

SECTOR ASSESSMENT (SUMMARY): MULTISECTOR (AGRICULTURE, NATURAL RESOURCES, AND RURAL DEVELOPMENT; AND WATER AND OTHER URBAN INFRASTRUCTURE AND SERVICES)

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. Water is possibly the single most pressing resource bottleneck to the ongoing economic growth of the People's Republic of China (PRC) until 2030. Annual per capita freshwater resources are among the lowest for a major country, with available water resources further reduced by ongoing pollution issues and about 300 million rural Chinese lacking access to safe drinking water. Feeding its population of 1.4 billion will require producing more food with less water. With higher rates of urbanization, increasing demand for drinking water and domestic use will put greater stress on existing water sources.

2. Climate change scenarios for the PRC show an increased likelihood of more severe storms, floods, and droughts in many provinces. For example, the drought in 2011 made people realize that even the Yangtze River basin, which is recognized for high annual rainfall, is not immune from the impacts of climate change and unsustainable water consumption. This lesson reinforced the need to implement adaptation measures and urgently strengthen disaster risk management. During 2010–2013, annual flood damages were worse than damages reported in 1998, when the country was hit by the severe Yangtze River basin floods. The PRC, including its drought-prone northern part, suffered from flood disasters in July 2016, resulting in over \$28 billion of economic damage.

3. Water pollution is another water-related challenge for the PRC. Many rivers have been seriously polluted; and pollution incidents occur frequently, including the water pollution accidents in Lanzhou and Wuhan in 2015. All these incidents indicated that water pollution can easily spread across the boundaries of administrative jurisdictions, causing severe environmental and economic damages in large areas; and invite public concern and potential social unease, if not immediately and effectively controlled.

4. The water crisis in the PRC is already costing the country at least 2.3% of gross domestic product, of which 1.3% is attributable to water scarcity and 1.0% to the direct impacts of water pollution.¹ The country's ability to make available an adequate quantity and quality of water for agricultural, domestic, environmental, and industrial uses will depend on better management of water resources and increased cross-sector planning and integration.

5. Zuoquan County, located in the Hai River basin, had a population of 165,042 in 2015, about 57% of which is rural. The county's mean annual precipitation is 520 millimeters, with more than 70% of rainfall occurring from June to September. About 98% of Zuoquan County is in the Qingzhang watershed. Originating in the county, the Qingzhang River flows into the Zhang River in Hebei Province—a tributary of the Hai River. The Qingzhang River, together with the Shixia and Xiajiaozhang reservoirs, is a strategic water source for 1.92 million people in Shanxi Province. As an important source for the Hai River basin, the water quality of Qingzhang River also bears significantly on the water safety of 1.2 million people in downstream areas of Hebei and Henan provinces.

¹ Asian Development Bank (ADB). 2011. *Eco-Compensation for Watershed Services in the People's Republic of China*. Manila.

6. **Soil erosion and sedimentation.** Located on the Loess Plateau, Zuoquan County experiences serious soil erosion, with over 50% of its land eroded to some degree. The vegetation coverage of the Qingzhang River's upstream catchment is generally good, but the vegetation condition for areas near villages and towns and along the roads is poor. Some areas are even bare land without vegetation. Heavy rain has caused soil erosion from these areas with little or without coverage. Soil erosion also comes from unprotected riverbanks. Sediment from soil erosion has resulted in the siltation of rivers, streams, and reservoirs, including sections of the Qingzhang River and the Shixia Reservoir. According to the record of the Zuoquan Shixia Reservoir Management Office from 1990 to 2013, the total accumulated siltation volume during these 23 years was 345,000 cubic meters (m³), with an average siltation volume of 15,000 m³ per year. Siltation of the reservoir compromises its flood control function and reduces the water storage capacity. Soil erosion also impairs other vital ecosystem services. Projected increases in storm intensities will likely increase the risk of soil erosion.

