



Project Information Document/ Integrated Safeguards Data Sheet (PID/ISDS)

Concept Stage | Date Prepared/Updated: 11-Nov-2016 | Report No: PIDISDSC19733



BASIC INFORMATION

A. Basic Project Data

Country India	Project ID P160463	Parent Project ID (if any)	Project Name AP Integrated Irrigation & Agriculture Transformation Project (P160463)
Region SOUTH ASIA	Estimated Appraisal Date March 1, 2018	Estimated Board Date Jul 26, 2018	Practice Area (Lead) Agriculture
Lending Instrument Investment Project Financing	Borrower(s) Department of Economic Affairs	Implementing Agency Government of Andhra Pradesh	

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Financing (in USD Million)

Financing Source	Amount
Borrower	68.08
International Bank for Reconstruction and Development	170.00
Total Project Cost	238.08

Environmental Assessment Category
B-Partial Assessment

Concept Review Decision

Have the Safeguards oversight and clearance functions been transferred to the Practice Manager? (Will not be disclosed)

No

Other Decision (as needed)

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B. Introduction and Context

Country Context

1. **India has sustained economic growth during last decade:** India's Gross Domestic Product (GDP) for 2016-17 is estimated at 7.6 percent, higher than the 7.2 percent for the preceding year, but lower than the projected 8.1-8.5 percent for this year¹. Sustained economic growth during the last decade, however, has contributed to annual decline in poverty by 1.5 percent, but income inequality has continued to persist. Emerging as one of the fastest growing economies, there has been significant upturn in key development indicators. Life expectancy at birth increased to 68

¹Economic Survey 2016-17



years in 2014 from a low of 54 in 1980. India's per capita gross national income increased by about 338 percent between 1980 and 2014, from \$1,255 in 1980 to \$5,497 in 2014. As a result, India has climbed five notches to 130th rank in Human Development Index among 188 countries in 2014².

2. **Reducing poverty and creating jobs can fuel economy:** Sustained economic growth notwithstanding, India remains home to 263 million poor people (80% of whom reside in rural areas) living on less than US\$1.90/day. Expansion of the economy in recent decades has largely resulted in jobless growth. For addressing these issues, Govt. of A.P has set an ambitious goal of achieving an annual growth rate of 8.2 percent, reducing poverty by 10 percent (poverty in the State is on a decline and currently stands at 9.2%, as per Socio-Economic Survey 2016-17), and creating 50 million new jobs.. It has been argued that adequate attention to agriculture could fuel growth, create jobs and reduce poverty. In the wake of consecutive low monsoon rainfall and consequent decline in farm productivity, agriculture has served a wake-up call, demanding attention from policy makers.

3. **Agriculture sector continues to lag behind:** The issues of inclusive growth and gainful employment are major challenges in rural areas where two-thirds of the workforce resides. About 66 percent of the labor force is employed in agriculture sector which accounts for 14 percent of GDP, and is saddled with problems of uncertain growth. Per capita land and water availability is decreasing while high intensity rainfall events and dry spells are increasing. Land and labor productivity continues to be low.

4. **Agriculture growth is essential in achieving India's development goals:** During the last 25 years, agriculture sector has not achieved the envisaged growth targets. In 1990s and 2000s, the annual agriculture growth rate was around 3-3.5 percent and declined to less than 1 percent in the last two years (2014-16) due to technology fatigue, degradation of land and water resources, growing water scarcity, exacerbated by two consecutive droughts, floods, cyclones, heat waves, and declining international commodity prices. The growth in agriculture sector in 2015-16 has continued to be lower than the average of the last decade, mainly due to a second successive year of lower-than-normal monsoon. Report from the Department of Agriculture, Cooperation and Farmers Welfare for 2015-16 indicates that the production of food-grains and oil-seeds is likely to decrease by 0.5 and 4.1 percent respectively, while that of fruits and vegetables is likely to witness a marginal increase.

5. To fuel the agrarian economy, strategic shifts in agriculture would be aimed (based on the Socio-economic Survey 2016-17 projections) at: (i) towards high value vegetables, fruits, livestock and fish products; (ii) towards value addition in post-harvest segments; (iii) towards diversification and resilience of farming systems to address climate change effects; (iv) towards nutrition sensitive agriculture; and (v) finally a shift towards improved water use efficiency.

6. Many new schemes have been launched to effect the proposed shifts in agriculture: *Pradhan Mantri Krishi Sinchai Yojana* will fast track irrigation coverage and improve water use efficiency in rural areas; *Parmparagat Krishi Vikas Yojana* aims to reduce input costs by promoting organic farming; *Pashudhan Sanjivani*, *Nakul Swasthya Patra*, and *E-Pashudhan Haat* have been proposed to improve livestock productivity. There is an enormous potential for harvesting gains from transformation of irrigated agriculture as production, consumption and agribusiness shift from traditional cereal crops to horticulture, livestock and fish production. India has a comparative advantage in having a very large and largely untapped domestic market, which reduces reliance on exports as the principal driver and consumer of agriculture growth.

