

## SECTOR ASSESSMENT (SUMMARY): AGRICULTURE AND NATURAL RESOURCES<sup>1</sup>

### A. Water Resources Management

1. The People's Republic of China (PRC) is undergoing a transition from construction-oriented water resources management to sustainable and integrated water resources management that promotes people-centered development and balances the interests of social welfare, economic efficiency, and sustainability of aquatic ecosystems. To promote water conservation, the PRC is developing a system of water rights—or water allocations—between provinces within river basins. The Yellow River Basin is the first large river basin in the PRC to allocate water among its provinces. The 10 provinces in the basin were allocated a total annual consumption of 27 billion cubic meters (m<sup>3</sup>), representing 47% of the Yellow River's mean annual flow of 58.0 billion m<sup>3</sup>.<sup>2</sup> Water allocation is also a policy instrument for managing inevitable trade-offs between economic sectors. Economic efficiency favors allocation of scarce water (i) from subsistence crops to commercial crops, (ii) from agriculture to industry, and (iii) from upstream to downstream provinces. However, equity considerations require that some water is allocated to upstream provinces where it is likely to be used for subsistence agriculture. To achieve balanced development, the government has allocated Qinghai Province 1.41 billion m<sup>3</sup> of water (consumption), about half of the Yellow River Basin's average per province allocation. This is consistent with the government's western rural development and poverty alleviation policy, one priority of which is to address the growing inequalities between western areas and eastern areas.

2. The Qinghai Comprehensive Water Resources Plan (CWRP) for 2008–2030 recognizes the need for Qinghai to pursue a combination of water supply and demand management involving new water development, including interbasin transfers and increased extraction of groundwater, and adoption of “water-saving” technology.<sup>3</sup> The plan envisions that irrigation water use efficiency will increase from 35% in 2009 to 53% by 2020, and to 57% by 2030.

3. Increased water use efficiency will result in real water savings under circumstances where local “losses” (diversion minus consumption) are discharged to “sinks,” such as saline groundwater, where they become either unavailable or unsuitable for reuse further downstream. However, local “losses” are expected to return to the Yellow River via the underlying fresh groundwater. The estimated changes in water requirements resulting from the proposed Qinghai Rural Water Resources Management Project are presented in the table below. The table indicates that (i) consumption will increase by 11.2 million m<sup>3</sup> (21%), because of the increased cropping area, but (ii) diversion will decrease by 36.2 million m<sup>3</sup> (24%) because of the expected increase in water use efficiency.

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<sup>1</sup> This summary is based on *Technical Assistance Final Report—People's Republic of China: Preparing Qinghai Rural Water Resources Management Project*. <http://www.adb.org/Documents/Reports/Consultant/42016-PRC/default.asp>. Available on request.

<sup>2</sup> Government of the People's Republic of China, Ministry of Water Resources. 2008. *Statistics of Water Resources, 2007*. Beijing.

<sup>3</sup> Qinghai Provincial Government, Qinghai Provincial Water Resources Department. 2008. *Qinghai Comprehensive Water Resources Plan for 2008–2030*. Xining, Qinghai.

### Changes in Water Requirements in the Project Area

Parameter	Unit	Without Project	With Project
Cropping area	hectare	11,230.0	13,903.0
Water requirement	millimeter	470.0	460.0
Efficiency	%	35.0	56.0
Consumption	million cubic meters	52.8	64.0
Return flow	million cubic meters	98.0	50.6
Diversion	million cubic meters	150.8	114.6

Source: Asian Development Bank and Provincial Project Management Office estimates.

## B. Irrigation

4. By the end of 2009, the total national effective irrigated area reached about 57.8 million hectares (ha). Water-saving irrigation served 23.5 million ha, representing 41% of the total irrigated area, of which 10.1 million ha had lined canals, 5.6 million ha had low-pressure pipes, and 3.9 million ha had sprinklers or drip irrigation (footnote 2). The irrigation area in Qinghai was only 176,600 ha, or about 32.6% of its total cultivated land, below the national average of 46.4%. The project area is mainly served by dozens of small lift irrigation pumps.

5. Irrigation water management enabling year-round sustainable agriculture in most regions of the PRC, particularly in the northwest and northern PRC. Meeting irrigation needs has become one of the major issues related to water. Irrigation accounted for about 61.9% of total water usage in the PRC in 2008, down from about 68.8% in 2000. This decrease was due to the PRC's rapid urbanization, economic growth, and population growth. Irrigation water management needs to be improved to meet the water requirements of the PRC's developing agriculture sector.

