SECTOR ASSESSMENT (SUMMARY): AGRICULTURE, NATURAL RESOURCES AND RURAL DEVELOPMENT

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. The agriculture sector continues to be one of the main drivers of Pakistan's economic growth, ensuring food security and poverty reduction for the population. It accounted for 21.5% of gross domestic product (GDP) in fiscal year 2013, and although its share has been decreasing, it remains the second-largest contributor to GDP, after the services sector, which contributed 58.1% of GDP.[1] Agriculture provides employment for about 44% of the nation's labor force and remains the main livelihood source for most of Pakistan's rural population. It also plays an important role in Pakistan's transformation toward industrialization. It supplies raw materials to industries such as textiles and food processing, and is among the biggest purchasers of industrial products such as chemicals, fertilizer, pesticides, and machinery. Agriculture also accounts for most of Pakistan's exports of semiprocessed and agri-based products, and is one of the main sources of foreign exchange earnings. A World Bank report highlighted the importance of the agriculture sector to the economy through its intra- and inter-sector linkages, noting that the sector contributes about 80% of export earnings through agri-based industries, and as a major source of raw materials for manufacturing contributes about 50% of basic inputs.[2]

2. As a mostly semi-arid and arid country, Pakistan's agriculture sector is almost entirely dependent on irrigation as more than 90% of agriculture output comes from irrigated agriculture, the vast majority of which is dependent on the Indus Basin Irrigation System (IBIS). Of 22 million hectares (ha) of cultivated land in Pakistan, about 18.8 million ha are irrigated, with the remainder from rain-fed or *barani* agriculture areas.[3]

3. About 20% of Pakistan's cultivable area is outside the IBIS. Farming in most of these areas is almost exclusively dependent on rainfall, resulting in low agricultural productivity. Some of the country's poorest populations also reside in these *barani* areas and are dependent on agriculture for most of their income. Improvement in their livelihood, especially for a large majority of small landholders and tenant farmers, greatly depends on gains in agriculture. Without a secure source of water for irrigation, however, rain-fed agriculture is both a low-productivity and a high-risk venture. Construction of small dams in rain-fed areas can develop irrigated agriculture and stabilize crop yields through supplemental irrigation, thereby improving rural livelihoods, reducing poverty levels, and contributing to greater food security in these areas. Improved irrigation infrastructure and service delivery through irrigation reforms can minimize the impact of climate change and ensure the sustainability of irrigated agriculture, thereby contributing to food security.

4. The Federally Administered Tribal Areas (FATA), located along Pakistan's northwestern border with Afghanistan, is spread over an area of 27,220 square kilometers or 3.4% of the country's land mass. It consists of seven agencies (Bajaur, Khyber, Kurram, Mohmand, Orakzai and North and South Waziristan) and six bordering frontier regions.[4] FATA has a population of about 4.3 million, which represents about 2.4% of Pakistan's total population. It is one of the most underdeveloped regions of Pakistan whose inhabitants are among the poorest in the

[1] Government of Pakistan. Ministry of Finance. *Pakistan Economic Survey, 2013–2014*. Islamabad.
[2] World Bank. 2014. Pakistan: Country Development Landscape. *Working Paper*. 12 January 2014.
[3] Government of Pakistan, Bureau of Statistics. 2013. *Agriculture Statistics 2011–2012*. Islamabad.
[4] The six frontier regions are Bannu, Dera Ismael Khan, Kohat, Lakki, Peshawar, and Tank.

country.[5] The vast majority of FATA's population lives in rural areas and is dependent on agriculture, including livestock, and the natural resource base for livelihood. Farm sizes in the project area vary from less than 1.0 ha to more than 5.0 ha; however, most farms are 1.0 ha or less and are owner-managed. Two distinct types of farming systems characterize agriculture in FATA: (i) *barani* subsistence agriculture that produces food staples—wheat as the major summer crop and maize as the main winter crops; and (ii) the more stable and productive irrigated agriculture, which enables farmers to earn higher incomes by expanding production beyond food staples into higher-value horticultural crops, including vegetables.

