



Andhra Pradesh Integrated Irrigation and Agriculture Transformation Project (APIIATP)

Environment and Social Management Framework: Volume 2 – Stand Alone Documents

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**Andhra Pradesh Integrated Irrigation
and Agriculture Transformation
Project (APIIATP)**

**INTEGRATED NUTRIENT
MANAGEMENT PLAN**



**Environment and Social Management Framework:
Volume 2 – Stand Alone Document 1**

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INTEGRATED NUTRIENT MANAGEMENT PLAN

Section 1: Introduction

Overview

Integrated plant nutrient management involves monitoring all pathways of plant nutrient supply in crops and cropping systems and calls for a judicious combination of fertilizers, bio fertilizers and organic manures. The basic concept underlying INM is the maintenance of soil fertility, sustainable agricultural productivity and improving profitability through judicious and efficient use of fertilizers, organic manures, crop residues, bio fertilizers, suitable agrochemical practices, conservation agricultural practices and nutrient efficient genotypes. Soil testing and assessment of productivity potential and targets for crops and cropping system, estimation of nutrient requirements, soil nutrient supply potential and fertilizer use efficiency besides assessment of resource base and socioeconomic background of the farmers are essential for suggesting and practicing site specific INMS. The system also involves monitoring all the pathways of nutrient flows in the cropping system from all the sources to maximize the profits.

Need for INM

The INM system demands a holistic approach to nutrient management. It is not new to Indian agriculture and a lot has been written on the subject. There have been several causes apart from slow extension that has contributed to declining use of organic sources;

1. Quick and visible responses to fertilizer use, its easy availability and handling
2. Cumbersome procedures and drudgery in making manures/composts and their usage, and
3. Less economical compared to the fertilizers in view of their low nutrient contents, application in bulk quantities, slow release of nutrients to the crops, lack of quality norms and most important the need for faster dissemination of green revolution technologies to enhance food production.

While the organic nutrient sources are definitely of low nutrient concentration material which is available to plant uptake only upon microbial decomposition and nutrient release, the material are rich in all plant nutrients and organic carbon that provide stability to the quality of the system. The importance of organic sources could be realized when the productivity growth stagnated and yields started declining requiring increasing levels of nutrient application which led to depletion of plant essential nutrients from the soil system. The situation has already been arrived in many parts of the country where intensive cultivation is being practiced.

Section 2: Integrated Nutrient Management

Objectives of INM

The aim of Integrated Nutrient Management (INM) is to integrate the use of natural and man-made soil nutrients to increase crop productivity and preserve soil productivity for future generations (FAO, 1995a). Rather than focusing nutrition management practices on one crop, INM aims at optimal use of nutrient sources on a cropping-system or crop-rotation basis. This encourages farmers to focus on long-term planning and make greater consideration for environmental impacts.

Key components

Components of INM and their use: Major components of integrated nutrient management are ;

- Integration of soil fertility restoring crops like green manures, legumes etc.
- Recycling of crop residues
- Use of organic manures like FYM, compost, vermicompost, biogas, slurry, poultry manure,
- Bio compost, Press mud, oil cakes, Phospho-compost
- Utilization of Bio fertilizers
- Efficient genotypes and lastly
- Balanced use of fertilizer nutrients as per the requirement and target yields.

Preparation

Unbalanced and excessive use of chemical fertilizers along with lack of application of micro-nutrients not only have reduced the efficiency of these inputs but degraded the land and soil resources adversely affecting its texture and structure. Incidence of degradation is more in Rayalaseema and Telangana regions where agriculture is predominantly dry land-based dependent on rainfall (Reddy 2003.4). Degradation in some parts of these regions has reached irreversible levels. The Drought Prone Area Programme (DPAP) has given way to Desert Development Programme (DDP). The ideal ratio of N, P and K for the use of fertilizer is 4:2:1 and in order to improve the efficiency of fertilizer use it is essential to encourage judicious application of NPK and micro nutrient fertilizers, also referred to as Integrated Nutrients Management (INM).

It would also be essential to promote the use of bio-fertilizers as an environment friendly, cheaper and supplementary source of plant nutrients, which would help in improving the soil texture and fertility. This ensures the improvement of efficiency of plant nutrients, conserving the land resources and protection of environment.