7. **Flood risks.** Zuoquan County suffers from frequent floods because of lack of adequate infrastructure. Riverine floods occur in most sections of the Qingzhang River at a flood frequency of one in 5 years. The main urban section contains a structural embankment whereas rural areas only have isolated earth bunds. Bank protection for both sides of the river in the west district (a new city district under development) is almost nonexistent—a few earth bunds built from the 1950s to the 1980s are in dilapidated conditions, and some have been washed down to the river, causing severe blockages. Flood risks are heightened by the projected increase in climate-induced storm intensities. A major flood in August 1996 caused huge losses, affecting about 100,000 people in all 10 townships of Zuoquan County. About 9,000 houses were destroyed, and nearly 140,000 *mu* of cropland were damaged.² The flood caused more than 30 deaths and 550 injuries. Flooding not only poses a significant risk to people's lives, but is also a key restraining factor of sustainable development in Zuoquan County.

8. **Low quality and inadequate water supply.** The separate planning process and different ownership structures for water management in Zuoquan County have resulted in serious development gaps in water supply facilities. Zuoquan County has functioning water supply facilities for its 60,000 residents in the county's urban center. However, the water supply to rural residents is lacking or of poor quality, without any treatment. The water supply pipes are also aged and leaking. Further, though they have permits to withdraw water from the Shixia Reservoir, most rural enterprises use groundwater without proper infrastructure to access surface water, resulting in the depletion and unsustainable use of groundwater. These rural enterprises, which hire over 90% of local villagers, are an important income source for rural farmers. Inequitable and unsafe water supply is inconsistent with socially inclusive development, and hinders the government's goal of urban–rural integration.

9. **Insufficient wastewater collection and treatment.** The wastewater collection and treatment capacity in Zuoquan County cannot meet the demand of increasing urbanization. Some sewer networks are aged and leaking, causing pollution to the Qingzhang River. Key issues include (i) wastewater overflowing from some flow interceptors into the Qingzhang River, even in the dry season; (ii) the trunk sewer leaking directly into the Qingzhang River, as it is laid along the river; (iii) the Zuoquan County wastewater treatment plant facing frequent equipment breakdown; and (iv) the capacities of wastewater collection and treatment being unable to meet current and future needs.

² A *mu* is a Chinese unit of measurement (1 *mu* = 666.7 square meters).

10. Lack of ecosystem-friendly infrastructure connecting urban center and new district.

Zuoquan County's urban development master plan expected the urban population to grow to about 82,000 in 2020 and 113,000 in 2030.³ The urbanization rate is projected to increase to 62% in 2030. The existing Binhe Road, a trunk road connecting the urban center to the new district in peri-urban and rural areas, cannot satisfy current and increasing traffic demands. The east section of the Binhe Road has reached its design capacity, while the west section of about 5 kilometers is yet to be expanded to meet the demand. Moreover, the storm water pipe and the trunk sewer to the new district need to be installed concurrently along the Binhe Road—as an integrated approach to improving water resources management together with road improvement—which will be cheaper than constructing them separately.

11. Weak institutional capacity. Zuoquan County's water resources management is fragmented, lacking a coordinated and integrated approach to land use planning, and urban and rural development. The urban and rural water supply systems are separate, with large gaps in water quality and service reliability. Zuoquan County's capacity for project planning and implementation is weak since it has little experience with international organizations. The counterpart staff of the project do not have experience in implementing Asian Development Bank (ADB) projects and are unfamiliar with ADB procedures and requirements. The current flood-warning system is inadequate, and cannot provide effective and timely warnings to rural communities.

2. Government's Sector Strategy

12. Overall, the PRC aims to build a harmonious and moderately prosperous society through livelihood improvement, equitable urbanization and coordinated urban–rural development, and regionally balanced and environmentally sustainable growth. The main theme of the PRC's Thirteenth Five-Year Plan on National Social and Economic Development, 2016–2020 is to build a harmonious and moderately prosperous society; and achieve more balanced economic development that considers environmental sustainability, social inclusiveness, and ecological civilization.⁴

13. In January 2012, the government issued the “Opinion on Implementing the Most Stringent Water Management System.”⁵ This established the following three “red lines” for water management: (i) capping total national water use at 700 billion m³ in 2030; (ii) improving water use efficiency (by 2030, irrigation efficiency increased to 0.60; and industrial water use reduced to 40 m³ per CNY10,000 industrial added value); and (iii) improving the water quality compliance rate above 95% by 2030.