5. Poor water resources management has become a major challenge to increasing agriculture productivity, which undermines efforts to improve the socioeconomic condition of FATA's inhabitants. The water sector faces the following main problems:

(i) The project area has scanty rainfall, much of which converts into flash floods because of the steep slopes that characterize the area's geography. The rainfall drains into the Bara Kabul, Panjkora, and Swat rivers that run into gorges in the project area.
(ii) Most of the surface runoff generated in the project area drains out due to lack of infrastructure for utilizing this resource for productive purposes. The estimated runoff ranges from 2% to 21% of the annual rainfall volume of 295–1,048 millimeters in the project area.
(iii) Aquifers are depleted because of overexploitation of groundwater in all watersheds for irrigation and domestic use. There is a need to shift from groundwater to surface water as the main source of water for irrigation.
(iv) Given that most of FATA lies in arid and semi-arid zones, the area receives little precipitation throughout the year, which lowers the recharge rate of the subsoil aquifer, and reduces both the water table and the quantity available from surface sources.
(v) The area lacks infrastructure to store runoff and conserve the seasonal flows in the streams to provide a regular supply of water that can be used primarily for irrigation, as well as for other sources (water for human and livestock consumption).
(vi) There is a lack of rain and stream gauges to measure the quantity of water and seasonal variations.
(vii) Good on-farm water management practices are lacking.

6. Only about 8% of FATA's land area is cultivated. About 44% of the cultivated area is irrigated, relying predominantly on groundwater abstracted by tube wells, dug wells, and open wells conveyed through small channels made by families, clans, or tribes. These traditional irrigation methods involve temporary arrangements for diversion works and are vulnerable to flash floods. The topographical characteristics of the land area and the lack of technical knowledge among users render many such arrangements unworkable and unsustainable in the long term. In areas with formal irrigation schemes, access to water is not equitable. For instance, in the dry season, outlets at tail-end distributaries only draw a fraction of their allocated share compared with those located in the upper reaches of channels that irrigate water-intensive crops such as rice, fruits, and vegetables. This is partly the result of inefficient conveyance systems and low irrigation efficiency. It is estimated that up to three-quarters of the irrigated area serviced by communal gravity water channels has high water losses. Perennial springs and streams can supplement irrigation needs, while water from flash floods can be stored to overcome water

[5] Government of Pakistan, Bureau of Statistics (FATA Cell), Planning and Development Department, FATA Secretariat. 2012. *FATA Development Statistics 2012*. Peshawar.

shortage.

7. Various factors, such as poor water resources management, extensive deforestation, and overgrazing of rangelands, have put immense pressure on FATA's watersheds. Their degraded condition has increased runoff and resulted in high rates of soil erosion. In the absence of proper tree and vegetation cover, the runoff leads to flash floods that often destroy the productive agricultural land in the valley bottom. This steadily worsening situation has severe repercussions for the overall sustainability and viability of the resource base of the watersheds, and thereby on the region's population, most which are dependent on this resource base for their livelihoods. Increasing tree cover and the construction of check dams (where appropriate), will strengthen the watersheds, reduce land erosion and the frequency and impact of flash floods, and improve water availability through replenishment of the aquifers.

8. Effective management of water resources in FATA is further constrained by weak sector institutions and the lack of a comprehensive water resources management strategy. However, a water management plan was prepared for the project area (Bajaur, Khyber, and Mohmand agencies) under the FATA Rural Development Project. The plan follows an integrated water resources management approach focusing on watershed management, appropriate infrastructure, and efficient use. It emphasizes a shift from groundwater to surface water utilization, and improving groundwater recharge and management in light of future demands, environmental degradation, and a shrinking natural resource base. The plan encompasses water resources management, water monitoring, watershed management, and agriculture development. It encourages using watersheds, catchments, and basins as a basis for planning, implementation, and monitoring.