Organic Nutrient Sources

Available information show that organic manures in addition to fertilizers sustain high crop yields over long periods as compared to application of only fertilizers as observed in many long term studies (DRR, 2007; 2008; Rajendra Prasad 2008). The results indicate scope for substituting more than 25% of recommended dose of NPK with organic sources in intensive

cropping systems. Under ideal conditions green manures and grain legumes when integrated into the cropping system has the potential to meet more than 50% of N requirement of the immediate rice crop. Further addition of organic manures as part substitutes or supplementary, improves soil physical-chemical and biological properties and ultimately its quality.

Biofertilizers (N fixing, P solubilizing, cellulolytic microorganisms) facilitate economizing fertilizer nutrient use through utilizing BNF systems, solubilizing less mobile nutrients from fixed components and recycling of nutrients from crop residues. Integration of such systems makes the production system more stable and sustainable.

Table 1: Nutrient Composition of Organic Materials (N, P, K)

Material	N %	P %	K %	Dry Matter %
Cow manure	0.5-0.8	0.15-0.2	0.6-0.8	25-30
Poultry Manure (broiler)	2.0-2.5	1.5-2.2	1.0-1.5	60-75
Sheep manure	1.5-2.0	0.4-0.7	2.0-2.5	50-60
Fish meal	5.0-10	1	<0.1	80-90
Garden compost	2.0-4.0	1.0-3.0	0.5-1.5	65-80
Grain straw	0.3-0.7	0.1-0.15	0.8-1.3	70-80
Sewage sludge	3.0-8.0	1.0-3.0	0.3-0.8	60-80
Wood ashes	-	1	5	95

Legumes and green manures: Grain and fodder legumes and green manures can fix atmospheric N to the extent of 50-500 kg N/ha before the plant starts flowering (about 40-60 days growth). The residues of legumes after harvest of grain contain 25-100 kg N/ha which is released at a steady rate when incorporated because of optimum lignin content. Green manures accumulate 100-200 kg N/ha in about 50 days period of which 60-80 per cent is fixed from atmosphere (Rao et al., 1996) and can meet 60-120 kg/ha of N requirement of rice.

Besides N, the crop mobilizes less available soil P and K which can be recycled into the system. A 60 day green manure was reported to accumulate 20 kg P₂₀₅ and 125 kg K₂₀/ha in their biomass which gets released upon decomposition and is less prone to soil fixation because of organic environment. The deep rooted grain legumes also have the potential to recycle sub soil nutrients to the benefit of the following cereal crops in the cropping system.

The GM crops had C:N ratio of 14-15 at 30days and 18-19 at 60 days, and mineralize in 15 days 41-43% of biomass N of a 30 day old crop while a 45 day old GM crop took 30 days to mineralize same amount of biomass N. The biomass N release rates depend on plant characteristics like lignin content, C/N ratio, N content, age of the residue, etc. Multi location trials in rice-wheat and rice-rice system indicated that GM crops can on an average supply 50% N requirement of rice, with considerable impacts on soil organic C, and N and K status of soils besides improving soil physical conditions. There is, however, a discouraging scenario of green manuring. Its area has decreased because of lack of space and time under conditions of increasing cropping intensity, non-availability of seed, and availability of fertilizers at subsidized rates. Integration of grain or fodder legumes, as alternatives, has been equally effective as any GM crop in terms of N supply with an additional income on the legume grain harvested.

Crop residues: Mechanisation of Indian farms, semi-urbanization of villages, increasing cropping intensity with low turnaround time, decreasing availability of farm labour have led to problems of crop residue disposal, which has vast potential to meet nutrient requirement of major cropping systems. The problem is more intense in the utilization of kharif rice-straw which has higher moisture and is generally soiled besides being hardy as a source of nutrients for use in intensive crop systems, while that of dry season crops like wheat are utilized as fodder for the animals and partially recycled. A ton of rice residue contains 6.0, 2 and 11 kg NPK and wheat straw has 5, 0.7 and 10 kg NPK/ t. More than 340 M. tons of crop residues from various crops are produced annually of which major quantity is contributed from rice and wheat (nearly 240 M.tons). This accounts for nearly 6 million tons of major nutrients of which at least one third is tappable for recycling. About 12-16 M.t of crop residues / straw is burnt annually to clear the land for early wheat sowing leading to considerable loss of straw N, P, K and S to the extent of 100, 20,20, and 80 percent, respectively. In addition to causing environmental pollution, burning results in large losses of organic carbon besides plant nutrients.

