

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

### Sector Road Map

#### 1. Sector Performance, Problems, and Opportunities

1. Agriculture is a mainstay of the State of Karnataka's economy, with more than 60% of the workforce engaged in the sector. However, the contribution of agriculture to the gross state domestic product is reducing and the demand for water by nonagriculture sectors is increasing rapidly (e.g., industrial diversions and/or demands are expected to almost triple from 2000 to 2025). Agriculture accounted for about 84% of water diversions in 2000, and estimated water demands in the state may reach 52,366 million cubic meters (m<sup>3</sup>) or 1,850 thousand million cubic feet (MMCF) by 2025 from 37,419 million m<sup>3</sup> or 1,321 MMCF in 2000. Agriculture will remain by far the largest water user and the major source of employment for about 55% of the total population and about 75% of the rural population.

2. Krishna and Cauvery are major river systems. However, Karnataka is one of the most water-stressed states in India, with limited water resources of 1,608 m<sup>3</sup>/person/year overall and about 1,072 m<sup>3</sup>/person/year in eastward flowing rivers.<sup>2</sup> Water resources are distributed unevenly in both time and space—increasing the difficulties involved in management of water. The state's surface water runoff has already been substantially utilized, while groundwater is overutilized in 40% of districts. Meeting the anticipated 40% increase in demand from 2000 to 2025 is a major challenge that may threaten sustainable economic growth.<sup>3</sup> Better water resources management will involve improved efficiency in existing water use, including reuse, while tapping remaining water resources to maintain the overall basin water balance.

3. About 2.46 million hectares (ha) of irrigation have been developed in Karnataka since 1947, but cropping intensity remains below design expectations and substantial gaps persist between the irrigation potential created and that utilized in many systems.<sup>4</sup> In FY2010, about 59% of irrigation potential (1.46 million ha) was utilized. Modernization of irrigation infrastructure and improvement of irrigation performance will be critical to bridge the gap between irrigation potential created and utilized, and to improve agricultural productivity. Enhancing the performance of irrigated agriculture will involve improved management of water resources, upgrading of irrigation infrastructure and control systems, strengthening of management capacity, improvement of agricultural practices, and strengthening of farm to market linkages.

4. Fragmentation of management responsibilities, requiring coordination between multiple agencies, is also a constraint on effective water resource management. To maximize equitable economic and social welfare, without compromising the sustainability of vital ecosystems and the environment, makes the adoption of integrated water resources management (IWRM) approaches essential. IWRM promotes the coordinated development and management of water, land, and related resources. The IWRM approach will move Karnataka away from existing, largely irrigation-focused development initiatives in which water resources are managed system-specifically, to consider water availability and efficiency in the context of the overall river basin. IWRM requires more holistic planning and is an effective tool for climate

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<sup>1</sup> This summary is based on the project preparatory technical assistance consultant's final report (TA7954). Available on request.

<sup>2</sup> About 61% of the state, the 5th highest percentage, was included in drought-prone area or desert development programs in 2003.

<sup>3</sup> Government of Karnataka. 2010. Vision 2020. Bangalore.

<sup>4</sup> Government of Karnataka. 2011 and 2012. Economic Survey of Karnataka 2010–11 and 2011–12. Bangalore.

change adaptation. Karnataka has a number of enabling factors that support adoption of the IWRM approach, including recognition of emerging scarcity and threats to the water resource; progressive policy statements; a history of large water resources management investments; a capable technical workforce; and new and semi-independent institutions such as the Advanced Centre for Integrated Water Resources Management (AC-IWRM) established to function as a centralized think tank to advise the Government of Karnataka on IWRM approaches to water resources management.

## 2. Government's Sector Strategy

5. The state has published its road map for development—setting development targets, challenges, and strategies and a long-term development plan to accelerate growth, reduce poverty, and enhance human development in the state.<sup>5</sup> It postulates specific strategies that must be translated into meaningful interventions by the state government and relevant stakeholders to achieve the goals. These include (i) ensuring greater visibility of agriculture and allied activities to increase rural incomes; and (ii) achieving a sustainable and orderly process of industrialization and urbanization. To contribute to these goals, the State's Water Resources Department has proposed an ambitious budget allocation of about \$8.5 billion during the 2014–2018 financial period (the budgeted allocation is \$2.06 billion during FY2014).