9. Initially, the Irrigation Department of Khyber Pakhtunkhawa Province was responsible for developing and managing major irrigation systems in FATA. Since 2002, the Irrigation Directorate of FATA has been responsible for developing and managing the region's irrigation systems. Key irrigation interventions include the construction of small channels from perennial sources in the mountainous areas, lining of channels, installation of tube wells in the plains, building of flood protection works and, construction of irrigation ponds. On-farm water management responsibilities are shared between the Irrigation Department and the Agriculture Department, with the Agriculture Department having responsibility for activities such as land leveling. Watershed management is the purview of the Forest Department. Given this institutional mix, an integrated approach to water resources is essential to ensure effective water resources management, including greater focus on utilizing surface water to reduce the exploitation of groundwater.

2. Government's Sector Strategy

10. The federal government's Vision 2025 seeks to accelerate and sustain economic growth with a focus on improving productivity, to which the agriculture sector is a key contributor. The growth strategy prioritizes investments for the development and efficient management of water resources through (i) augmenting surface water resources through the construction of additional storage; (ii) promoting conservation measures (lining of irrigation channels, modernizing and rehabilitating the country's irrigation system, and lining of watercourses) and efficiency enhancements for better management of the system; (iii) protecting the systems from flood impacts; and (iv) addressing land degradation resulting from water logging and salinity.

11. The FATA Sustainable Development Plan, 2007–2015 aims to ensure the optimal and

equitable use, and sustainable management of existing water resources to bring more land under irrigated agriculture.[6] This is to be achieved by (i) creating efficient management systems for water sources and infrastructure, (ii) conserving and recharging groundwater aquifers, (iii) harnessing seasonal runoff to provide additional sources for irrigation, (iv) harvesting surface water for irrigation, and (v) scaling up efficient irrigation systems.