²UNDP Human Development Report, 2015



Sectoral and Institutional Context

7. **Andhra Pradesh is a leading reforming economy:** Bifurcated on June 2, 2014, the present state of Andhra Pradesh (AP) is a middle income state with an average per capita annual income of INR 107,532 which is 15 percent higher than the national average. The state accounts for 4.95 percent of India's land mass, 4.09 percent of its population and 4.44 percent of its GDP. AP is predominantly a rural state with 70.4 percent population living in villages and dependent on agriculture as the main source of livelihood. Despite severe challenges following the division of AP into two states in 2014 (AP and Telangana), the state has recorded appreciable progress in terms of the objective of achieving inclusive growth with noteworthy performance in both development and welfare sectors. In 2015-16, the Gross State Domestic Product (GSDP) grew at the rate of 10.99 percent, compared to corresponding growth rate of 7.2 percent for the country.

8. The sector-wise growth rate is equally impressive. At 2011-12 constant prices, agriculture grew by 8.4 percent, compared to industry by 11.13 percent and services sector by 11.39 percent. The per capita income of AP at current prices registered a growth of 12.38 percent over 2014-15. This has led to decline in the incidence of poverty from 45 percent in 1993-94 to 9.2 percent in 2015-16³. AP is recognized as one of India's leading reforming states and in the last two decades has achieved significant development outcomes through sustained policy and institutional reform programs in which the World Bank has been an important development partner. Rich in natural and human resources, the state is keen to leverage its strengths through specific growth strategies tailored to achieve double digit growth.

9. **Agriculture sector has performed below capacity:** The performance of the state agriculture sector, which accounts for 27.6 percent of the state GDP and employs 62 percent of the work force, has been a cause of concern. Between 1999-00 and 2013-14 agriculture grew at around 2.1 percent per annum with most of this growth coming from livestock, horticulture and fisheries sub-sectors. In 2015-16 these sub-sectors respectively contributed 26, 25 and 15 percent to the Agriculture State Domestic Product (AgSDP). Land use pattern is critical for agriculture growth, only 38.31 percent of the state's geographical area is net sown (6.23 million hectares). Majority of the farmers are small and marginal with average landholdings of 1.06 hectare (ha). The main crops are rice, groundnut, sugarcane, cotton, maize and Bengal gram. Due to seasonality and scarcity of water supply, cultivation is mostly limited to only one crop per plot per year, with a cropping intensity of 126 percent.

10. **The productivity of major crops has remained largely stagnant:** The reason for low productivity is because AP is one of the severely water stressed states of India with an average annual rainfall of 966 millimeters, and a coastline of 974 kilometers that is vulnerable to cyclones. Agriculture in AP is highly exposed to extreme weather events like droughts, untimely and high intensity rains, floods, cyclones and hailstorms. Increasing erratic weather aberrations and climate change are likely to exacerbate vulnerability of agricultural sector. Of the net sown area of 6.23 million ha in the state, 3.15 million ha is presently irrigated through a combination of canals, wells, tanks, ponds and other sources. Although 40,817 tanks cover a command area of 2.56 million ha, the actual area irrigated by tanks has declined significantly from about 1 million ha in 1990 (24% of irrigated area at that time) to 0.26 million ha in 2015 (8.4% of irrigated area).

11. **Irrigation is the key to revival of the agriculture sector:** Due to deficient maintenance and management of the tank systems, as a result of which most tanks are performing well below the capacity, the actual area irrigated to potential created varies between 35-55 percent depending on rainfall. Some 35,376 tanks having a command area of 0.32 million ha have been transferred from Panchayat Raj Department to Minor Irrigation Department. The rapid spread of groundwater irrigation has been an additional contributing factor to the decline in tank irrigation, and has also led to a serious depletion of groundwater resources across large parts of the state. Since most of the tanks are in rainfed areas

³AP Socio-Economic Survey 2015-16



with limited possibilities of providing other systems of surface irrigation, their decline poses a serious threat to the fragile agricultural economy of these areas.

12. Poorer farmers, often found at the tail-end of dilapidated tank/pond systems (Small Scale Community Based Irrigation Systems- SSCBI Systems) and lacking resources to access groundwater irrigation amidst low and falling water tables, are particularly affected. In response to the difficulties being faced by the agriculture sector, the State Government has substantially expanded capital investments for modernizing irrigation infrastructure since 2006-07. The Government has also taken steps to strengthen participatory irrigation management and AP was the first state in the country to adopt participatory irrigation management (PIM) following enactment of the Andhra Pradesh Farmers Management of Irrigation Systems (APFMIS) Act in 1997. About 6,400 Water User Associations (WUAs) were formed which collect water taxes for meeting operation and maintenance (O&M) costs of tanks.

13. Institutional development through capacity building has contributed to the success of PIM, a process that has been significantly supported by externally funded projects. The Bank-supported AP Community Based Tank Management Project (APCBTMP), which concluded in July 2016, has made significant development impacts in the state by rehabilitating 2,157 tanks, which resulted in 32 percent increase in tank command area and contributed to increase in paddy, maize and groundnut productivity by 36, 72 and 97 percent, respectively. In addition, tank rehabilitation resulted in 388 percent increase in fish productivity.