14. The government's action plan for water pollution prevention and control, released in 2015, lists several measures to tackle water pollution and improve water and ecological quality by 2030.⁶ The plan includes the following indicators by 2020: (i) the quality of over 70% of the water body in seven key river basins, such as the Yangtze River and the Yellow River, will reach class III or above; (ii) the amount of foul water in urban built-up areas will be controlled and will not exceed

³ Zuoquan County Government. 2011. *Zuoquan Urban Development Master Plan, 2011–2030*. Zuoquan.

⁴ Government of People's Republic of China. 2016. *Thirteenth Five-Year Plan on National Economic and Social Development*. Beijing.

⁵ Government of People's Republic of China. 2012. *Opinion on Implementing the Most Stringent Water Management System*. Beijing.

⁶ Government of the People's Republic of China. 2015. *China announces action plan to tackle water pollution*. 16 April. Beijing. http://english.gov.cn/policies/latest_releases/2015/04/16/content_281475090170164.htm.

10%; (iii) the water quality of 93% of the sources for urban water supply will reach class III or above; and (iv) 70% of coastal sea water quality will reach Class I or II.

15. The government's New Urbanization Plan, 2014–2020 also highlighted the environmental carrying capacity of river basins, and urged urban master planning to draw red lines to protect surface and underground waters during future urbanization.⁷ The sponge city initiative aims to build up infrastructure to collect excess rainfall and integrate flood control in urban planning.

16. Guided by national government policies, Shanxi Provincial Government declared Zuoquan County part of the ecological barrier for Shanxi Province, prioritizing eco-environmental protection in the area. Zuoquan County government is committed to ecological civilization, prioritizing and integrating environmental and ecological protection goals in the county's overall development strategy. Zuoquan County government has formulated its urban development master plan (2011–2030, footnote 3), its stormwater and flood control special plan (2014–2030), and other measures to implement the national policies on water management.⁸

3. ADB Sector Experience and Assistance Program

17. ADB's country partnership strategy for the PRC, 2016–2020 focuses on innovative projects where ADB can play a catalytic role in managing climate change and the environment, promoting regional cooperation and integration, supporting inclusive economic growth, fostering knowledge cooperation, and supporting institutional and governance reform.⁹ ADB will support operations that will produce regional benefits, such as achieving greenhouse gas emissions commitments ahead of the 2030 target; pilot testing projects to reduce air, water, and soil pollution; and promoting emerging renewable technologies, such as solar power and carbon capture and storage. These strategic priorities are aligned with the PRC's Thirteenth Five-Year Plan (footnote 3), ADB's Midterm Review of Strategy 2020, and ADB's approach to supporting upper middle-income countries.¹⁰

18. ADB has fostered a diverse and active portfolio in natural resources management and sustainable water resource use, flood management, water supply, and wastewater treatment. ADB assistance to the PRC's water resources management has been effective in addressing a range of water resources protection problems, with a positive impact on water resources, pollution control, and public health. Lending in the agriculture and natural resources sector has increased since 2006. Since 1998, about 20 ADB-financed loan projects to the PRC's water resources sector have been financed. ADB has been supporting the PRC's development initiatives, focusing on the provision of infrastructure and the creation of an enabling environment to lay a foundation for sustainable socioeconomic development. Shanxi Province has received about \$1.2 billion from international development agencies for more than 12 infrastructure projects. ADB, along with the World Bank, is the main agency for such financing. Lessons learned from previous projects are used to develop and design the project.

