# Brief Project Description

| | |
|---|---|
| **Project/Programme Title:** | **Ground water recharge and solar micro irrigation to ensure food security and enhance resilience in vulnerable tribal areas of Odisha.** |
| **Country/Region:** | **India/Odisha** |
| **Accredited Entity:** | **National Bank for Agriculture and Rural Development (NABARD)** |
| **National designated authority:** | **Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India.** |
| **Executing entity/beneficiary:** | **OCTDMS an SPV of Govt. of Odisha in Deptt. Of Water Resources.**<br>**Beneficiary: 5.2 million vulnerable populations of which 51% would be female.** |
| **Project size category:** | **Medium**<br>**Total investment:**<br>**>50 million USD**<br>**<=250 million USD** |
| **Mitigation/adaptation focus:** | **Adaptation** |

**Executive Summary**

1. ***Climate Context:*** The state of Odisha is highly vulnerable to climate change due to high monsoon variability. This has caused drought and flood affecting the food security of agriculture dependent communities and pushed the vulnerable sections to margin. As per the climate change projection for the region, the temperature would breach $2^0$ C barrier by end of the 21st century. Groundwater is highly vulnerable to the impacts of climate change. Groundwater either directly or indirectly is vulnerable to the impacts of climate change and temperature is an important factor impacting the groundwater table through human stress and high evapo-transpiration. The rising temperature may result in greater heat stress for people and ecosystems and it would enhance energy and water drawl, induce drought and impact food security.

   ***Food and Water security Context*:** Many districts in Odisha state face multi-hazard scenario as 13 districts (out of 30 districts) are severely food insecure and 5 are extremely food insecure. Lack of adequate infrastructure for enhanced run off has implication on water conservation and overall enhancement of risk and vulnerability for the people living in the fringe. It is envisaged that annual 17 BCM replenishable ground water has to be conserved through some adaptive mechanism so that under the projected climate scenario it does not cause distress, migration and large scale social unrest. As of now as per Census 2011 in Odisha, around 38.5% families travel at least half a km to fetch drinking water in villages. The number of such families was 32.5% in 2001, which increased by 6% in 10 years.

2. To respond to these challenges the **primary objective** of this project is to enhance groundwater recharge in the community ponds through structural adaptation measures and use of solar pumps for micro irrigation to ensure water security and food security in the vulnerable areas of the state.

3. The following **results** are expected to be achieved by this project (i) **Augmentation of ground water recharge** to improve water table and water quality for health and well-being of about 5.2 million vulnerable communities through water security (ii) **Improved food security through resilient crop planning** (through irrigation) through installation of Ground Water Recharge Shaft (GWRS) in 10,000 tanks. (iii) Use of **solar pumps for irrigation is not only to improve energy access but also will be part of low emission climate resilient crop planning strategy of the state.** In 1000 demonstration ponds to achieve

energy saving of 3.27 million kWhr per year and avoided $CO_2$ emission of 2614 tonnes/year as mitigation co-benefit under this adaptation project.

**Project Description**

1. The primary objective of this project is to enhance groundwater recharge in the community ponds through structural adaptation measures and use of solar pumps for irrigation to ensure water and food security in the vulnerable areas of the state. The project will be implemented in the 15 vulnerable districts viz **Baragarh, Bolangir, Boudh, Gajapati, Kalahandi, Kandhamal, Keonjhar, Koraput, Malkangiri, Mayurbhanj, Nabarangpur, Nuapada, Rayagada, Sambalpur, and Sonepur**. These districts were identified based on the state level consultations and meetings by Government of Odisha based on their food insecurity and future climate related vulnerability. The hunger atlas prepared by WFP showed all the eight districts in the Eastern Ghats region lie in the most food insecure categories, as also most of the Central Table land. These areas have high concentration of indigenous population. Enhanced food security in these areas will enhance their adaptive capacity. The project will have demonstration effect on SC and ST households in 15 districts. 3.6 mn persons are of Below Poverty Line (BPL) category of which 92% cases the head of the household earns < USD 75 (INR 5000) per month. Agricultural labourers are also about 3.8 million in these areas.

2. The sub-objectives of the project are as follows:
    - Augmentation of ground water recharge to improve water table and water quality conditions in rural areas (Gram Panchayat) of the state through adoption of recharge systems in existing village ponds / tanks.
    - Sustainability of ground water based (domestic / irrigation) Schemes at GP level. Revival of defunct community tank used as drinking water sources for reducing vulnerability.
    - Use of solar pumps for irrigation as part of low emission climate resilient crop planning strategy.
    - Create a knowledge base for enabling policy and regulatory framework for market transformation
3. It will help three concrete outputs under Green Climate Fund:
    - Improved ground water table which will improve food security through resilient crop planning, water budgeting, protective irrigation through installation of GWRS in 10,000 tanks.