14. **Agriculture sector is in need of a paradigm shift:** The negative consequences of low agriculture yields extend from precarious incomes of farmers to large tracts of land locked in low value agriculture, despite growing demands for high value products such as fruits, vegetables, and livestock products. According to NSS data⁴, the average annual income of the median farmer net of production costs (of 1 hectare) from cultivation is less than INR 20,000 in 17 states, including Andhra Pradesh. Add high cost of cultivation, growing indebtedness, climate uncertainty, ineffective procurement, insufficient storage space and market linkages, and it makes agriculture an increasingly uneconomical activity.⁵ The crisis in agriculture sector is evidenced by the 'Crop holiday' (farmers abstained from farming) observed by farmers of East Godavari district in an area of 85,050 acres in Kharif 2011, which is further reflected in continuing suicides by farmers in the state. During 2015, 516 suicides by farmers were recorded in AP⁶.

15. **Primary Sector Mission seeks institutional convergence for maximizing profitability:** To pull agriculture from its current abysmal condition, AP requires a new paradigm with the following components: increasing productivity by getting "more from less" especially in relation to water; prioritizing the cultivation of less water-intensive crops, especially pulses and oil-seeds, supported by a favorable price regime that incorporates the full social benefits of producing such crops, and backed by a market-linked value chain. To effect a paradigm shift, GoAP has proposed the Primary Sector Mission to converge independently operating sub-sectors viz., agriculture, horticulture, fishery, and agribusiness into an integrated farming system for maximizing profitability of small and marginal farmers from a unit of arable land. The proposed project will showcase an alternate approach for leveraging capacities of relevant departments to improve farm incomes, and make agriculture resilient to climate change. For a clear understanding at the highest level of authority in the state to prevent further deterioration of the socio-economic fabric in rural areas (exodus, farmer suicides), a more comprehensive, longer term approach based around adaptive management in agriculture is required – particularly given the climate projections and their impact on the agriculture and water sectors in AP. The GoAP has evaluated the results of different initiatives taken during the previous years to develop a comprehensive long term strategy aimed at making agriculture in the state productive, profitable, sustainable and climate resilient. The state has

⁴ NSS SAS Round 70 data reported in The Economic Survey, 2015-16.

⁵ White Paper on Agriculture, Horticulture, Sericulture, Animal Husbandry, Dairy, Fisheries & Agri. Marketing, GoAP, July 2014.

⁶ Suicides in the Farm Sector in 'Accidental Deaths and Suicides in India 2015', National Crime Records Bureau, Govt. of India.



also realized that a mono-cropping production system based on capital intensive irrigation infrastructure and technologies has its limitations under the present circumstances with climate variables.

16. To unlock the full potential of agriculture sector growth, AP has stressed a strong need for policies and programs to focus on: (i) improvement of water use efficiency; (ii) intensification of cropping systems and diversification to high value crops and commodities; (iii) enhancement of post-harvest management and value addition; and (iv) improvement of the resilience of agriculture system in order to deal with increasing threats of climate change. By reorganizing PIM with regular administrative systems, AP envisions realizing the full potential of its water sector reforms by achieving a 20 percent increase in water use efficiency over the next five years.

Relationship to CPF

17. **The proposed project is fully consistent with the India Country Partnership Strategy (CPS):** The proposed project is fully consistent with the India Country Partnership Strategy (CPS) for FY 2013–17 to support poverty reduction and shared prosperity in India. The proposed project is aligned with two key pillars of CPS – ‘transformation’ and ‘inclusion’. In line with ‘transformation’, the project aims to promote inclusive rural growth, development and dissemination of new agricultural and water management technologies, climate-resilient agriculture, enhanced market linkages for small and marginal farmers, and improved water and natural resource management (CPS Outcome 2.4). The proposed project will have positive impact in terms of environmental protection, and reduced greenhouse gas emissions by disseminating high efficiency irrigation systems, and promoting diversification to pulses and high value crops, which significantly reduce water and carbon footprint of agriculture (CPS Outcomes 2.5/2.6).

18. **The project is aligned with the Bank’s transformative and inclusive criteria:** With respect to ‘inclusion’, the project aims to enhance the livelihoods of small and marginal farmers through crop diversification, enhanced market access (CPS Outcome 3.6), and also by improving disaster management abilities of GoAP and local communities through enhanced design and restoration of smallholder irrigation infrastructure with better drought proofing and flood protection features (CPS Outcome 3.8).

19. The proposed project will directly contribute to the achievement of 5 out of 17 United Nations’ Sustainable Development Goals (SDG), namely:

Goal 2 – End hunger, achieve food security and improved nutrition and ote sustainable agriculture, by enhancing income, food security, and nutrition of large number of rural population, where majority of AP’s poor reside.