6. The Karnataka State Water Policy, 2002 requires water resources planning, development, and management in the state to be undertaken through (i) adopting hydrological planning units (river basins and/or subbasins); (ii) undertaking multisector assessments; (iii) conjunctive planning and management of surface and ground water resources; (iv) incorporating quantity, quality, and environmental considerations for poverty alleviation—increasing incomes, productivity, and equity; and (v) reducing vulnerability to natural and economic risks. Realizing the importance of system users in the management of systems, the Karnataka Irrigation Act, 1965, amended in 2000 and 2002, authorizes water users' cooperative societies. These societies will engage in the control, maintenance, repair, and monitoring of irrigation works; the collection of levy and water charges; and form water users' distributary level federations, water users' project level federations, and a water users' apex level federation.

7. The Karnataka Agriculture Policy, 2006 sets the primary goal of improving net farm income by about 3.0% per annum—requiring a growth rate of 4.5% per annum in the gross value of agricultural production. The 2006 policy is farmer-oriented, with components for better crop planning, production, technology, marketing, and prices. It also focuses attention on the inclusion of bypassed regions and farmers in the development, regeneration, and dissemination of technological inputs. It calls for careful handling of trade-offs between production and resource depletion, and access to factor market and quality of inputs. The Integrated Agribusiness Development Policy, 2011 creates an enabling institutional structure and conducive environment for public and private investment in agribusiness—to improve production and productivity; reduce production costs and wastage; increase value addition; provide price stabilization; and promote the use of advanced agriculture technologies, including genetically modified varieties, micro irrigation, integrated nutrient management, organic farming, and integrated pest management.

8. The National Water Policy,<sup>6</sup> 12th Five Year Plan,<sup>7</sup> and National Water Mission<sup>8</sup> provide a comprehensive policy framework that supports holistic planning of water resources, including

<sup>5</sup> State Planning Board. 2009. *Karnataka—A Vision for Development—2020*. Bangalore.

<sup>6</sup> Government of India, Ministry of Water Resources. 2012. *National Water Policy*. New Delhi.

the conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within States through integrated water resources development and management. A primary goal of the National Water Mission is the promotion of basin IWRM. The promotion of basin level IWRM is a primary goal, as demonstrated by the Ministry of Water Resources setting up a National Forum of Water Resources and Irrigation Ministers of States in 2012 to (i) review various reforms required in the water resources sector and achieving consensus at the national level, and (ii) providing a platform for sharing innovative ideas and initiatives for improved water governance.

9. In Karnataka, the major water institutions are in eight departments, with 37 agencies to administer the multiple policy, legislation, and statutes governing water resources. The departments are water resources, minor irrigation, mines and geology, agriculture and horticulture, animal husbandry and fishery, forests, ecology and environment, industries and commerce, rural development and Panchayat Raj and urban development.

### 3. ADB Sector Experience and Assistance Program

10. The Asian Development Bank (ADB) supports inclusive economic growth and poverty reduction in India through four strategic pillars: (i) inclusive and environmentally sustainable growth, (ii) catalyzing investment through the use of innovative business and financing solutions, (iii) strengthening results orientation and emphasizing knowledge solutions, and (iv) regional cooperation.<sup>9</sup> In the agriculture and natural resources sector, ADB focuses on water use efficiency and productivity in irrigated agriculture through (i) irrigation infrastructure and modern management; (ii) climate-resilient river basin water resource management; and (iii) support for a reduction in water-induced disaster via flood control and coastal zone management, including actions for climate change adaptation.<sup>10</sup> ADB's sector operations seek to increase women's access to water for household, livestock, and other uses; increase the role of women in water resource management; ensure disaster risk reduction and climate change adaptation measures take account of women's interests; and provide equitable access to employment in construction, maintenance, and agro-enterprise—supporting women's empowerment and gender equality.