- As a co-benefit - Energy saving of 3.27 million kWh per year from 1000 solar pumps and avoided $CO_2$ emission from solar 2614 tonnes/year
- Increased resilience of health and well being of about 5.2 million vulnerable communities through water security (household use with enhanced access year round) and increased income of farming households.

The specific components shall be as follows:

**Output 1: 10000 tanks will have Ground Water Recharge System as a concrete adaptation measure to ensure ground water conservation to reduce vulnerability in 15 water stressed districts of the state**

1. In the prevailing socio-political scenario, creation of additional surface-storage through new major/medium irrigation projects is not practically possible. Alternatively, ground water which is widely accessible and less impacted by droughts and floods provides a vast scope for its recharge though community-based rainwater harvesting practices. A recharge shaft as concrete adaptation measure has been proposed in the community ponds to ensure the aquifer recharge. Normally shallow water bodies like tanks or ponds serve as good rainwater harvesting structures but their contribution towards ground water recharge is quite less due to the presence of low permeable soil layer in between the tank bed and underlying aquifer system. Further due to sedimentation process, layers of silt / clay get deposited on tank bed rendering the tank completely unsuitable for ground water recharge. By constructing recharge wells inside the tank, the connectivity between the water body and the underlying aquifer system can be established bypassing the soil layers. Ground Water Recharge System (GWRS) consists of two to six recharge wells (RW) of suitable size constructed around the water body depending on the pondage area. These wells during rainy season (June-September) provide an easy passage of excess rainwater to the underlying aquifers system through a filter pack of pebbles / gravels. The construction of RWs (made of precast RCC rings) is very simple and similar to the construction of any open well. These RWs are so designed that the excess rainwater / runoff from the tank during the rainy season will be diverted to underground aquifers for recharge. At the end of rainy season the average water level of at least 1.5 m in the tank can be maintained for pisci-culture / community use. Periodic replacement of filter packs of the RWs is the only requirement as maintenance of the GWRS to ensure its efficient functioning. The constructional details of a typical RW and GWRS have been indicated in the drawings at Annexure-1. The average depth of the recharge well is 3.5 meters i.e. 2 m below the tank

bed and 1.5 m above the tank bed. For construction of each well (1500 mm X 300 mm) size precast RCC rings are to be used. RWs are covered by perforated RCC covers on their top as indicated in the drawing, for entry of rainwater, in addition to lateral inlets. The estimated cost of a typical recharge well of 3.5 meter depth is USD $ 424 (Approx) as has been indicated in Annexure-1. It justifies the cost per meter depth of RW is USD $ 151 (INR.10, 000). The average cost of a GWRS with five RWs (3.5 m depth) has been considered as USD $ 2121 (i.e. INR1, 40,000).

2. These structures will be constructed phase wise based on the tank renovation plan given in the annexure 1 of this document. A baseline study will be conducted during the inception of the project. The purpose of this study is to review the status of various tanks, mapping of area, sensitivity and adaptive capacity related indicators. The preparedness of the local communities, nature of the cropping pattern current patterns of water use and energy use will also be covered in baseline. It is important to distinguish between baseline study and tank improvement plan. The tanks will be selected in a transparent manner after this study is completed. This study will feed into the project implementation plan and help develop clarity to the World Bank supported component. Each selected tank will have a tank improvement plan (TIMP) with a recharge structure. One of the success indicators shall be pre and post monsoon recharge in the tank and availability of life saving irrigation for the Kharif crop and some residual moisture for the rabi crop in the tank command. TIMP formulation is always done after the baseline study gets over and tanks are selected. The estimates are prepared based on TIMP. This is a participatory planning exercise. The actual works contract are issued based on the tenders.

3. The state has been preparing for obtaining IBRD assistance for the capital investment of the first phase 600 tanks under OCTMP II. The subsequent capital investment for additional tanks (9400) in 15 districts (maps enclosed) that would be renovated would be made available by the state. Only the cost for construction of recharge structure in 10,000 tanks has been requested under this component from GCF. Once the adaptation logic is established it will be expanded to all the tanks in the state (the cost norm will be revised and guideline developed) and through its own convergent budget. Government of Odisha considering the chronic poverty and recurrent drought in the identified districts has already decided to have large scale water harvesting structures through convergence and financial assistance of World Bank. The farmers are familiar with the pumping system. The problem

for them is the availability of reliable power supply for irrigation. The demonstrative effect of this project will help in developing an eco-system and value chain for the solar energy for which private and individual investments will flow in without increasing carbon foot print.