Goal 6 – Ensure availability and sustainable management of water and sanitation for all by investing in irrigation infrastructure, promoting a whole range of water saving technologies for irrigated agriculture, which uses about 75 percent of all water in the state.

Goal 8 – Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all by promoting a broad-based agriculture growth and employment in rural areas, where more than two-third of country’s population are employed.

Goal 9 – Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation by rehabilitating and modernizing irrigation infrastructure (supply canals, water tanks) with enhanced resilience features of flood protection in about 1,211 tanks.

Goal 13 – Take urgent action to combat climate change and its impacts and reduce GHG effects of agriculture production by promoting a wide range of water saving technologies and agricultural practices (SRI, micro-irrigation), expanding areas under pulses and high value crops, which consume less water, and also by enhancing awareness-raising, human and institutional capacity on climate change mitigation, adaptation, and impact reduction.



20. The project will also coordinate with other Bank-supported projects in Andhra Pradesh and at national level including Assam Agriculture project, Maharashtra Agricultural Competitiveness Project, Andhra Pradesh-Telangana Water Sector Improvement Project, National Hydrology Project, and National Groundwater Improvement Project to ensure synergy and enhance long-term project impact.

C. Proposed Development Objective(s)

The Project Development Objective is to *enhance agricultural productivity, profitability and resilience of Small Scale Community Based Irrigation Systems (SSCBI Systems)⁷ in selected districts of Andhra Pradesh.*

21. **The project beneficiaries** will include small and marginal farmers, water users associations, farmer producer organizations, and other agro-entrepreneurs. During project preparation, specific target areas will be identified and specific interventions will be designed to benefit women and other vulnerable groups.

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⁷The SSCBI system consists of few small tanks, ponds and water bodies within a defined catchment area



Key Results (From PCN)

22. The following 5 Key Performance Indicators (KPI) are proposed to measure key outcomes of the project:

- (i) KP#1: Number of Farmers / farmer groups adopting resilient technologies and practices –(such as Agriculture Technology, water productivity/efficiency) (Corporate Result Indicator)
- (ii) KP#2: Percentage increase in irrigation supply in the project area / selected tank command area
- (iii) KP#3: Percentage increase in productivity (for selected crops, vegetables and fisheries), and percentage increase in returns from two selected agriculture commodities over the baseline value through development of supply chain
- (iv) KP#4: Number of farmers benefitted through increased access to agricultural assets and services – disaggregated by gender
- (v) KP#5: GHG: Change in incremental value to various Carbon stock assessments in selected plots (Corporate Result Indicator)

D. Concept Description

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. Description

23. **Project Rationale:** The proposed project is seized of GoAP initiatives in ameliorating the current distress in the state farm sector. The biggest challenge for the state is to pull farmers out of the current crises. To achieve food and nutritional security, the issues related to growing water scarcity, degrading land resources, high cost of cultivation, stagnant farm productivity, and the impacts of climate change need to be systematically addressed. AP with 13 districts and 6 agro-climate zones has great potential for growth and profitability in agriculture and allied sectors (fisheries & horticulture). This is what the project seeks to realize by providing transformative direction to the agriculture sector by packaging and up-scaling relevant technologies and appropriate practices, and by supporting reforms (Primary Sector Mission) that could support more effective policies and management practices to improve the productivity of agriculture, animal husbandry, and fisheries to increase net benefits, and improve equity and livelihoods

24. **Alternative considered:**

25. In line with the Government of India’s policy imperative on getting ‘more from less’, especially in relation to water, the project proposes to improve SSCBI for realizing underutilized potential of decentralised irrigation system for benefitting small and marginal farmers for producing less water-intensive crops, especially pulses and oil-seeds, and creating a favorable procurement ecosystem towards improved profitability under emerging specter of climate change.



26. **Innovative design:** The project design is consequently built on the key lessons learnt from the APCBTMP and from similar projects in other States (Karnataka, Tamil Nadu, Maharashtra), clubbed with the emerging need of integrating with climate variables, and value addition to the SSCBI Systems for reducing farm-level water footprints, and for enhancing carbon stock in farmers' fields in providing a strategic direction to develop climate-resilient sustainable production systems. The innovative aspects will include improved designs of smallholder irrigation infrastructure for efficient capture, storage and delivery of rain water, strong focus on improving water-use efficiency, recent advances in intensification and diversification of agriculture, agri-entrepreneurship, and movement toward climate resilient agriculture with relevant agriculture-water related investments and substantial improvements of participatory irrigation management practices.

27. Improved resilience of agriculture production systems is expected to be achieved under the project through improving soil organic carbon, higher water use efficiency, reducing crop water footprints through diversification, and increased adoption of technologies and practices for optimizing and sustaining productivity. Project activities will be complimented by the use of innovative information and communication technology (ICT) for enhanced efficiencies and faster turnaround time for delivering services to project beneficiaries, and new media technologies for real time reporting and data sharing among project teams working at different levels.