3. ADB Sector Experience and Assistance Program

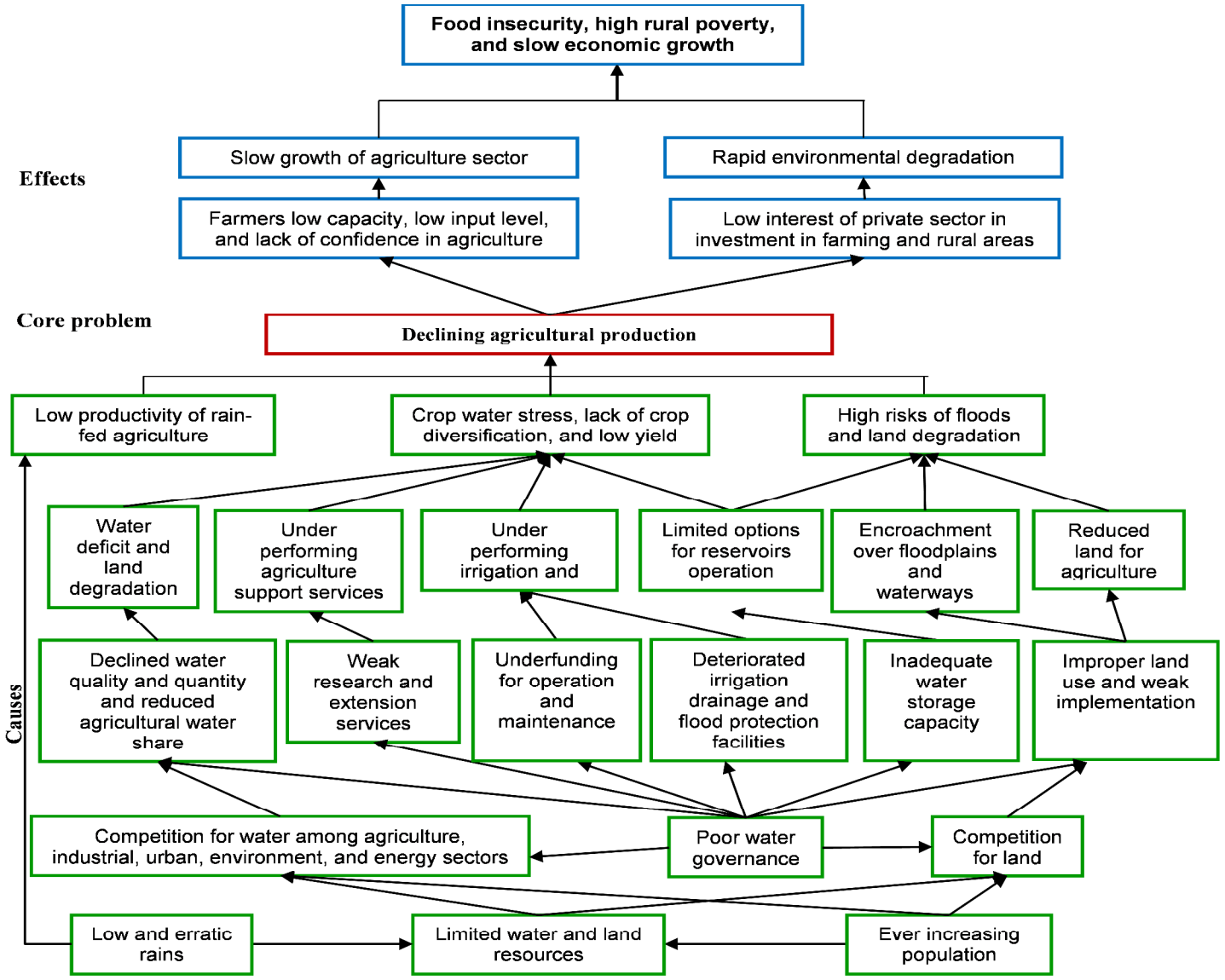
12. During 1970–2014, ADB provided $3.7 billion in loans and grants and $45.0 million in technical assistance to Pakistan's agriculture sector. The water resources subsector has been the largest recipient, with loans totaling over $2.0 billion. The recent focus of assistance has been on sector policy reforms to promote freer markets for agricultural inputs and outputs, community-based area development projects, and rehabilitation of provincial irrigation infrastructure through both sector and project loans. Under the country partnership strategy, 2009–2013 for Pakistan, ADB provided support for the development of water resources to finance investments and reforms in the irrigation, drainage, and flood protection subsectors. ADB will continue the focus on improving agriculture productivity to enhance economic growth, reducing the high incidence of rural poverty and food insecurity, and improving the natural resource base. Ongoing and new water resource investments, with corresponding reforms, will directly contribute to achieving sector outcomes through (i) providing better irrigation and water resources infrastructure, and improved irrigation service delivery and water resources management; (ii) rehabilitating and upgrading the IBIS and associated infrastructure; (iii) establishing new irrigation systems with development of command areas in selected rain-fed regions with corresponding agriculture support services; (iv) supporting irrigation and water resources reform initiatives; and (v) strengthening government and local community capacity for better water and natural resources management.

13. ADB will support four new stand-alone interventions to increase agriculture productivity and improve the natural resource base in the arid and semi-arid areas of Balochistan, FATA, Khyber Pakhtunkhwa, and Punjab. The benefits from these projects will be improved agricultural production from increased yields, greater cropping intensity, enabling diversification into high-value crops, improved water supply from the systems, and broadly improved land and water resources integrity in the project areas. In these fragile arid and semi-arid regions, ADB interventions will also support better watershed management, water harvesting, and appropriate cropping and farming systems that can adapt to increasing climate variability. ADB will also (i) complete three ongoing projects under the $700 million multitranche financing facility Punjab Irrigated Agriculture Investment Program; and (ii) undertake a new $150 million stand-alone project in Punjab supporting physical and nonphysical investments in water resources and irrigated agriculture to promote economic growth, increase farm incomes, and improve resource sustainability.