11. ADB operations in the sector are designed to improve irrigated agriculture, river basin water resources management, agribusiness, flood management, and coastal protection. ADB-supported projects have already made a substantial breakthrough in demonstrating ways to

<sup>7</sup> Government of India, Ministry of Finance, Planning Commission. 2012. *Twelfth Five Year Plan (2012–2017): Faster, More Inclusive and Sustainable Growth*. New Delhi.

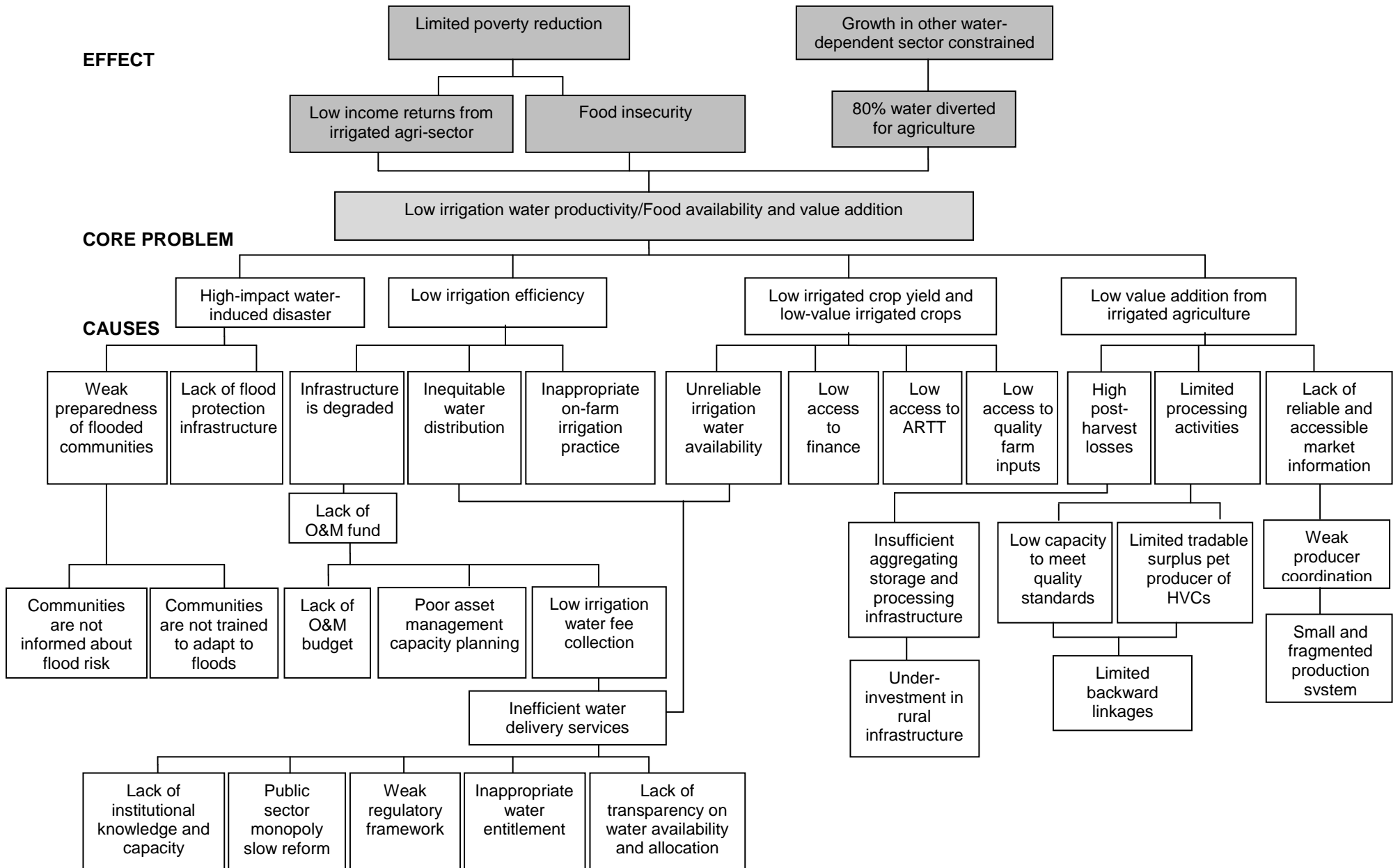
<sup>8</sup> Government of India, Ministry of Water Resources. 2009. *National Water Mission*. New Delhi.

