live in growing and emerging small and medium-sized cities. Large investments are needed in public infrastructure to provide municipal services for this rapidly expanding urban population. Although urbanization and sustained economic growth provide significant opportunities for further reduction in poverty, they also pose important challenges in terms of environmental degradation and socioeconomic imbalances. The threats to sustainable urban growth and achieving a better quality of life in cities include the rising water and air pollution in the country, the growing need to manage municipal solid waste and meet expanding energy demands, worsening road congestion, and depletion of land and other natural resources.

2. **Challenges and opportunities.** Yunnan Province in the southwest of the PRC is one of 12 less-developed municipality, provinces and autonomous regions targeted under the PRC's Western Development Strategy. The province shares 4,060 kilometers (km) of border with the Lao People's Democratic Republic, Myanmar and Viet Nam, and is emerging as an important national transport and trade gateway to these neighboring countries, which are members of the Association of Southeast Asian Nations and, along with the PRC, seek to boost regional economic cooperation and integration as part of the Greater Mekong Subregion (GMS). Yunnan has invested in 55,099 km of national roads and highways since 2001, rapidly improving transport connectivity within the province and with its GMS neighbors.² Despite this, its economic growth has been slow and its per capita gross domestic product of \$3,505 in 2012 was only 57.5% of the national average of \$6,093, making it one of the country's poorest provinces. Even though the provincial capital of Kunming is located at the junction of three major GMS transportation corridors, Yunnan's share of the PRC's trade volume with other GMS countries dropped steadily during 2001–2012, from 20.0% to 16.0%.³ In 2012, Yunnan's urbanization rate was only 39.3%, compared with the national average of 52.6%. Its relatively slow urbanization is considered a major obstacle to its economic growth and greater economic integration with the region.

3. Yunnan adopted the Central Yunnan City Cluster Economic Area Development Strategy to guide implementation of its 12th five-year plan for 2011–2015. The province aims to stimulate urbanization and socioeconomic growth by developing city clusters. City clusters comprise cities connected by transport networks to create growth poles with a variety of industries and commercial activities. The strategy covers the provincial capital of Kunming along with Qujing

¹ National Bureau of Statistics, Government of the People's Republic of China. 2013. *Statistical Yearbook 2013*. Beijing.

² Yunnan Bureau of Statistics. 2013. *Yunnan Statistical Year Book 2013*. Kunming.

³ Kunming is located on the northern, eastern, and north–south corridors of the GMS. During 2001–2012, annual trade between the PRC and the other GMS countries increased from \$10.8 billion to \$115.2 billion. Yunnan's share grew from \$2.2 billion to \$16.0 billion over the same period.

City, Yuxi City, and Chuxiong Yi Autonomous Prefecture, which are all located in the area surrounding Kunming and within 150 km–200 km of the capital. The city cluster covers an area of 94,588 square kilometers, has a population of 17.0 million (about 30% of the provincial total), and contributes 59% of Yunnan's gross domestic product. Many of Yunnan's small and medium-sized cities are currently isolated economically and struggle with a lack of basic infrastructure. Combined with the effects of mountainous terrain, weak flood protection, poor solid waste management, and limited sewerage coverage have made these cities (i) especially vulnerable to natural disasters, (ii) victims of rapid environmental degradation, and (iii) unattractive for public and private investments.

4. **Flood management.** Flooding is one of the most frequent and serious natural disasters that hinder urban development in the PRC, especially in the mountainous western region. In 2009, for example, about 21.1 million people were physically or economically affected by flood disasters, which resulted in about CNY374.5 billion of direct losses.⁴ The problem worsens each year. Yunnan's predominantly hilly and mountainous terrain helps trigger frequent floods and waterlogging in cities and agricultural lands surrounding them. A total of 390,500 hectares of land were affected in 2012, 7% of it agricultural. Flood records since 1997 indicate that economic losses were CNY70.6 million in Chuxiong Municipality, CNY92.7 million in Lufeng County, and CNY84.8 million in Wuding County—where three project cities will be supported by the Yunnan Chuxiong Urban Environment Improvement Project.⁵ This flooding hampers their economic development. These and many other small and medium-sized cities in the province have only preliminary flood early warning and evacuation systems. Upgrading and strengthening these systems offers a relatively low-cost option for improving flood management.