14. Ongoing and planned interventions by major donors to the sector, such as the United States Agency for International Development (USAID), and the World Bank, will continue to complement the ADB program. These partners also provide support to the agriculture sector, including water resources in FATA and Balochistan, Punjab, and Sindh provinces with the aim of increasing water security and enhancing agricultural productivity for improved livelihoods, and strengthening the capacity of government institutions, water users, and community organizations for more effective planning and resource management.

[6] Government of Pakistan, Planning and Development Department, Civil Secretariat (FATA). 2006. *FATA Sustainable Development Plan 2007–2015*. Peshawar.

Problem Tree for the Agriculture, Natural Resources and Rural Development Sector



Sector Results Framework (Agriculture, Natural Resources and Rural Development, 2015–2019)

Country Sector Outcomes		Country Sector Outputs		ADB Sector Operations	
Outcomes with ADB Contribution	**Indicators with Targets and Baselines**	**Outputs with ADB Contribution**	**Indicators with Incremental Targets**	**Planned and Ongoing ADB Interventions**	**Main Outputs Expected from ADB Interventions**
Reliable irrigation supplies, reduced flood risks, and increased agricultural production in the project areas by 2019.	• Reliable water supply to about 2 million ha by 2021 compared to high risk of failure in 2013. • Agriculture production maintained on 2 million ha by 2022 compared to high risk of crop failure in 2013 • Flood risks to 300,000 people reduced by 2019.	▪ Irrigation infrastructure rehabilitated and upgraded ▪ Irrigation and water resources reforms introduced ▪ Capacity of the irrigation officials and farming communities enhanced ▪ Flood passing capacity of existing barrages enhanced ▪ New irrigation infrastructure developed on 90,000 ha	– One barrage and 3,500 km of irrigation canals rehabilitated or upgraded by 2016 compared with 2008 – One new barrage serving 1.1 million ha constructed by 2016 compared with 2012 – Three new irrigation projects initiated and 90,000 ha improved by 2016 – 54 farmer organizations manage irrigation distribution system serving 700,000 ha by 2016 compared with none in 2012 – More than 1,000 farmers and 50 staff from the projects trained – Flood passing capacity of the two barrages enhanced by 1.4 - 1.5 times by 2016	**Planned key activity areas** - New construction and improvement of canals and appurtenant structures (70% of funds) - Irrigation reforms and capacity building (30% of funds) **Pipeline projects with estimated amounts** – ~~TPBIP ($150 million~~FATA Water Resources Development Project ($47 million) – KP Water Resources Development Project ($100 million) – JIP ($100 million) – BWRDP ($100 million) **Ongoing projects with approved amounts Ongoing** – PIAIP MFF loans 2299-PAK ($217.8 million), 2300-PAK(SF) ($10 million), 2841-PAK(SF) ($270 million), and 2971-PAK ($73 million) – TPBIP ($150 million)	**Planned key activity areas** About 90,000 ha of land improved with new irrigation supplies Private agricultural support system serves more than 50,000 ha Farmers' organization manages irrigation distribution system of about 80,000 ha **Pipeline projects** Rehabilitation and upgrading the two barrages serving more than 1.7 million ha. About 2000 ha improved with irrigation supplies **Ongoing projects** About 3,500 km of canals rehabilitated About 700,000 ha ensured with reliable irrigation supplies Two barrages upgraded About 54 farmers' organizations established and trained in operational management of irrigation system

BWRDP = Balochistan Water Resources Development Project; FATA = Federally Administrated Tribal Areas; ha = hectare, JIP = Jalalpur Irrigation Project; KP = Khyber Pakhtunkhwa; TPBIP = Trimmu and Panjnad Barrages Improvement Project.
Sources: Asian Development Bank.