Based on the study conducted in some select ponds in the state the quantum of recharge through recharge shaft (single unit) in pre-monsoon scenario is expected to be 13 hectare meter of ground water in a year. The aforesaid quantum of recharge will result in ground water table rise of 4.17 meter within a 500 meter radius of the tank and will positively impact an area of 25 hectare area. The proposed activity undertaken across 10000 community tank is expected to result in recharge of 131040 hectare meter of ground water in a year and benefit a total area of 250000 hectare. The cost estimate of recharge system constructed on pilot basis at Keonjhar district for one pond is estimated to be INR 140,000 (USD 2121.2) assuming 5 recharge well in a pond.

4. The following concrete adaptation activities will lead to this output:
    a) Baseline study for the 10,000 tanks are conducted: The works under baseline study for the tanks would include the overall assessment of catchment area of tank i.e. upstream and downstream, drainage system, existing depth and area of tank, soil type at bed level, quantum of runoff in monsoon season, identification of location for recharge well, assessment of command area and likely beneficiaries, existing cropping pattern and water requirement of crops, etc.
    b) Tank improvement plan and estimate for the recharge shaft for these tanks prepared – Tank improvement plan will consist of de-siltation of tanks, use of soil, treatment of catchment area, tank bed, etc.
    c) Groundwater recharge system installed in the identified tanks – GWRS would be installed in identified location of the tank to recharge the aquifer.
    d) Standard operating procedures prepared – For identification of ponds, installation of recharge system and maintenance of tanks and solar system, etc the SOPs prepared.

**Output 2: Increased resilience of health and wellbeing of about 5.19 million vulnerable communities through water security (household use with enhanced access year round)**

1. Currently, the tanks those are partially derelict or derelict are not able to harvest adequate rainwater and most of these water are getting wasted as run-off. A study conducted with respect to OCTMP reveals that in 65 intervention (sample) tanks under phase I the water

availability has improved from 28.7% in 2013 to 68.2% in 2016. The yield of paddy too increased from 3.5 tonnes/ha to 4.7 tonnes/ha. The increased water availability and increased income through improved productivity led to increased resilience of health and well-being.

2. As per Census in Odisha, around 38.5% families travel at least half a km to fetch drinking water in villages. The number of such families was 32.5% in 2001, which increased by 6% in 10 years. The enhanced ground water recharge at the aquifer level would help in making quality water available and would reduce drudgery and reduce disease burden. Augmented water availability would reduce risk of crop failure and enhance food security.

3. The following concrete activities will lead to this output:
    a) Improved water availability in the tank command (where tank improvement plan has been implemented): The tank improvement plan includes design and estimate with a participatory exercise with community. This plan will be the basis for awarding the contract and the process must reflect in the execution of work. The community will involve in social audit of the work, so that water availability is not compromised in the tank command as planned. All structural aspects (e.g. de-silting, compacting, bunding, etc.) as per the plan will be part of this component.
    b) Crop-water budget prepared: Farmers are made aware about the water requirements of various crops and water availability through various sources such as rainfall, surface water and ground water. The water losses through evapo-transpiration and various methods of irrigation will be briefed to the farmers and efficient use of water by crops will be demonstrated. To enhance the water use efficiency and to reduce the vulnerabilities the crop water budget will be prepared for sustainability of the water resources.
    c) Water sharing master plan developed: For equity distribution of water among vulnerable a detailed master plan is developed for each tank. The preference to women headed households in the master plan is given and an adequate representation of fair gender in formation of Pani Panchayat is taken care. Rotational irrigation to ensure equity and adequacy will be preferred in each tank.
    d) Improved water quality from drawn samples: Farmers are sensitized about the quality of water and less use of pesticides, fertilizer will be advised. The organic farming in each tank areas will be promoted to minimize the health hazard.

e) Additional days of food available in a year as compared to baseline: The enhanced productivity of crops led to food security of each household in tank's command area.
f) Improved nutritional status of children in the Angan Wadi Centres (AWC) near the tank cluster – Drinking water availability and irrigation facilities led to diversified farming system such as Crop plus livestock which improved the nutritional status of children.