<sup>9</sup> ADB. 2009. *Country Partnership Strategy: India, 2009–2012*. Manila.

<sup>10</sup> ADB-supported projects include: (i) ADB. 2005. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Technical Assistance Grant to India for the Chhattisgarh Irrigation Development Project*. Manila (Loan 2159-IND); (ii) ADB. 2008. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranches Financing Facility to India for the Orissa Integrated Irrigated Agriculture and Water Management Investment Program*. Manila (Loan 2444-IND); (iii) ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranches Financing Facility to India for Agribusiness Infrastructure Development Investment Program*. Manila (Loan 2669-IND); (iv) ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranches Financing Facility to India for Sustainable Coastal Protection and Management Investment Program*. Manila (Loan 2679-IND); (v) ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranches Financing Facility to India for Assam Integrated Flood and Riverbank Erosion Risk Management Investment Program*. Manila (Loan 2684-IND); and (vi) ADB. 2011. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranches Financing Facility to India for Agribusiness Infrastructure Development Investment Program*. Manila. (Loan 2837-IND).

increase water productivity through infrastructure upgrading, participatory irrigation management, and participatory agriculture extension. ADB sector operations have provided lessons to avoid common problems and improve implementation performance, and these have been incorporated in the design and implementation of projects.

### Problem Tree for Agriculture and Natural Resources



ARTT = agriculture research, training and technology, HVC = high value crops, O&M = operation and maintenance.

### Sector Results Framework (Agriculture and Natural Resources, 2013–2017)

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
Increase in agricultural growth rate and food production, and improved management of water and natural resources	<p>Annual average growth rate of agriculture increased to 4% during 12th plan (11th plan baseline: 3.3%)</p> <p>Food grain production growth rate increased to 2.00% per year during 12th plan (11th plan baseline: 0.65 %)</p> <p>Water use efficiency increased to 36% in 2017 (2011 baseline: 30%)</p>	Agriculture infrastructure expanded, improved, and well managed	<p>Increase irrigation potential utilized (by 10 million ha by 2017 compared with 2011)</p> <p>Irrigation service fee increased to Rs1,350/ha by 2017 (baseline: Rs375/ha in 2011)</p> <p>Restore additional 2.2 million ha of lost irrigation potential</p>	<p><b>(i) Planned key activity areas</b> Surface and groundwater irrigation and drainage; irrigation systems management</p> <p><b>(ii) Pipeline projects</b> Karnataka integrated and sustainable water resources management investment program</p> <p>Climate adaptation through subbasin development investment program</p> <p>Chhattisgarh irrigation development project-2</p> <p>National water use efficiency improvement investment program</p> <p>Orissa Integrated Irrigated Agriculture and Water Management Investment Program (Project 2)</p> <p><b>(iii) Ongoing projects</b> Chhattisgarh irrigation development project (closed in March 2013)</p> <p>Orissa Integrated Irrigated Agriculture and Water Management Investment Program (Project 1)</p>	<p><b>(i) Planned key activity areas</b></p> <p>542,000 ha under modernized irrigation management; drainage system modernized for 190,000 ha</p> <p>Women's participation in all decision-making processes and structures (i.e., WUAs and water user cooperative societies) increased (based on gender targets)</p> <p><b>(ii) Pipeline projects</b></p> <p>275,000 ha under modernized irrigation management; drainage system modernized for 190,000 ha</p> <p><b>(iii) Ongoing projects</b></p> <p>266,300 ha irrigated systems modernized; 322 WUAs strengthened (target: 33% women's participation in WUAs and WMCs achieved)</p>

ADB = Asian Development Bank, ha = hectare, WMC = water management cooperatives, WUA = water users association.

Source: Asian Development Bank.