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

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. Pakistan's agriculture sector has been the main source of food production for the country's ever-increasing population, which has grown from 33.7 million in 1951 to 184.0 million in 2013,[1] and is expected to produce adequate food for a projected population of 221.0 million by 2025. Its share in the country's gross domestic product (GDP) has declined from 29.0% in 1985 to 23.0% in 2011 and 21.4% in fiscal year (FY) 2013 (July–June). Nevertheless, it remains the second largest contributor to GDP after the services sector, which contributed 57.7% of the GDP during FY2012-2013.[2] The sector provides employment for 45% of the nation's labor force and remains the main livelihood source for the majority of Pakistan's rural population.

2. Agriculture plays an important role in Pakistan's transformation towards 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, fertilizers, pesticides, and machinery. Agriculture also accounts for the majority of Pakistan's exports in the form of semi processed and agro-based products, and is the main source of foreign exchange earnings. The agriculture sector has been and is likely to be one of the main drivers of Pakistan's economic growth, ensuring food security and poverty reduction.

3. The Ministry of Planning and Development has estimated that the agriculture sector has to grow at 5% per year to reduce the poverty incidence and ensure food security, and for the national economy to reach its 7%–8% annual growth target.[3] However, the agriculture sector has been performing below its potential, averaging a low annual growth rate of only 3.3% over 2003-2013, reflecting in part the low level of public and private investment in the sector. Less than 10% of the country's total gross capital formation goes to agriculture, notwithstanding its contribution to GDP (footnote 2), and gross capital formation has declined steadily during 2008 and 2013 to its lowest share of GDP since the 1970s.

4. Land and water resources are the important natural resources contributing to agriculture. With an average annual rainfall of 240 millimeters and mostly semi-arid and arid country, Pakistan's agriculture sector is heavily dependent on irrigation. About 80% of arable land and over 90% of agriculture output depends on irrigated agriculture, and irrigation uses about 95% of the country's water resources. Out of 22.04 million hectares (ha) of cultivated land in Pakistan, approximately 18.8 million ha are irrigated, with the remainder being *barani* (rain-fed) agriculture areas.[4]

5. Pakistan's Indus River basin covers around 65% of the country's territory and is the main source of water.[5] The annual renewable water resource is 246.8 cubic kilometers (km^3), which includes 18% groundwater.[6] The annual wastewater is estimated as 12.5 km^3. The country's water

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[1] Ministry of Finance, 2013. Pakistan Economic Survey 2012–2013, June 2013. Islamabad: Government of Pakistan.
[2] Ministry of Finance. *Pakistan Economic Survey, 2012–2013*. Islamabad: Government of Pakistan.
[3] Ministry of National Food Security and Research. 2013. *Draft Agriculture and Food Security Policy*. Islamabad: Government of Pakistan.
[4] Bureau of Statistics. 2013. *Agriculture Statistics 2011–2012*. Islamabad: Government of Pakistan,
[5] Food and Agriculture Organization (FAO) of the United Nations. *Aquastat*, *FAO's Information System on Water and Agriculture*. http://www.fao.org/nr/water/aquastat/basins/indus/index.stm.
[6] Based on FAO Aquastat data www.fao.org/nr/aquastat/. FAO aquastat uses the dependency ratio of 78% for renewable water resources.

availability per capita declined from 5,000 cubic meters (m^3) in 1950 to 1,068 m^3 in 2013, close to the water scarcity threshold of 1,000 m^3 per capita.[7] Water resources also face problems of high temporal and spatial variability and water quality degradation.

6. Performance of the Indus basin irrigation system, the lifeline of Pakistan's agriculture sector, has been low both in terms of water adequacy and reliability. Crop water requirements in the system have dramatically increased as a result of cropping intensities and cultivation of high water-consuming crops, such as sugarcane and rice. While the demand for canal irrigation water has increased, surface water availability has essentially remained the same as no new reservoirs have been constructed on the Indus River since 1976. Irrigation efficiency is also low at about 40%, which means that 60% of water available at the head of the main canal is lost either in conveyance (though some goes for groundwater recharge) or during its use at the farm level.

7. Agriculture productivity per unit of water, land, and other inputs is well below global and regional standards because of water shortages, land degradation, and mismanagement of water resources.[8] The poor condition of the irrigation and drainage infrastructure and weak management practices result in unreliable surface irrigation service delivery. The Indus basin irrigation system is also financially unsustainable, recovering only on average 24% of the costs necessary for the effective management of the irrigation infrastructure.[9] As a result, asset management remains a pervasive problem as the irrigation departments routinely defer maintenance because of the lack of funds to cover operation and maintenance costs.