6. The project area is presently serviced by pumped-irrigation systems involving two or more lifts of up to 50 meters in height each. Present average operation (electricity) fees are reportedly \$198/ha/year for the first lift, \$264/ha/year for the second lift, and \$374/ha/year for the third lift. Farmers consistently report that they cannot afford such fees, and many of them no longer farm the elevated areas served by the third lift. Water is clearly a limiting factor in the project area because distribution costs are high and local governments of the project counties have limited delivery capacity. It is reported that only about 50% of main canals and even fewer lower-level canals are lined. These unlined canals, in porous loamy soils on moderate slopes, cause major seepage losses and contribute to Qinghai's low irrigation water use efficiency.

7. The Qinghai CWRP envisages that the whole province will increase its irrigation water use efficiency from 35% in 2009 to 53% by 2020 and 57% by 2030. The project will be designed to achieve an efficiency of 56% by 2016. This indicates that Qinghai views the project as an important pilot in achieving its CWRP target. This is ambitious but realistic and achievable. The project presents the Asian Development Bank (ADB) with an opportunity to help the Qinghai provincial government introduce successful participatory irrigation management (PIM) reforms.

8. **Participatory irrigation management and water users associations.** Since the late 1990s, the government has promoted PIM and initiated steps to transfer secondary and tertiary irrigation canal management to water users associations (WUAs). The legal framework for the

development of WUAs was established in mid 2000s.<sup>4</sup> By 2009, there were about 40,000 WUAs nationwide, which managed about 23% of the total irrigated area. Qinghai Province introduced irrigation reforms in 2006, but still lags far behind in PIM, with only a few pilot WUAs which were established on a township basis rather than by hydrological units of the irrigation system which has been proven a more efficient system worldwide. Progress has been hampered by the inability of the WUAs to perform operation and maintenance (O&M) work on their own and achieve cost recovery. The Qinghai Provincial Water Resources Department, local government agencies, and the WUAs have not reached a level of development that would enable them to provide accountable irrigation services and recover O&M costs. To address these issues, PIM and WUAs will be established, and the WUAs will be strengthened for effective transfer of responsibilities of O&M of irrigation systems.

9. In the meantime, each county government will set up a service delivery organization (SDO) or irrigation administration station to manage and operate the proposed four new inter-township irrigation canal systems. The SDOs, with support from the county water resource bureaus, will also provide technical support and training to the WUAs. The SDOs and WUAs will need to jointly develop, agree, and implement water delivery schedules that balance (i) the available water supply and its equitable distribution among WUAs, and (ii) the water demand requirements of each WUA's preferred cropping system and patterns.

### **C. Agriculture and Agricultural Support System**

10. Of the total national cropped area of about 121.3 million ha in 2009, about 58.9 million ha, or 48.5%, were irrigated.<sup>5</sup> Nationally, the total sown area of crops in 2009 was 156.3 million ha, implying a national average cropping intensity of 126%. However, the sown area has declined marginally since 2000, when it stood at 156.3 million ha. The major cause of this decline has been a reduction in the area of wheat sown, from 26.7 million ha in 2000 to 23.7 million ha in 2009. However, this decline has been more than compensated for by an increase in the area of corn sown, from 23.1 million ha to 29.5 million ha. At the same time, there has been an increase in the area of vegetables sown, from 15.2 million ha in 2000 to 17.3 million ha in 2009, as well as increases in the areas of other high value crops sown, including orchards. These trends are in line with the changing food consumption habits in the PRC.

11. Agriculture remains an important sector in Qinghai Province's economy. From 2000 to 2009, the contribution of the sector to the provincial gross domestic product (GDP) increased from CNY4.0 billion to CNY10.7 billion (a 37.4% increase). During the same period, GDP increased from CNY26.4 billion to CNY108.1 billion (a 24.4% increase). However, the contribution of agriculture to the provincial GDP actually declined, from 15.2% to 10.0%. Over the same period, the number of jobs in the sector declined from 1.6 million (55.8% of total jobs in the province) to 1.4 million (44.3% of the total jobs in the province).

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<sup>4</sup> Key regulations include the Social Group Registration Management Regulations (State Council Decree No. 250-1998), the Guide on Strengthening Development and Registration of Rural Professional Economic Cooperatives (Ministry of Civil Affairs Decree No. 148-2003), and the Guide on Strengthening Development of Water Users Associations (Joint Decree No. 502-2005 of the ministries of Civil Affairs and of Water Resources, and the National Development and Reform Commission).

<sup>5</sup> China Statistical Yearbook. 2009. *National and Provincial Statistics*. Beijing. <http://www.stats.gov.cn/english/>

12. In Qinghai, agricultural productivity is low and below the national average. The average wheat yield during 2005–2007 in Qinghai was 3.6 tons/ha, which was only 76% of the national average. From 1998 to 2009, the annual average increase in the yield of wheat, one of the main crops in Qinghai and the project area, was just 0.6% in Qinghai compared with a national average of 2.5%. Staple crops account for the majority of cropping in both Qinghai and the project area, with about 58% of total sown areas in Qinghai and the project counties. The total cultivated area in the three project counties is about 48,300 ha as of 2009, while the sown area in 2009 was about 52,100 ha, implying a cropping intensity of 108%. The average yields in the project counties were generally above the provincial average, but below the national average.