**Output 3: 1000 solar pumps installed in the pilot locations for demonstration in 15 districts**

1. 4.3 million Rural households are yet to be electrified in Odisha. Even those rural areas electrified the quality of power is poor and availability is around 4-5 hours in a day. Energization in agriculture in the state is about 10% but it is rapidly increasing. Considering that about one third of the blocks in the state receiving deficient rainfall in last five years the government want to provide 40,000 pump sets to farmers to address the problem of water scarcity. Most of these would be fossil fuel based unless an ecosystem for solar pumping system is created in the state. This project aims to align the stated objective of Odisha to align its growth aspiration in low carbon trajectory. Many of these areas (targeted 15 districts) are also having high energy poverty. As a part of low emission development strategy the state intends to pursue solar based pumping interventions to address water security not to negate the adaptation benefit through higher emission. The Solar pump set, either AC/DC, comprising of PV array, Motor Pump Set (Surface or submersible), Electronics (Maximum Power Point Tracker (MPPT) and Controls / Protections) and Interconnect Cables and "On-Off" switch. The basic difference is the Motor Pump Set. The DC unit comprises of D.C. Motor Pump Set (with Brushes or Brush less D.C.) whereas AC system comprises of -A.C. Induction Motor Pump Set with a suitable Inverter that has been optimized for high efficiency operations. These pumps when maintained well last for more than 20 years on the field. Typically, the eastern states like Odisha can be served by pumps up to 3 HP.

2. India has an installed base of around 17611 solar agriculture pumps. Three-fourth of these pumps is in north-west regions of India. Odisha will be a new entrant and the state government has also announced incentives for this. The bigger problem of this sector is the AC pumps in the unorganized sector. The panels eligible for subsidy too have low efficiency level.

3. As per the last benchmark cost published by NABARD for 3 HP solar pumps is INR 558400 (USD 8460.6) which is followed by Ministry of New & Renewable Energy (MNRE), Govt. of India. Odisha Renewable Energy Development Authority (OREDA) is the technical partner for the project. OREDA is the single window agency to channelize subsidies related to renewable energy from MNRE to project participants. There is a well-established mechanism in place for such transfer. In addition OREDA will pre-qualify vendors who would provide the pumps. OREDA has been performing this role for more than two decades and have been co-opted to the project steering committee for this purpose for seamless integration. The procurement method followed by OREDA for solar pumping system for drinking water will be customized for solar pumps for irrigation.
4. Based on the stakeholder consultation with Pani Panchayats the following observations were noticed:
   (a) The farmers have low awareness about the solar pumps
   (b) Many are not convinced about the performance of the solar pumps as compared to the diesel pumps
   (c) Easy availability of the subsidized diesel
   (d) Only a small percentage (1 out of 10) wanted to have it as a second investment and rest think this can be used as a backup rather than prime irrigation equipment. Availability of battery and other after sales services is a major concern
5. The project aims to tackle these issues as follows: (a) Technical partner OREDA has standardized the procurement process for registered channel partners. A separate agreement will be developed by the project management unit to create an interface with pani panchayats for this pilot. 1000 installations and post installation support clauses will be built into this agreement. The mobilized suppliers will provide demonstration and handholding support for certification of para-professionals (*Jal Saathis*) for pump operation and maintenance. (b) Awareness and positive precedence – and development of a complete value chain will help deepening the solar market. Demonstration of good working installations will build the confidence among the communities about the system. Conversely, any poor installation makes the entire community apprehensive and restoring confidence is very difficult. It is, therefore, important that this pilot phase demonstrates all the claimed benefit addressing all the concerns raised by the farmers. (c) Performance and quality assurance about the volume of water, less conveyance loss and saving of energy this need to be assured working closely with the suppliers and barefoot *Jal Saathis*. As per the industry estimate it is possible to replace 0.4 million diesel pump sets in Odisha. In other

words these 1000 solar pump sets would help in building an ecosystem for a market of 0.4 million solar pump sets with resultant emission reduction.