8. Groundwater ensures reliable and equitable water resource and contributes 40%–50% of irrigation supplies. Over 90% of groundwater is used to supplement insufficient surface water supplies in canal-irrigated areas, and constitutes the major source of water in more than half of the canal commands in Punjab, the country's agricultural heartland (footnote 3). However, in several areas (especially at the tail end of canals in Punjab), intensive pumping has led to the lowering of groundwater levels by an average of 1 meter annually, resulting in high pumping costs and saltwater intrusion. The balance between recharge and groundwater pumping is in peril.[10] Given the importance of this resource for agriculture and other sectors, effective groundwater management is of critical social and economic importance.

9. About 20% of Pakistan's cultivable area is outside the Indus basin irrigation system. 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 greatly depends on gains in agriculture. Without a secure source of water for irrigation, however, farming in *barani* areas is both a low-productivity and high-risk venture.

10. Pakistan is susceptible to climate change impacts, including greater unpredictability in monsoon and rains leading to more frequent and intense floods or droughts. Already stressed water resources will be further strained by variability in flows in the Indus River system as a result of

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[7] Based on FAO aquastat data and author's analysis. www.fao.org/nr/aquastat/ (accessed 7 December 2013). The water scarcity indices follows Falkenmark, M. 1989. "The massive water scarcity threatening Africa-why isn't it being addressed." Ambio 18, no. 2 (1989): 112-118.

[8] Friends of Democratic Pakistan Water Sector Task Force. 2012. *A Productive and Water-Secure Pakistan: Infrastructure, Institutions, Strategy*. Islamabad.

[9] Planning Commission. 2012. *Canal Water Pricing for Irrigation in Pakistan: Assessment, Issues and Options*. Islamabad: Government of Pakistan.

[10] In some of the arid zones, such as Balochistan, aquifers have been exhausted and groundwater use in some critical aquifers is a small portion of what it once was.

glacial melt. Sea-level rise will exacerbate saline water intrusion and further damage the already fragile coastal zones and marine ecosystems, with greater likelihood of increased storms.

11. Opportunities exist to bring an additional 8.3 million ha of arable land under irrigation and improve the water and land productivity by 1.5–2.0 times. Additional storages on the Indus River can harness the flood flows for irrigation, hydro power development, and flood mitigation. Construction of small dams in rain-fed areas can develop irrigated agriculture and stabilize crop yield through supplemental irrigation, thereby improving rural livelihoods, reducing poverty, and contributing to greater food security in these areas. Improved irrigation infrastructure and service delivery via irrigation reforms can minimize the impact of climate change and ensure the sustainability of irrigated agriculture, thereby contributing to food security.

2. Government's Sector Strategy

12. The federal government's Framework for Economic Growth sought to accelerate and sustain economic growth with a focus on improving productivity, to which the agriculture sector is a key contributor. The growth strategy accorded priority to investments for the development and efficient management of water resources through (i) augmentation of surface water resources through the construction of additional storage; (ii) conservation measures (lining irrigation channels and watercourses, and modernizing and rehabilitating the country's irrigation system) and efficiency enhancements for better management of the system; (iii) protecting the systems from flood impacts; and (iv) addressing land degradation resulting from waterlogging and salinity. The Ministry of Planning and Development is reviving the 5-year planning process and is currently working on a new 2013–2018 development strategy focused on reviving the economy for balanced and sustainable growth by promoting private sector and transforming productive sectors, such as agriculture, towards value addition through innovation, enhanced quality, and productivity.

13. Punjab derives 90% of its agricultural production from its 8.4 million ha of irrigated land and accounts for 80% of Pakistan's agricultural production. The government of Punjab's Medium-Term Development Framework (2012–2015) aims to provide adequate, equitable, and reliable irrigation to enhance agricultural productivity by (i) expanding irrigated agriculture; (ii) modernizing existing irrigation infrastructure; (iii) mainstreaming sustainable use of surface and groundwater resources; (iv) reducing land degradation and extending and improving drainage and flood protection; (v) improving productivity of rain-fed areas; and (vi) implementing broad-based reforms to improve service delivery.[11] The government of Khyber Pakhtunkhwa will increase water availability; modernize existing irrigation; invest in new irrigation infrastructure, water conservation, and groundwater regulation; and expand flood protection efforts in response to potential climate change impacts.[12] The sector focus for the Federally Administered Tribal Areas (FATA) is to bring more agricultural land under irrigation by conserving recharge groundwater, diverting perennial water, and harvesting seasonal run-off.[13]

3. ADB Sector Experience and Assistance Program

14. Since 1970, ADB has 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 $2.1 billion, followed by agricultural production and markets ($916 million) and area-based rural development ($311 million).[14] The recent focus of assistance has been