28. The total project cost is expected to be around US\$ 238 million, of which the World Bank will finance US\$ 170 million (70 percent of total project cost) and the GoAP will finance US\$ 68 million (30 percent of total project cost). The project activities will cover the entire state of Andhra Pradesh (its individual components will cover different geographic areas) and will be implemented over a six-year period. The project activities would be grouped into four main components: (i) Improving Irrigated Agriculture Efficiency at Farm Level; (ii) Promoting Adaptive Sustainable Agriculture Practices; (iii) Post-harvest Management, Market and Agribusiness Promotion; and (iv) Project Management and Capacity Building. The individual components have been detailed below.

Component A: Improving Irrigated Agriculture Efficiency at Farm level (approx. US\$ 110 million)

29. This component would improve SSCBI systems to strengthen the integrated farming system (in which growing crops, agro-forestry and rearing of livestock co-exist) with reduced water footprints. It will consist of four inter-related sub-components: (i) institutional strengthening and capacity building (ii) improving Small Scale Community Based Irrigation System (SSCBI System) performance and resilience; (iii) improving water productivity and efficiency; and (iv) building synergy with the Primary Sector Mission (on agriculture, fishery, horticulture, livestock and irrigation).

Sub-component A.1: Institutional Strengthening and Capacity Building

30. The sub-component would focus on engaging communities through water users' associations (WUAs) in social engineering of project interventions. The Participatory Irrigation Management (PIM) will follow a distinct approach where better operation and maintenance (O&M) of rehabilitated smallholder tank systems will be dovetailed with irrigation outreach based on reduced water footprints through adaptive agriculture practices (Component B) at the farm level. This sub-component will also sensitize water users and ensure that a desired level of greenhouse gas (GHG) emission is managed at the tank level. Water use efficiency will be the *leitmotif* for creating a culture for 'more crops, per drop' through community based institutions for assuming greater responsibility towards making water-conserving crop choices for water conservation and management. The sub-component will support in strengthening the existing WUAs and establish new WUAs for effectively developing all aspects related to efficient *in situ* water conservation and management practices. The component would enhance



WUA capacity in grounding the concept at the farm level.

31. In addition, the sub-component would relate to mobilizing water users for collective action through the vehicle of WUAs for ensuring local level participation in planning, implementing and managing the SSCBI facilities as well as establishing backward and forward farm-linkages with the external government, private sector and non-government agencies. The proposed project would expand the scope of 'SSCBI' beyond the 'crop irrigation' into others - fisheries, animal husbandry and domestic users. The spheres of intervention would include: (i) Policy and Governance - educating and enabling enactment of the existing legislative provisions and exploring new vistas for establishing relation between different sets of water users; (ii) Physical and Engineering- creation of assets, including capacity building support for designing and implementing construction, as well as managing procurement, finance and quality control; (iii) Operation and Maintenance (O&M) involving physical sustainability and improved irrigation performance leading to enhanced production/productivity, incomes and food security; (iv) Social mobilisation - local level organizational development including leadership building and problem solving approaches, empowerment of poor and vulnerable sections such as women, Scheduled Castes, Scheduled Tribes etc., and provision of capacity support and capacity building including observation and study tours; and (v) Economic - fixing and collection of water tariff and building of a corpus to enable further modernization and diversification, market penetration to enable establishing backward and forward linkages; and the related book keeping.

Sub-component A.2: Improving Small Scale Community Based Irrigation (SSCBI) System Performance and Resilience

32. This sub-component will modernize irrigation infrastructure, including SSCBI systems and irrigation canals within a defined catchment and also use a cascading management approach. The modernization of irrigation infrastructure will focus on improving the bulk water delivery to irrigation systems through rehabilitation and modernization of approximately 1,211 smallholder irrigation structures. The expected works will include modernization of control structures (diversion weirs), supply channels, cross-masonry structures, de-silting⁸ of feeder and supply channels, construction of recharge well structures and strengthening and up-gradation of tank bunds, installation of flow measurement devices, up-gradation of distribution systems, improvements of irrigation and drainage canals, and introduction of modern quality testing devices to determine soil compaction parameters, as well as modern quality testing devices for meticulously maintaining specified cover to reinforcement steel in the construction of reinforced concrete structures for long term durability. In addition, relevant catchment treatment approaches will be considered for reduced siltation, reliable and dependable flow to cascade SSCBI systems.

Sub-component A.3: Improving Water Productivity and Efficiency

33. The objective of this sub-component will be to promote water saving technologies such as drip and sprinkler systems, and for implementing Participatory Groundwater Management (PGM) at assessment unit level. The investments will include catchment and command area treatment of SSCBI systems, including construction of group based mini-irrigation schemes (dug wells, shallow tube wells, water harvesting and groundwater recharging systems). For drought proofing and capturing flood waters, cascades will be linked. Robust automation systems will be demonstrated, which will enable spatial homogeneity in water delivery in these systems.

34. Conjunctive use of surface and groundwater will be coordinated with crop planning and water budgeting.

⁸Considering economic and environmental perspectives, desilting of the tank will be limited only to remove silt from the tank bed to use for raising and strengthening tank bund during the rehabilitation of tank bund in such a way that sufficient area upstream of sluices is de-silted on priority to ensure free flow of water towards the sluices.