13. Agricultural extension has played an important role in supporting agricultural productivity and poverty reduction. Public extension agencies at all administrative levels are the main institutions that help farmers access new agricultural technologies and market information. Recently, private extension providers such as universities and private agricultural enterprises have emerged. Public extension services are provided mainly through local agriculture bureaus, which have limited outreach and do not deliver adequate technical advice that is responsive to farmers' needs. The project area contains only a few private agricultural enterprises and farmers' professional associations. Only about 39% of surveyed households within the project area received some technology advice from the public extension services, and nearly 50% of surveyed households were not satisfied with the quality of existing extension services. Establishing more farmers' professional associations and empowering them to provide improved farm-level agricultural extension services will be vital to increasing agricultural productivity and farmers' income.

#### **D. Lessons**

14. Lessons from ADB loan and technical assistance projects and from the irrigation and drainage projects of the World Bank and other development partners include the following: (i) a conducive irrigation policy and institutional framework with political support is essential to improving irrigation and promoting PIM; (ii) sustainable O&M with user financing should be pursued; (iii) development and participation of farmers' organizations and farmers are vital elements of irrigation management reform, and WUAs should be developed early in the project cycle, with clear targets and continuous support; (iv) efficient on-farm irrigation systems and agronomic measures should be pursued as an integral part of project interventions; (v) an effective interagency coordination mechanism should be in place; and (vi) capacity development for all institutions and stakeholders is essential.

15. Interventions supporting farmers' participation in local irrigation management, introduced through World Bank-supported projects, have been generally successful in the PRC. The priority for future development and expansion should be promoting WUAs by, among other initiatives, providing them with incentives to ensure sustainable O&M. Past projects have demonstrated the effectiveness of (i) employing a comprehensive approach to involve not only engineering works but also agricultural and management measures into the project; (ii) adopting a flexible and decentralized approach to WUA development; and (iii) adopting a PIM plan for improved irrigation performance and targeted water use reduction. The project promotes a comprehensive approach by integrating land, water, and agriculture management. The project also promotes establishment of WUAs and encourages water saving through demonstrations and trials.

16. Implementation of the PRC–Global Environment Facility partnership on land degradation<sup>6</sup> indicated that a genuine multiagency implementation structure needs to be put in place by the government to address land degradation issues, as these require good management, smooth consultancy services, and full cooperation between all agencies involved. The design and implementation of the project takes these lessons into consideration by promoting joint implementation of project activities among relevant agencies, such as provincial agriculture and land management departments.

## **E. Government Policies and ADB Strategies**

17. The government’s official socioeconomic guide is known as “scientific development concept,” which includes promoting sustainable development, social welfare, a people-centered society, increased democracy, and ultimately the creation of a harmonious society. This marks a shift in the official economic development agenda from one focused purely on economic growth toward a more balanced program that addresses the growing inequalities between western areas and eastern areas.

18. The government’s Eleventh Five Year Plan, 2006–2010 calls for “construction of a new socialist countryside” as the foremost task facing the PRC during this period.<sup>7</sup> The eight “rural reconstruction” policy priorities promote (i) balanced socioeconomic development, (ii) modern agriculture, (iii) sustained increases in farm incomes, (iv) construction of infrastructure, (v) development of public services, (vi) comprehensive reform to protect rural people, (vii) improved democracy, and (viii) enhanced leadership and motivation of party members and participation of civil society.<sup>8</sup> To further address growing social inequalities, the government’s Western Development Policy focuses on one municipality, five autonomous regions, and six western provinces, including Qinghai.

19. ADB’s country partnership strategy (CPS), 2008–2010 for the PRC supports the government’s Eleventh Five Year Plan.<sup>9</sup> The CPS recognizes that the economy in the interior regions needs special attention and identifies four priority sectors, including agricultural and natural resources. The CPS sector road map proposes ADB’s support in three strategic areas: (i) investing in rural productivity improvement and inclusive growth, (ii) investing in sustainable natural resource use and conservation, and (iii) strengthening the enabling environment and local institutional capacity for decentralized and participatory rural investments.

20. To overcome agricultural market and extension constraints, the CPS envisages promoting new enterprise–farmer and association–producer relationships. These are intended to improve input supply, distribute financial and technical information, and provide future contracts to reduce farm price risk and spur increased production. Many private agro-enterprises (the so-called “dragon heads”) have successfully reached domestic and export markets and are creating nonfarm rural employment.