[11] Government of Punjab. 2013. *Medium-Term Development Framework 2013–2016 and Development Programme 2013–2014*. http://www.pndpunjab.gov.pk
[12] Government of Khyber Pakhtunkhwa. 2010. *Comprehensive Development Strategy 2010–2017*. Peshawar.
[13] Government of Pakistan. 2007. *FATA Sustainable Development Plan, 2007–2015*. Peshawar.
[14] ADB. 2006. *Evaluation of the Agriculture and Natural Resources Management Sector*. Manila.

on sector-specific policy reforms to promote freer markets in 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 (CPS), 2009–2013, ADB provided support to the development of water resources to support investments and reforms in the irrigation, drainage, and flood protection subsectors.[15]

15. Under the new CPS, ADB will continue to focus on improving agricultural production and economic growth and reducing rural poverty and food insecurity, while conserving the natural resource base. Ongoing and new water resource investments will directly contribute to achieving sector outcomes through (i) provision of better irrigation and water resources infrastructure, and improved irrigation service delivery and water resources management; (ii) rehabilitation and upgrading of the Indus basin irrigation system and associated infrastructure; (iii) establishing new nonperennial irrigation systems; (iv) supporting irrigation and water resources reform initiatives; and (v) strengthening government and local community capacity for better water management.

16. ADB will complete three ongoing projects under the $700 million multitranche financing facility (MFF) for the Punjab Irrigated Agriculture Investment Program and undertake a new $150 million stand-alone project in Punjab. ADB will also 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 water supply and agricultural production, enabling diversification into high-value crops; increased farm incomes; economic growth; and improved resource sustainability in the project areas.

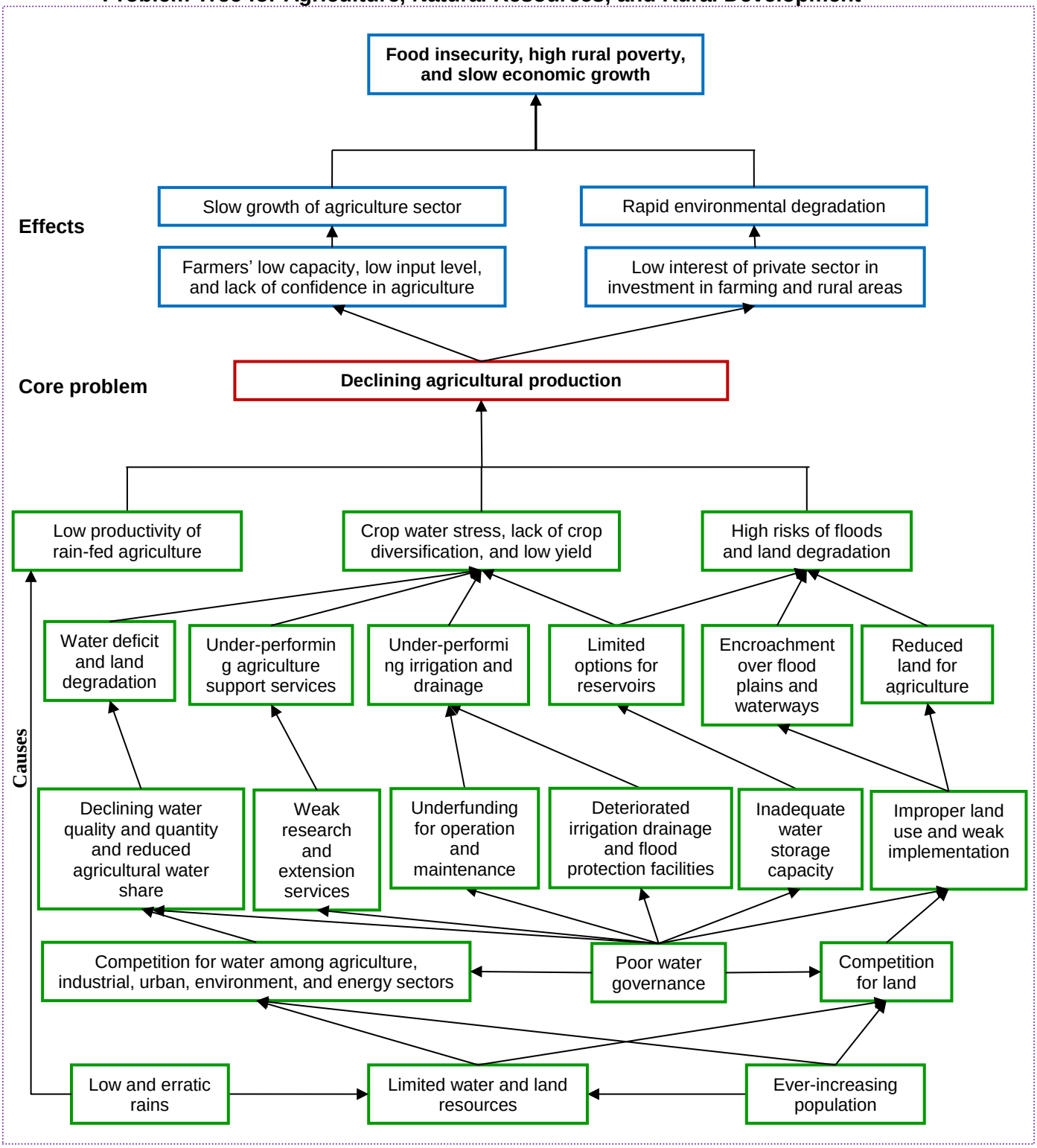
17. Ongoing and planned interventions by major donors to the sector, such as the Japan International Cooperation Agency, the United States Agency for International Development, and the World Bank, will continue to complement the ADB program. These partners also provide support to the irrigation subsector in Balochistan, Punjab, and Sindh provinces for increased water security; enhance agricultural production; and strengthening the capacity of government institutions, water users, and community organizations for more effective planning and management.