Future increases in food production are possible through improved soil productivity. Proper management and utilization of crop residues and other agricultural wastes will constitute an important factor in achieving this objective. With widespread use of combines, crop residues largely remain in the field and must be managed for sustainability of the system. Studies conducted at DRR and elsewhere in R-W region indicate early release of P and K upon soil incorporation, while N is released into the soil after a brief period of immobilization up to 4-5 weeks. Spreading of chopped rice straw after combine harvest of rice and a booster dose of 20-30 Kg N/ha after rice straw incorporation/spreading hasten its decomposition and release of nutrients. Combined use of rice straw and green manure (GM) improve and sustain yields compared to standard fertilizer package through increased nutrient supply, improved soil physical conditions and favorable biological activity .

Inoculation of rice and wheat residues with cellulolytic fungal cultures observed improved K uptake significantly by 18% (Rajendra Prasad, 2008). Incorporation of crop residues in R-W and rice – rice system improved soil organic C, N, and soil physical properties (Surekha et al, 2008) besides leaving a positive K balance in the system.

Organic Manures: Organic manures vary in their nutrient content, quality and utility as a source of nutrients. When properly managed these have high potential as nutrient sources supplementing at least 25-35 per cent of nutrient requirement. In Rice – Wheat system FYM @ 15.3 t/ha applied to rice was nearly 90 per cent as efficient as 150:60:60 kg N, P₂₀₅ and K₂₀ while in wheat (applied@ 20-40 t/ha) FYM was only 35-45% efficient because of low temperatures. As the only source, FYM was less efficient while as a supplementary dose along with fertilizer NPK the results have been highly encouraging (DRR, 2007; 2008). As a substitute, 50% N requirement of rice and wheat could be substituted with FYM and green manures in equal proportions. The manure also influenced soil nutrient status positively and many physical and biological properties.

Vermicomposts contain 1.9% N, 2.0% P and 0.8% K and are comparatively superior to FYM in their effects on crop productivity as reported in studies with rice perhaps due to higher N and P contents and manure characteristics. The impacts of vermicompost on soil quality are also superior to FYM in many cropping systems.

Poultry manure (PM) is generally richer in P (1.8% N, 2.5% P and 1.4% K) and other nutrients which makes it a good source. In a laboratory study 45% of PM-N mineralized in 4 weeks as compared to only 12% from FYM-N, while as N source to rice 4 t PM and 60 kg N/ha was equivalent to 120 kg N/ha as urea.

Biogas slurry (BGS) contains about 1.4, 1.2 and 1.0% NPK and was as effective as urea for rice and wheat in a study conducted at IARI in light textured soils. It is more efficient source of nutrients than strait fertilizers alone when > 50% N requirement is substituted with BGS (Gupta et al 2002).

Biocompost (BC) It is prepared by mixing press mud cake (PMC) with spent wash from distilleries, and contains 1.9, 1.85 and 1.5% NPK besides many micronutrients. It was reported to be a good source more efficient than fertilizers when applied @ 5 t/ha BC + 50% RDF for wheat. The material also influenced soil quality (nutrient supply, OC) and recorded 22% more wheat yield (Tripathi et al 2007).

Press mud cake (PMC) is a waste product of sugar industry, and about 9.0 M.t. is produced annually. It contains about 1.6, 1.0 and 0.8% NPK. Applied @ 5.0 t/ha along with 40-60 kg N/ha to rice, PMC was equally effective as 120 kg N/ha as urea with significant residual effects on wheat to the extent of 40 kg N and 13 kg P/ha (Yadvinder Singh et al 2003). The material also improved soil OC by 50%, total N by 60% and the biological properties by 91 % (SMBN).

Phosphocompost (PC or PEC): Enriched with P (SSP or RP) phosphor compost can be a good organic source of nutrients particularly of P in phosphorous fixing soils. Following NADEP method of composting Dhawan et al (1996) reported increased P content from 0.69 to 0.92 and 0.98% when enriched with RP and SSP, the latter also improving N content by preventing loss of N through ammonia volatilization during composting. Combining PSB inoculation with phosphocomposting with RP, the citrate soluble P of the fertilizer also improved, which make it useful even in calcareous soils.