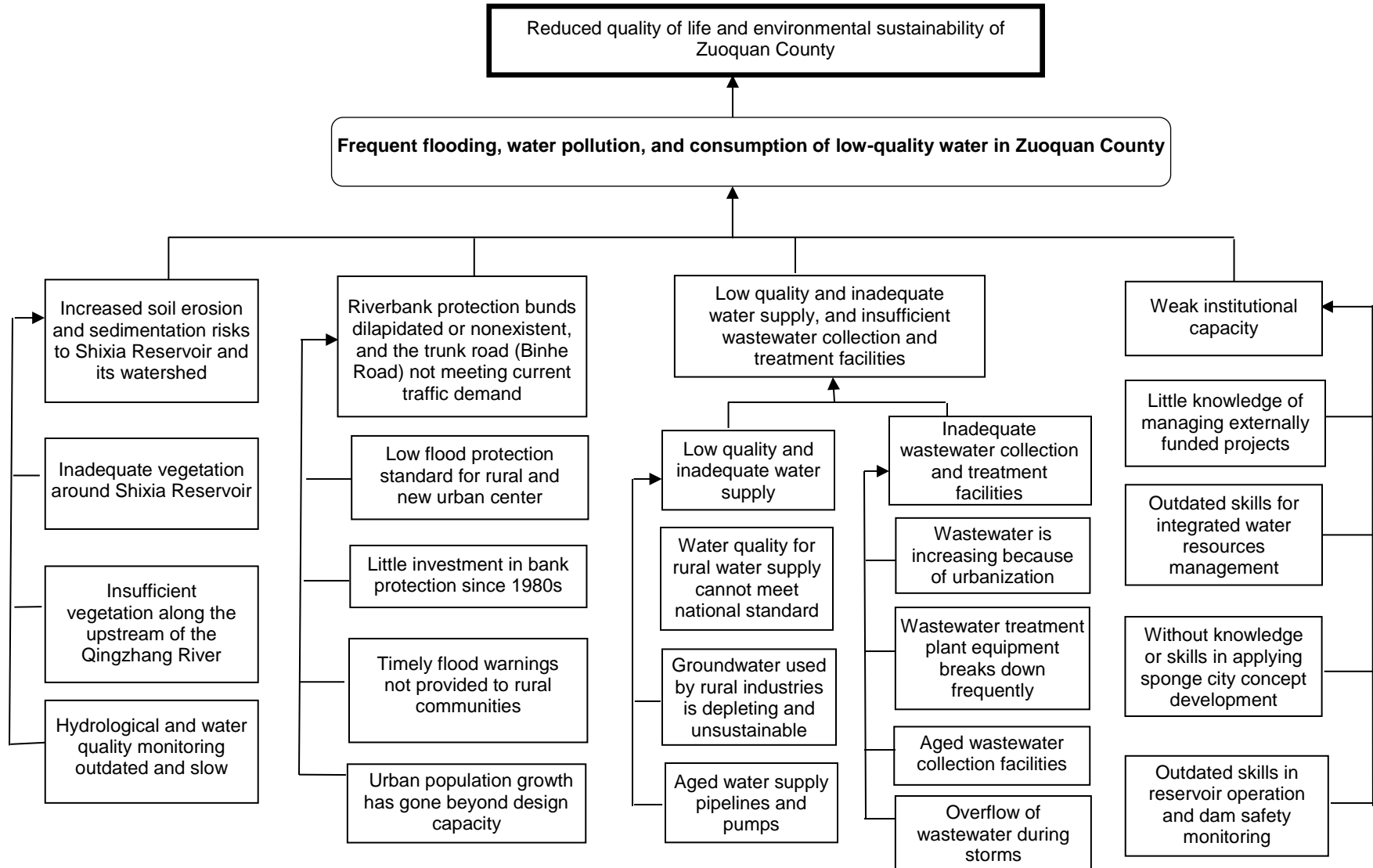
⁷ Government of People's Republic of China. 2014. *New Urbanization Plan*. Beijing.

⁸ Zuoquan County Government. 2014. *Zuoquan Stormwater and Flood Control Special Plan, 2014–2030*. Zuoquan.

⁹ ADB. 2016. *Transforming Partnership: People's Republic of China and Asian Development Bank, 2016–2020*. Manila.

¹⁰ ADB. 2014. *Midterm Review of Strategy 2020: Meeting the Challenges of a Transforming Asia and Pacific*. Manila.

PROBLEM TREE FOR MULTISECTOR (Agriculture, Natural Resources, and Rural Development; and Water and Other Urban Infrastructure and Services)



Source: Asian Development Bank.