5. **Solid waste.** The growth in solid waste from economic and population expansion has become a serious threat to the urban environment in the PRC. Solid waste collection in urban area is growing 8.0%–10.0% annually, while municipal solid waste collection during 2001–2012 increased by about 2.0% a year. Although municipal solid waste collection increased from 135.0 million tons to 170.8 million tons during 2001–2012, about 24.0% of the waste is still treated improperly. In Yunnan, the amount of municipal solid waste collected almost doubled from 1.6 million tons to 3.0 million tons during 2001–2012. An inadequate ability to collect, transport, and treat waste is the major reason for the increasingly poor environment and health conditions in the province's smaller cities, including the three project cities in Chuxiong Municipality, Lufeng County, and Wuding County. Their facilities cannot keep up with the growth in solid waste that is accompanying their development. The three project cities and their residents face further deterioration in these conditions due to a lack of appropriate equipment, irregular collection, inadequate handling, and illegal dumping into rivers, on to streets, and in the city outskirts.

6. **Road and related urban infrastructure.** The PRC's rapid urbanization raises urgent needs for more city roads, bridges, water supply and sewerage systems, and other municipal infrastructure and facilities. Vehicle registrations, which reached 109.3 million at the end of 2012, increased steadily by an average of 17.8% per annum during the 2001–2012 period. The total length of paved road in urban areas grew to 327,081 million km, and sewer and water supply pipelines were extended to 439,080 km and 591,872 km, respectively. Urbanization has been slower in Yunnan, and so has the growth of municipal infrastructure. Although it accounts for 3.4% of the country's population, the province had only 5,276 km of urban roads in 2012, or 1.5% of the national total. The province's installation of urban sewerage and water supply

⁴ Ministry of Water Resources, Government of the PRC. 2010. *Bulletin of Flood and Drought Disasters in China*. Beijing.

⁵ Estimated in 2012 prices.

pipelines are also lagged behind. The 5,276 km of sewerage pipelines in 2012 represented 1.2% of the national total, and the 8,011 km of water supply pipelines also equated to a low 1.4% of the national network.⁶

7. Yunnan's mountainous terrain limits urban expansion and development in the project areas of Chuxiong Municipality, Lufeng County, and Wuding County. Even when urban roads have been extended into surrounding areas, many of the villages receive few additional benefits in terms of access to water and sanitation infrastructure. The problem results from weaknesses in all aspects of the planning, engineering, design, construction, management, and maintenance processes.

2. Government's Sector Strategy

8. The main theme of the PRC's Twelfth Five-Year Plan, 2011–2015 is to build a harmonious and moderately prosperous society and to achieve more balanced economic development that considers environmental sustainability and social inclusiveness. The government aims to manage urbanization more carefully in recognition of the challenges in the past that have been posed by rapid rural–urban migration. The plan calls for the development of small and medium-sized cities as local economic centers and addressing socioeconomic inequalities through targeted investments in urban and rural public services and adjustments to the economic structure and social development reforms.

9. Yunnan's strategy for urban development, outlined in its five-year plan for 2011–2015,⁷ emphasizes (i) water source development to ensure quality of living and economic development for the province's people; (ii) improving the safety of rural and urban drinking water; (iii) rehabilitation and flood control on rivers; (iv) integrated transportation system, including rail, highway, aviation, and waterway transport; (v) energy development; and (vi) information and communications development. The plan aims to achieve an urbanization rate in the province of 60.0% by 2015. To accelerate its urbanization, the province approved the Central Yunnan City Cluster Economic Area Development Plan for 2009–2020.⁸ It aims to: (i) develop city clusters as economic growth bases and gateways for trade and economic integration with the neighboring countries of the GMS and the Association of Southeast Asian Nations, (ii) lead regional economic development, and (iii) accelerate urbanization to hasten economic development and improve quality of life.