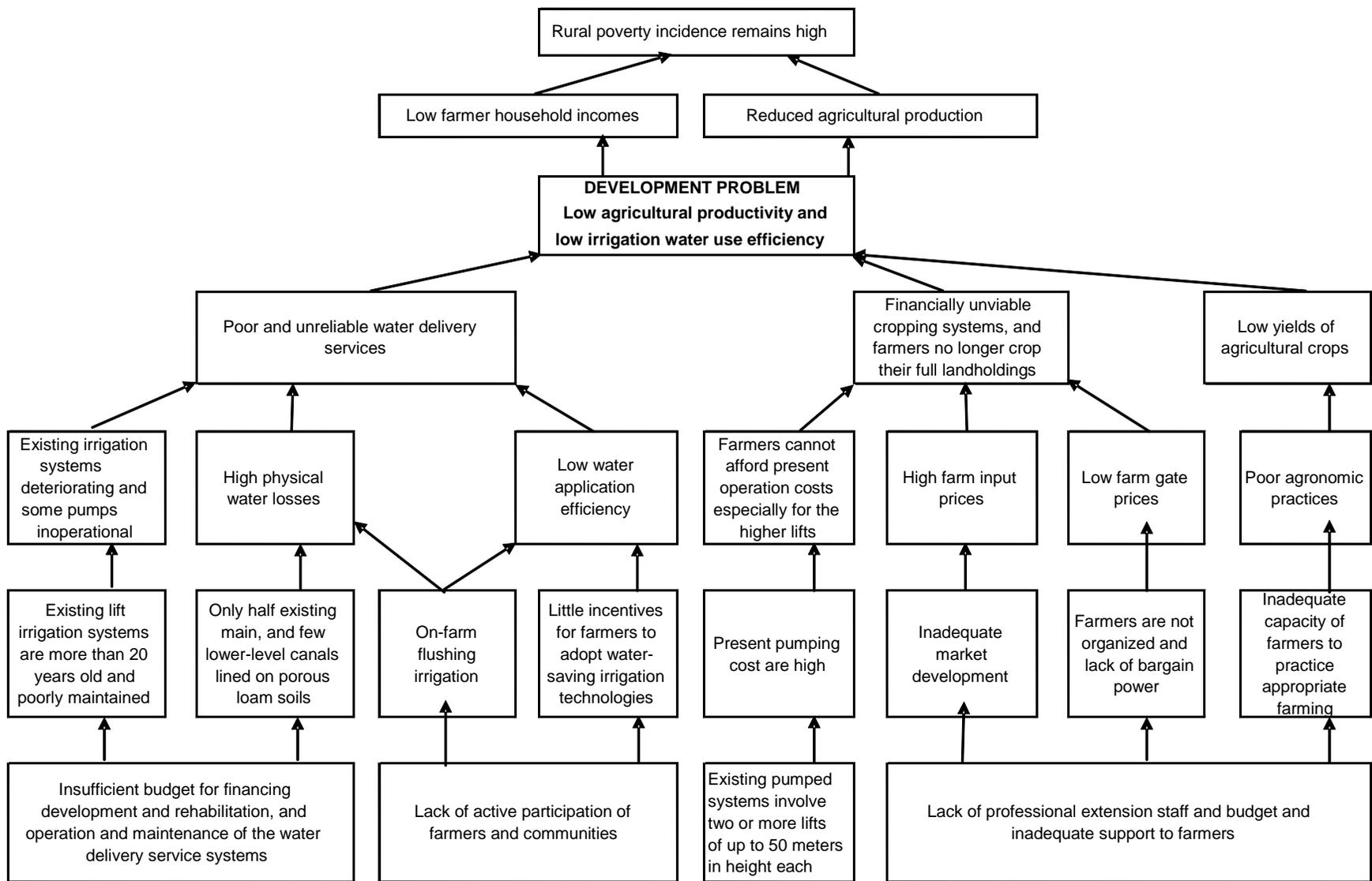
<sup>6</sup> ADB. 2004. *Financial Arrangement for a Proposed Global Environment Facility Grant and Asian Development Bank Technical Assistance Grant to the People’s Republic of China for the Capacity Building to Combat Land Degradation Project*. Manila; ADB. 2001. *Technical Assistance to the People’s Republic of China for the PRC–GEF Partnership on Land Degradation in Dryland Ecosystems*. Manila

<sup>7</sup> Government of the People’s Republic of China, National Development and Reform Commission. 2006. *The Outline of the Eleventh Five-Year Plan*. Beijing.

<sup>8</sup> Policies on Building a “New Socialist Countryside” Issued. <http://www.china.org.cn/>

<sup>9</sup> ADB. 2008. *Country Partnership Strategy: People’s Republic of China, 2008–2010*. Manila.

### PROBLEM TREE ANALYSIS



Source: Asian Development Bank.