Biofertilizers: Biofertilizers are cultures of micro-organisms that are capable of fixing atmospheric N, solubilizing less soluble P forms, mobilizing native soil P and K and for accelerating decomposition of organic material while composting or directly used in the fields to decompose crop residues. N fixers are symbiotic (*Rhizobium* sp.) and non-symbiotic (*Azotobacter*; *Azospirillum*; blue green algae, *Azolla* etc.). *Rhizobium* cultures are used for the legumes, the residues of which can be recycled into the cereal crop system, while *Azospirillum*, BGA and *Azolla* are directly used in the rice fields. Estimates of N fixation in rice fields range from 25-30 kg N/ha by BGA and was reported to increase rice yield by 14%’ BGA inoculation with 50% N as NCU was reported to be equivalent to 120 kg N/ha as urea.

Azolla (fern) has been used as N fixer in rice in china since 6th century. An algae *Anabaenasps* associated with it fix atmospheric N. The fern prefers low temperatures (16-170C) but many cultures were identified that survive at 30oc. Under field conditions it can fix 30-40 kg N/ha but requires 15-20 kg P205/ha to fix N. *Azolla* is grown simultaneously with rice as a dual crop but it is more useful as a source of N when used as a green manure. The quantum of N incorporated depends on the growth rate and doubling time.

Phosphate solubilizing organisms (PSO - PSB, PSF): The organic acids (gluconic, lactic, citric, tartaric) released by PSO decompose rock phosphates and release P thereby improving its efficiency as a nutrient source, and is reported to increase rice yield. Sharma and Prasad (2003) reported comparable efficiency of RP + PSO and DAP, which improved further with the supplementation of crop residues. PSOs along with RP are effective for pulses though the yield improvement is comparatively high in the presence of soluble P inoculated with PSO.

Nutrient efficient genotypes: Genotypes differ in their response to applied nutrients, utilization efficiency and nutrient requirement. Exploiting this variability to identify and utilize in specific environments would economize costs on nutrient use and conserve resources. Some of the rice varieties like Rasi, Vikas, RPA 5929, few rice hybrids, etc are reported to be efficient utilizers of nutrients.

- Efficient rice genotypes for nutrient stress situations
- Low N: Swarna, BPT-5204
- Low P: Swarna, BPT-5204, MTU 2400,
- Low Zn: MTU 1061
- Fe toxicity: MTU 1061

An economic analysis of IPNS and its impact on soil quality changes was done by Singh (2005) in a study conducted in Assam. The results in IPNS indicated a net gain in productivity index in IPNS and soil quality increased by 5 – 12.5 units in rice based cropping systems when compared with farmer's practice.

Promoting, therefore, site-specific integrated nutrient management (SSNM) depending on the resources available and keeping in view crop nutrient demand, productivity targets of the component crops in a system, soil nutrient supply and nutrient flows while alleviating in situ soil problems is very much essential for improving and sustaining soil and crop productivity.

INM in Andhra Pradesh

INM enables the adaptation of plant nutrition and soil fertility management in farming systems to site characteristics, taking advantage of the combined and harmonious use of organic and inorganic nutrient resources to serve the concurrent needs of food production and economic, environmental and social viability. INM empowers farmers by increasing their technical expertise and decision-making capacity. It also promotes changes in land use, crop rotations, and interactions between forestry, livestock and cropping systems as part of agricultural intensification and diversification. In a nutshell, the basic principle of INM are maximizing the use of organic material, ensuring access to inorganic fertilizer and improving the efficiency of its use, and minimize losses of plant nutrients. In this context the baseline survey was conducted and assessed the current practices and applications of nutrient forms through various types of fertilizers, 18 Project (APIAT) tanks spread over four Agro-Climatic Zones were selected and visited. Agro-Climatic Zone and intervention wise tanks visited are given below. The status of these aspects was presented in subsequent paragraphs.

a) Usage of eco-friendly bio-fertilizer

Fertilizers play an important role in enhancing crop productivity, use of bio fertilizers is desirable as they are natural, biodegradable, organic and more cost-effective than chemical fertilizers. Biofertilizers help to increase quality of the soil by providing nutrients and natural environment in the rhizosphere. The micro-organisms present in biofertilizers are important because they produce nitrogen, potassium, phosphorus and other nutrients required for benefit of the plants. Use of Bio fertilisers in the place of chemical fertilizers to supply major and micro nutrients would reduce the negative impacts on environment. The use of eco friendly fertilizers details were collected in 18 sample visited tanks and found that 53% tanks, bio-fertilizer like cow dung, Farm Yard Manure.