10. All infrastructure development components under the Yunnan Chuxiong Urban Environment Improvement projects are listed in the five-year plans and urban development master plans for 2011–2015 in Chuxiong Municipality, Lufeng County, and Wuding County. All the plans seek to (i) steadily expand urban development to optimize the use of their flatland areas; (ii) support industrial and commercial development to strengthen their individual economies, as well as to contribute to the economic growth of the Yunnan central city cluster; (iii) protect ethnic minority cultural heritages and promote tourism in a sustainable manner; (iv) implement social reforms to strengthen regional development; and (v) improve their social safeguard systems and the living standards and environments of their cities. The project will

⁶ During 2001–2011, the PRC's overall sewer pipeline network expanded by 10.1% annually, but Yunnan's grew by only 7.8%. The country's water supply pipeline length increased by 7.1% per annum nationally. The rate in Yunnan was only 4.2%.

⁷ Government of Yunnan. 2009. *Yunnan Economic and Social Development Twelfth Five Year Plan (2010–2015)*. Yunnan.

⁸ Yunnan Development and Reform Commission. 2009. *Central Yunnan City Cluster Economic Area Development Plan (2009–2020)*. Yunnan.

provide financial support to (i) construct flood protection dikes and river landscaping, provide solid waste equipment, and build urban roads and related infrastructure; and (ii) strengthen local government capacity in urban planning; transport planning and road safety; the planning, operation, and maintenance of infrastructure for solid waste management; and public financial management. The Chuxiong, Lufeng, and Wuding governments expect the project to strengthen their comparative advantages and the competitiveness of their cities.

11. In Chuxiong Municipality, the project's flood management activities on the Longchuan River will remove a development constraint in the northern part of the city center. The project's new urban road network component will support tobacco industries and biotechnological and pharmaceutical production in the southern section of the city center. Improved solid waste management will strengthen waste handling capacity throughout the city and improve the environment and living conditions. New sewage pipelines and sewage interceptor facilities will reduce public health concerns and enhance the environment by collecting untreated wastewater in and around the southern part of the city center.

12. In Lufeng County, the project will support the city's effort to strengthen and diversify its metallurgical industry-based economy, while also protecting and improving the living environment. Flood management of East and West rivers and surrounding road network construction under the project will strengthen the existing dikes and provide an opportunity for environmentally-friendly commercial and residential development in the areas improved. Solid waste management and sewage pipelines with the sewage interceptor facilities will reduce the problem of illegal waste dumping and provide a cleaner and safer environment for the local people.

13. The project will help Wuding County expand its urban area into the northern part of the city center. Flood management, road network development, and the provision of water supply, wastewater, and storm water pipelines, as well as a storm water detention pond, will improve living conditions, while also strengthening the city's organic food processing and mining industries. The project will also ensure that a basic solid waste management system will be developed to improve sanitation and the environment throughout the city center.