6. GCF fund will be used largely as a catalytic fund to develop the solar pumping eco-system in the state and enable private sector participation in the value chain. The state will address the agricultural vulnerability still being in the low carbon path.
7. The following activities are expected to lead to this output:
   Identification criteria for the pilot sites for installation of solar pumps developed; The selection criteria, availability of ground water, formation of WUAs, ownership of solar pumps, O & M charges, etc will be defined properly for effective implementation of solar pumps. The process of beneficiary selection will be as follows:
   - The TIMP prepared by pani panchayats or village committees will identify beneficiaries in the following order of priority and approved by gram-sabha (consist of all the adult franchise of a village):
   - For individual beneficiary (based on wealth ranking and meeting the sharing criteria):
     - Vulnerable and SC-ST household
     - Female headed household
     - Others

     For group
     - Farmer Interest Groups/Framer producer Organization
     - Women SHGs/landless
     - Village committee (for energy or water)
   - In each case the project and beneficiary will have a MoU to abide by water-budget norms, water sharing plan, Environment and Social Management Plan (on pesticide use). This is required to contain unauthorized abstraction of water and water contamination.
   - Procurement plan and standard contract for 1000 pumps both for channel partners and PPs developed: To ensure transparency, procurement of pumps will be done through well established procurement policy.
   - Baseline energy audit of the installed pumps established
   - 20000 village level para professionals (*Jal Saathis*) are certified for operation and maintenance
   - Monitoring of the solar pump functioning (energy saving/avoided generation, fuel, water delivery) is documented

**Output 4: Capacity Building Plans for livelihood support systems for water users and landless in the tanks command to build resilience.**

The core investment for this would come from the existing programmes and projects. However to safeguard the interest of the landless people and women, the project will ensure training them in activities such as mushroom cultivation, backyard poultry and fishery.

1. The project would build on the ongoing programmes (RKBY, NFSM, NHM) etc. The project would supply catalytic support like technology transfer, input support based on area based deficiency (nutrition deficiency, soil health, etc.) (ii) promoting diversification to high value vegetable or horticulture crops through field demonstration and improved technology. (iii) Improved yield by 20-25% in cereal crops through rainfall matched sowing. (iii) Promoting less water consuming cropping system, adjusting crop schedule with volatility of the climate variables, crop-water planning, enhancement of soil organic carbon, etc.
2. Capacity building will be done for the Pani Panchayat on these aspects and relevant module will be developed and delivered by the water and land management institute of the state and its partners. The plan also will focus on the collectivization of the produce and market linkage for enhancing the farm income and value share. The jal-sathis will be trained with all aspects of the crop-water management and budgeting. DOWR will train its engineers on tank quality management and monitoring of the ground water recharge. A project management unit of WALMI will coordinate these activities.
3. GCF fund will be used to develop capacity of the para-professionals at the village level, it will also heavily invest in water institutions on aspects of water budgeting crop choice, water use efficiency and cost recovery.
4. The following concrete activities will lead to this output:
   4.1 Training need analysis report of PP member along the tank command
   4.2 Training plan and modules prepared partners identified to train 300000 farmers and 150000 landless population trained on fisheries and poultry
   4.3 Training of 20000 jala sathis and 500 engineers completed and certified
   4.4 No of training and demonstration organized in convergence with relevant programmes of the government
   4.5 No of landless and women members covered under off-farm activities

**Output 5: Quality Monitoring System for ground water governance established**

1. It is important to monitor the programme both from adaptation and mitigation point of view. Policy briefs, knowledge products and modules would be prepared for its mainstreaming. A

suitable external agency (having suitable accreditation on energy audit) and working in the agriculture and water sector would be hired for this component. In addition the Accredited Entity (AE) too would provide support in fund management and other operational support.

2. The monitoring shall be at three levels (a) Pani Panchayat level by the jala sathis. (b) an independent satellite based monitoring system to be used by the directorate of ground water survey and investigation for modeling the ground water development efficiency (c) a project monitoring cell responsible for tracking all the indicators of the envisaged under the project as against baseline on a concurrent basis and generate the knowledge products and policy briefs. This also includes the concurrent energy audit of the functioning pumps and their performance. The project level monitoring cell will interface with Accredited Entity (AE) i.e. NABARD and assist them in their independent assessment providing all required information.
3. PPs will be provided a simple set of indicators for tracking through the life cycle of the project.Similarly the satellite data obtained ORSAC. Finally project level monitoring will be undertaken by the PMU concurrently based on the standard adaptation baseline and GCF accepted indicator sets. Tools to capture that will be developed by the agency. The agency would have requisite experience in climate change field in different sectors as well as expertise in energy audit and energy management.
4. The following results shall be delivered though this output:
   4.1. A project MIS including a GIS based tank database developed
   4.2. Quarterly monitoring report prepared
   4.3. Baseline, independent assessment report prepared
   4.4. Report on adaptation and mitigation benefits of the project assessed

   The concurrent monitoring system is integral to this project as lots of structural work is involved, The specialized wing of the DoWR will be responsible for quality monitoring and modelling the benefits. This is a scientific exercise. The adaption and mitigation co-benefits to be measured through scientific sampling. In addition a quality manual will be prepared for community level quality check and social audit. All the tanks will be geo-coordinated and its adaptation and mitigation benefit will be identified and quantified in a transparent manner.