Water sharing by groundwater users (with surplus water) with those without irrigation source will be promoted; and pipelines provided for efficient water distribution (as implemented in APCBTMP). Consolidation and linking of groundwater sources piloted in Anantapur district under the World Bank supported AP Drought Adaptation Initiative will be encouraged. All development and improvement activities will be included in an Integrated Water Resource Conservation and Management Plan (IWRCMP). A basin level ridge to valley treatment for water conservation and management in convergence with the activities of all the primary stakeholders and implementing departments will be undertaken.

Sub-component A.4: Building Synergy with Primary Sector Mission

35. For effective service delivery to farmers, various departments and entities involved in water, agriculture and related sub-sectors need to collaborate. For achieving this GoAP is working towards forming a consortium of knowledge stakeholders, including relevant state line departments, knowledge institutions, civil society organizations and other relevant national and international organizations to support planning, implementation and monitoring the activities of the Primary Sector Mission. The project will provide support to policy and institutional reforms for enhancing institutional capacities of relevant departments. The sub-component will provide incentives for capital investments, including through unlocking opportunities for crowding-in private sector investments. Support will also be provided for guiding, designing and implementing holistic strategy for the Primary Sector Mission.

36. As an innovative design feature, the project will use information and communication technology (ICT) tools, sensors and remote sensing in two ways – (i) leveraging Internet of Things (IoT) technologies combined with sensors to remotely capture data and information on various aspects pertaining to minor irrigation systems such as water flows, water quality and (ii) use ICT and remote sensing products for monitoring and evaluation (M&E).

Component B: Promoting Adaptive Sustainable Agriculture Practices (approx. US\$ 79 million)

37. This component aims to improve productivity of the tank systems and enhance resilience of agriculture production systems for increasing production and managing risks associated with climate variables. This would be achieved by diversification of farm production, introduction of climate resilient solutions, improving value realization at the farm level through improved post-harvest management, and strengthening farmer-market linkages. The component will provide incentives for capital investments by unlocking opportunities for crowding-in private sector investments. This component will have three sub-components: (i) Promoting climate smart diversified agriculture production systems; (ii) Innovation and technology transfer for fishery production; and (iii) Post-harvest management, marketing and agribusiness promotion.

Subcomponent B.1: Climate Smart Diversified Agriculture Production Systems

38. Sustainable intensification and diversification of crop and horticulture production systems will be achieved by awareness creation, on-farm demonstrations on new seeds and promising technologies, capacity building and training activities; and by leveraging private sector investments in water management and farm mechanization. Climate risk resilience will be built in agriculture production systems by promoting crop diversification from rice to low water requiring pulses, maize, oilseeds, millets, vegetables and fruits; cultivation of high yielding, short duration, drought-, pest- and disease-tolerant crop varieties/hybrids; complementary agronomic practices; and building ability to withstand biotic and abiotic stress through a large scale program of demonstrations, and training activities as well as investments in farm implements and resource saving technologies like micro irrigation systems



to enhance water use efficiency and land productivity. Component interventions will focus on irrigated command areas of the project, and will also cover the rain fed areas in the project villages and cascades. The project will support operationalization of web-based integrated weather forecasting and water management system to provide real time crop advisories, including water, pest and disease stress, and implementation of mitigation measures and contingency plans. A baseline of Green House Gas (GHG) emissions from agriculture production systems will be established and would be regularly monitored for changes during the project period.

39. The project will focus on increasing farm productivity by reducing 'input' costs and enhancing 'output' from farming systems on a sustainable basis. This will be achieved by (a) adopting diversified cropping system on 'navdanya'⁹ pattern to buffer weather anomalies; (b) promoting comprehensive, crop specific sustainable agricultural package of practices; (c) installation of integrated weather forecasting systems to provide weather-based crop advisories in selected smallholder irrigation cluster areas; and (d) developing a mechanism to quantify crop resilience to climate variability, and creating a baseline for quantifying soil organic carbon and GHG emission from crop production systems.

Subcomponent B.2: Innovation and Technology Transfer for Fishery Production

40. Fish production has registered an average annual growth rate of 9.92 per cent in AP. Building on this, the component aims at improving fish productivity and profitability in the project tanks and ponds which offer high economic opportunities and benefits. The GoAP accords top priority to fisheries development in the state, and has released the Fisheries Policy and Plan for 2015-2020. Under this policy, the government has approved the fiscal benefits covering several sections of the industry, including production, processing, marketing and disease management for stimulating development of the fishery sector.