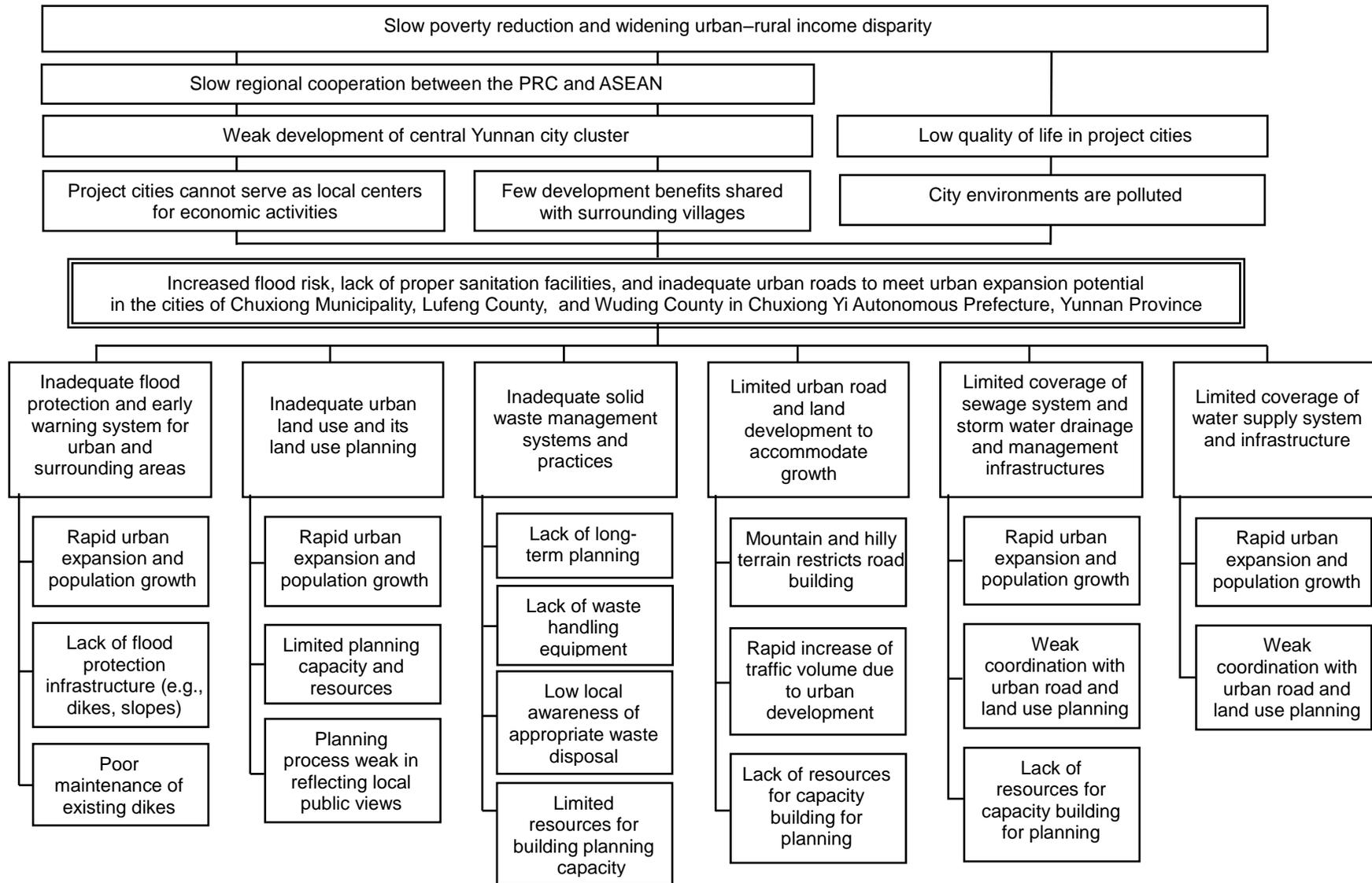
3. ADB Sector Experience and Assistance Program

14. As of January 2014, ADB had provided 49 loans totaling \$5.7 billion to the PRC for urban sector projects.⁹ In line with shifting the PRC's development challenges, ADB support has focused on balanced socioeconomic development, environmental improvement, and promotion of regional cooperation, with a growing emphasis on inclusive growth and integrated urban and rural development from the Country Partnership Strategy, 2008–2010. General lessons from urban development projects completed so far in the PRC include the need to (i) ensure a strong commitment from the government for effective project management and timely appropriation of counterpart funds; (ii) focus attention on implementation and supervision of resettlement; (iii) enhance capacity to ensure that road safety is improved along with road construction; and (iv) consider the engagement of experienced private agencies to help implement projects, including tendering agencies to strengthen the procurement processes.¹⁰ All lessons have been incorporated in the project design.

⁹ Subsector classification of urban sector projects include water supply and sanitation, waste management, urban transport, energy utility services, and energy efficiency and conservation.

¹⁰ As of January 2014, 14 project completion reports were available for urban sector, of which 11 are related to water supply and other municipal infrastructure and services sector, 2 are related to multisector, and 1 is related to energy sector.

Problem Tree



ASEAN = Association of Southeast Asian Nations, PRC = People's Republic of China.
 Source: Asian Development Bank.