18. To ensure a more climate-adaptable sector, ADB-supported large infrastructure schemes will be designed to be more climate resilient.[16] ADB will also work with the government to prepare a flood policy and an integrated flood and drought management plan, and bring integrated water resources management practices into operation. ADB's climate-resilient interventions will support better watershed management, water harvesting, and appropriate cropping and farming systems in the fragile arid and semi-arid regions, and sustainable coastal management in Sindh and Balochistan provinces.

19. Women will be important beneficiaries of ADB interventions. Lessons learned from ADB-funded water resources projects suggest providing interventions such as drinking water supply and provision of washing and sanitation facilities along the canals. Under the new CPS, ADB's support to the sector will significantly improve women's access to water and provide other gender-based opportunities, such as (i) increasing women's participation at the design and implementation stage, (ii) engaging women in water user groups and associations, and (iii) improving women's livelihood opportunities. ADB will also explore opportunities to support innovation and improved technologies through research efforts and development of knowledge products that could lead to private sector investment opportunities.

[15] ADB. 2009. *Country Partnership Strategy: Pakistan, 2009–2013*. Manila.
[16] This will be achieved through increasing flood capacity, structural safety, and hydraulic performance.

Problem Tree for Agriculture, Natural Resources, and Rural Development



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 sustained agricultural production in the project areas	Reliable water supply to about 2 million ha Agricultural production maintained over 2 million ha About 300,000 people protected from high flood risk by 2019 (2014 baseline; none).	Irrigation infrastructure rehabilitated and upgraded New irrigation infrastructure developed Irrigation and water resources reforms introduced Capacity of the irrigation officials and farming communities enhanced Flood passing capacity of existing barrages enhanced	– One barrage and 3,500 km irrigation canals rehabilitated/upgraded by 2016 compared to 2008 – One new barrage serving 1.1 million ha constructed by 2016 compared with 2012 – New irrigation canals serve 90,000 ha – Three new irrigation projects initiated and 90,000 ha improved by 2016 – 54 farmer organizations manage irrigation distribution systems serving 700,000 ha by 2016 compared to none in 2012 – More than 1,000 farmers and 50 staff from Punjab Irrigation Department 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 (loan amount $150 million) – FATA Water Resources Development ($47 million) – KP Water Resources Development ($100 million) – JIP ($100 million) – BWRDP ($100 million) **Ongoing projects with approved amounts** PIAIP MFF: – Loan 2299-PAK ($217.8 million) for LBDCIP – Loan 2300-SF ($10 million) for PDF – Loan 2841-PAK(SF) ($270 million) for NKBP – Loan 2971-PAK ($73 million) for PCSBIP	**Planned key activity areas** - About 90,000 ha land improved with new irrigation supplies - Private agricultural support system serves over 50,000 ha - Farmers' organization manages irrigation distribution system of about 80,000 ha **Pipeline projects** - Rehabilitation and upgrading of the two barrages serving 1.7 million ha - About 2,000 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

ADB = Asian Development Bank, BWRDP = Balochistan Water Resources Development Project, FATA = Federally Administrated Tribal Areas, ha = hectare, JIP = Jalalpur Irrigation Project, km = kilometer, KP = Khyber Pakhtunkha, MFF = multitranche financing facility, LBDCIP= Lower Bari Doab Canal Improvement Project, NKB = New Khanki Barrage Project, PCSBIP = Pakpattan Canal and Suleimanki Barrage Improvement Project, PDF = Project design facility, PIAIP = Punjab Irrigated Agriculture Investment Program, TPBIP = Trimmu and Panjnad Barrages Improvement Project.