41. The subcomponent will focus on strengthening research-extension linkages in order to improve farmers' access to technology, and support participation of fish farmers in value chains. Project aims to promote innovative, climate resilient, and modern technology packages in production, post-harvest management and marketing. The project will (i) support multiplication of improved germplasm for quality seed production, (ii) introduce suitably formulated fish feed using locally available ingredients; (iii) demonstrate semi-intensive and intensive production models at appropriate locations in ponds; (iv) promote improved fish production techniques in irrigation tanks including innovative technologies such as cage culture in an environmentally sustainable manner; and build institutional capacity of the fishery sector. The project will facilitate suitable linkages for better access to markets, and support measures for maintaining hygienic conditions throughout the fish value chain.

Component C: Post-harvest Management, Market and Agribusiness Promotion (approx. US\$ 32 million)

42. This subcomponent will enhance farmers' linkages to markets by providing alternate marketing channels and promoting farm level aggregation, post-harvest management and value addition. The project will support organizing producers into farmer producer organizations (FPOs) and companies (FPCs); develop their capacity and skills for accessing wider input and output markets; and investment support to the FPOs for establishing common service centers for aggregating grains and horticulture produce. The expected benefits to the FPO members are higher prices through a combination of larger critical mass of saleable produce, thereby providing economies of scale, savings in transaction costs, and strengthened negotiation positions, coupled with the added value achieved

⁹'Navdanya' means nine seeds (a traditional diversified cropping system which includes cereals, millets, and pulses), a system of farming that produces food while enhancing biodiversity, building soil fertility and conserving water.



through primary grading and packing. The project will support integration of producer organizations in commercial value chains of agricultural commodities, and facilitate public-private partnerships to enable direct buying arrangements. Key strategy will be market oriented agricultural production through collective marketing by farmer producer organizations.

43. For mitigating price risks the project will support operationalization of Negotiable Warehouse Receipts in AP. For promoting agri-business ecosystem in the state, an Agri-Business Promotion Facility (ABPF) will be established. The ABPF activities will include conducting market and value chain studies on the identified commodities; establishing and operating mentorship programs; scouting new technologies (including climate resilient technologies); assisting small and medium private entrepreneurs to prepare business and financial proposals; and providing business planning and incubation services to emerging agri-entrepreneurs.

44. The value chain for selected commodities will help to increase the share of farmers in wholesale and retail prices of the commodity. Some of the measures to achieve this include farmers' participation in commodity exchanges, establishing storage infrastructure starting from primary, intermediate and transit warehouses for value addition. For high value crops, emphasis would be laid on demand based production, post-harvest processing, and creating forward linkages for direct marketing. Such a production and marketing system would be aimed at encouraging farmers to diversify into high value crops for additional income.

Component D: Project Management and Capacity Building (approx. US\$ 16 million)

45. The objective of this component is to ensure smooth implementation of project activities, as well as monitoring of, and learning from project processes and outputs. Activities to be financed include: (i) setting up, supporting and capacity building of project management unit (PMU) to align with the project components at the state and district level; (ii) project monitoring, evaluation and promotion of learning culture at the PMU level; (iii) documentation of project processes and experience on a rolling basis, and its dissemination to the wider development community for cross-learning and sharing; (iv) hiring services of an external M&E agency as consultants for the duration of the project for creating a feed-back loop for improving project thrust and implementation; and (v) providing support for emerging needs and innovations during implementation; and networking with partner organizations, external professional agencies and the World Bank.

SAFEGUARDS

A. Project location and salient physical characteristics relevant to the safeguard analysis (if known)

Andhra Pradesh is located on the east coast in peninsular India facing the Bay of Bengal. The State has three physiographic zones, the hilly region (having Nallamalai, Erramalai hills and the Eastern Ghats having an altitude of 500 to 1400 m); the plateau (having an altitude of 100 m to 1000 m) and the deltas of rivers (between the Eastern Ghats and the Sea Coast). It has a coast line of 974 km and its major rivers are Krishna, Godavari, Tungabhadra. It has about 21% of the geographical area under forest cover with 6 National Parks and 21 Wildlife Sanctuaries. It has an ancient religious/cultural heritage and Tirupati is one of the most popular temples in the country.

The state is drained by three major perennial rivers viz. Godavari, Krishna and Pennar, several other medium and small rivers. In total 40 rivers drain into the sea. Rainfall varies from 560 mm in the Rayalaseema region to about 1200 mm in the northeastern coastal part of the state. The State receives about 66% of rainfall from south-west monsoon (June-



September) and about 25% from north-east monsoon (October-December). The stage of ground water development is around 70%. Six Agro-Climatic Zones are recognized – Scarce Rainfall Zone, Southern Zone, North Coastal Zone, Godavari Zone, Krishna Zone and High Altitude Zone. The state experiences frequent storms, floods particularly in coastal areas and drought in the Rayalseema region

The project activities will involve investing on repair and rehabilitation of about 1200 tanks spread across the state. The interventions will include: improving water assets, modernizing irrigation infrastructure, improving water productivity, promoting adaptive sustainable agricultural practices, enhancing fisheries production and climate friendly agri business promotion. Andhra Pradesh (erstwhile undivided) is known to be a leading consumer of agrochemicals in the country with 24% share and 21% share in pesticides alone.