   Accredited entity will support the project in financial and physical reporting and compliance requirement for which the fee structure has been proposed. AE will also manage the fund flow. AE will work with PMU to develop a master timeline and ensure that right agencies are mobilized on time and activities conform to time schedule.

**Output 6: Knowledge management (institutional and regulatory) input provided for water and clean energy market development**

1. The GCF funds will be used to improve the knowledge base on ground water conservation, regulatory frameworks and institutional set up governing the crop water management in 15 priority water stressed regions of the state. It will also develop knowledge products and policy brief for transforming the nascent water market and solar pumping market.
2. The project will provide a unique opportunity to develop knowledge base on adaptation benefit in a decentralized tank system. The learning and knowledge management component captured through a process document component will help in up-scaling this project in a programmatic mode. In addition the department has built in IEC component and training component for this concrete adaptation initiative. It will also provide further outlook in basin planning and tank cascade planning. The Prime Minister Krishi Sichai Yojana aims to reach to each farm field and this would require a massive scale up and has potential not only in the state but across the region. The learnings from the project will be shared through regular newsletters, policy briefs and project based working papers. There will be a half yearly learning workshop each year after 2nd year to share the learning in the project. The participants and experts will be invited from the region. The process will be managed by the knowledge management unit.
3. The following results are expected from this output:

   3.1. Preparation of policy briefs for the Odisha Ground Water Management and Development Regulation and State Water Policy

   3.2. Process documentation for standard operating procedure for establishing solar pumping value chain

   3.3. Process documentation for funding convergence with Agriculture, Fishery, Rural Development, Health and Panchayati Raj departments

   3.4. Knowledge products science to policy framework developed

   3.5. Quarterly newsletter based on the project progress in English and Odia in digital and physical form produced

   3.6. 10 workshops are conducted during the life cycle of the project

**Output 7: Effective project management system established**

1. Effective management and timely execution of this project is vital for measuring the benefit. For e.g. the structures have to be in place before the monsoon season in each phase to

measure depth to water level in both pre-post monsoon scenario and also both control and intervention scenario. Since the project is tapping into convergence fund the operating procedure and modalities to be placed to an interdepartmental steering committee would be put in place as part of the project implementation plan not to have any future delay. To ensure effective project management at the state, district, basin and sub-basin level, provide information communication and logistics support; provide project related consultancies; undertake concurrent M&E and ensuring quality supervision and monitoring of structural work. The project would engage a management unit as service provider Activities to be financed include: (i) setting up and supporting (through capacity building and equipment) project management units at the state and district levels; (ii) design and establishment of a project specific Management Information System; (iii) setting up and leading the project monitoring, evaluation and learning activities; (iv) contracting resource agencies including services of an external M&E agency to be engaged as consultants for the duration of the project; (v) providing support for emerging needs and innovations during implementation; (vi) liaison and convergence with other agencies and government departments; and (vii) documentation of project experience and its dissemination in the wider development community.

2. The following results are to be in place:
   2.1. Inter-departmental steering committee notified
   2.2. Project Implementation Plan developed and approved
   2.3. Service providers mobilized
   2.4. Modalities of engagement with other departments/agencies developed
   2.5. Regular reporting to AE and other partners agencies and the government ensured
   2.6. Fund flow and physical work progress, quality reports are web hosted

Provide information on how the activities are linked to objectives, outputs and outcomes that the project/ programme intends to achieve. The objectives, outputs and outcomes should be consistent with the information reported in the logic framework in section H.

3. The proposed project will ensure a paradigm shift by creating an enabling framework in legislation and policy and strengthening the capacity of the grassroots level water institutions to ensure climate resilient development in crop water management in a decentralized tanks system not only in this project but also having a potential scale up in the region in similar projects/programmes. The fund level impact will be achieved both in adaptation and mitigation pathways: (a) The proposed project will increased resilience of

health and well-being, and food and water security of about 5.2 million vulnerable population in 15 food insecure districts of Odisha. (b) 2614 Tonnes of carbon dioxide equivalent (t $CO_2$eq)/annum in this pilot is expected to be reduced or avoided as a result of 1000 pilot solar pumps installed through this project.