B. Borrower’s Institutional Capacity for Safeguard Policies

Safeguard issues revolve around augmenting and/ or re-engineering the existing minor irrigation tanks along with water conveyance system and other associated activities related to enhancing production, productivity and incomes in the spheres of agriculture and fisheries. The key intervention relates ensuring bridging of the gaps between designed and actual irrigable area with participation by the local water using communities. Major challenge thus lies in mobilizing the local tank based community towards group action and establishing linkages with other public and private sector institutions. This has been addressed successfully under the first project (Andhra Pradesh Community Managed Tank Project) with the help of an Environmental and Social Management Framework (ESMF). The proposed project would build on the same, but taking into account the latest legislative developments and expanded scope of the interventions, into agriculture and fisheries. Environment Management Plans (EMP) will be prepared for tanks that are known to be rehabilitated by appraisal. In addition, the project will develop a Pest Management Plan (PMP). All this points to adequate capacity for safeguards management with the borrower.

The previous project has put in place a robust systems in place and capacities are developed for managing the social and environmental impacts. Adequate number of experienced professionals too have been deployed for managing the ESMF. However, as the follow on project’s scope is enhanced both in terms of the number of tanks and the interventions, GOAP has already initiated efforts towards re-visiting the ESMF. The learnings drawn the implementation experiences of the first project will be fed into this revision.

C. Environmental and Social Safeguards Specialists on the Team

Suryanarayana Satish, Anupam Joshi, Vanitha Kommu

D. Policies that might apply

Safeguard Policies	Triggered?	Explanation (Optional)
Environmental Assessment OP/BP 4.01	Yes	The physical investments under the project would be largely on rehabilitation of existing water assets where improper construction could result in adverse impacts. The investments under productivity enhancement through sustainable agriculture practices could result in positive impacts with effective planning an implementation.

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			An Environmental and Social Assessment will be undertaken and a Social and Environmental Management Framework will be developed for managing risks and maximizing the environmental and social opportunities. These will take into account experiences and learnings from the previous phase.
	Natural Habitats OP/BP 4.04	TBD	The rehabilitation of tanks may impact natural habitats such wetlands, which will be determined during EA.
	Forests OP/BP 4.36	No	The project interventions are not expected to impact the forest areas.
	Pest Management OP 4.09	Yes	The project will not directly finance pesticides but the improved irrigation and crop diversification may result in increased use of pesticides. The project will work in synergy with the state primary sector mission and focus on climate smart agriculture production system which will promote the non-chemical package of practices. A Pest Management Plan (PMP) will be prepared for the project.
	Physical Cultural Resources OP/BP 4.11	No	No significant adverse impacts on cultural property expected, but this issue will be examined during the ESA and appropriate measures will be put in place to deal with any chance findings.
	Indigenous Peoples OP/BP 4.10	Yes	AP state has a tribal population of 2.7 million amounting to 5.5% of the total population. A few pockets in three districts are predominantly inhabited by tribals and are covered under the Fifth Schedule of the Indian Constitution. So, project areas is likely to have tribal population. However, investment plans are currently not known. Hence, to address such situations wherein the project is likely to be taken up in tribal areas, a Tribal Peoples Planning Framework (TPPF) will be prepared.
	Involuntary Resettlement OP/BP 4.12	Yes	The project will not and need not resort to involuntary acquisition of lands as the existing irrigation tanks will focus of repair and rehabilitation. However, cases of encroachers on /within the Tanks cannot be ruled out. To address this, a Resettlement Policy Framework will be prepared.
	Safety of Dams OP/BP 4.37	Yes	Some of the tanks could be large with high embankments above 10 m. The heights of the embankments will be known by appraisal for ensuring that appropriate mitigation measures are put in place for addressing any potential adverse environmental impact. This policy was also triggered



during the previous phase and arrangements were put in place. Already, a robust mechanism exist in the state, which will be further strengthened. Three region-wise Dam Safety Panels (DSPs) were constituted by the Government to function with technical guidance from the Chief Engineer, Central Designs Organization.

The project will seek better coordination with the Dam Safety Panel and processes. The project will also support safety enhancement of tank systems as part of tank rehabilitation.

Projects on International Waterways OP/BP 7.50	No	The project does not fall on any international waterways.
Projects in Disputed Areas OP/BP 7.60	No	The project is not in any disputed areas.

E. Safeguard Preparation Plan

Tentative target date for preparing the Appraisal Stage PID/ISDS

May 31, 2017

Time frame for launching and completing the safeguard-related studies that may be needed. The specific studies and their timing should be specified in the Appraisal Stage PID/ISDS

GoAP will undertake social and environmental assessment so as to revise the existing environmental and social management frameworks (ESMF), in conformity with applicable Bank policies as well as the national and state legal stipulations. EMPs will be prepared for tanks that are known to be rehabilitated by appraisal. Apart from the comprehensive ESMF, the following independent documents-- Resettlement Policy Framework (RPF) and Tribal People Plan Framework (TPPF) – will also be prepared. These are expected to be completed by end August 2017.

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APPROVAL

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