Secondary sources of information revealed that currently, Government of India is promoting bio-fertilizers through various schemes of National Mission for Sustainable Agriculture (NMSA)/ Paramparagat Krishi Vikas Yojana (PKVY), Rashtriya Krishi Vikas Yojana (RKVY) and National Mission on Oilseeds and Oil Palm (NMOOP), National Food Security Mission (NFSM) and Indian Council of Agricultural Sciences (ICAR). Liquid Biofertiliser technology with higher shelf life has also been developed by ICAR. The ICAR also imparts training, organizes Front Line Demonstrations (FLDs) to educate farmers on all these aspect. As part of convergence, the project may take the advantage of use of various fertilizers to reduce the negative impacts to environment. Nutrient balance/flow analysis vis-a-vis soil fertility management practices with special reference to INM at farm level needs to be worked out.

Availability of Quality bio fertilizers at local markets is an important factor, besides improving knowledge on different Bio fertilizers and revival of traditional methods of making bio products with the locally available material is very important.

b) Soils testing and INM implementation

Soil test based nutrient management has emerged as a key issue in efforts to increase agricultural productivity and production since optimal use of nutrients, based on soil analysis can improve crop productivity and minimize wastage of these nutrients, thus minimizing impact on environmental leading to bias through optimal production. Soil Health plays a vital role to ensure agricultural production in a sustainable manner. Intensive farming, while increasing food production, has caused not only major nutrients deficiencies but also secondary as well as micronutrient deficiencies. Timely correction measures therefore necessitate balanced use of fertilizers based on soil test data. The Department of Agriculture will collect prescribed samples per revenue village to assess the soil fertility and distribute soil health cards to the farmers duly advocating the farmers to adopt soil test based fertilizer recommendations taking into consideration of the farming situation and major crops grown in each village. No tank systems were observed with INM implementation through WUA and in very few cases individual farmers were adopted with the help of Agriculture department. Zone wise details are given below.

Farmers in the FGD opined that they did not go for testing their soil because they did not know whom to contact for details on testing, they did not know how to take soil sample, do not about location of soil test laboratories nearby and few expressed they do not require for their

current crops which were growing since long. Soil testing was done in 33% of the studies tanks and on average 6 farmers per tank was reported to have soil test results to practice IPM.

This is a very important issue since farmers tend to apply huge quantities of chemical fertilizers through improper methods in the absence of these Soil health cards and periodical testing. Organic cultivation training would have reduced the input cost and improve their productivity to improve their income from agriculture.

c) Training and Demonstrations

The information in respect of INM related Training and Demonstrations were also collected and found that only in 7% tanks, received training program on Organic Farming, found to have field demonstrations on INM in 13% tanks. The other training on water management is in received in 27% of the tanks but there is no follow in its adoption on any of these tanks. Noticed with either measurement or records Water Bodies BOD data in any of the tanks selected for the study. Zone wise details of the same is given below.

There is an ample scope for these WUAs to implement Water efficiency practices once they are trained. Many of the farmers are aware of modern irrigation systems like Drip and Sprinkler, but how do one can manage this modern systems and improvements in surface water irrigation procedures will only be practiced through strong Capacity building programmes.

d) Use of Chemical Fertilizers in the Command Area

For the growth of crops, three essential nutrient elements are required and they are Nitrogen, Phosphate and Potash. Some of the items like urea, DAP, SSP and Muriate of Potash (MOP) are generally used by the farmers. Urea and DAP are the important fertilizers produced in India.

One of the important key issues facing the use of chemical fertilizers (both macro and micro nutrients) is groundwater contamination. Major macro nutrient like Nitrogen fertilizers break down into nitrates and travel easily through the soil. Because it is water-soluble and can remain in groundwater for decades, the addition of more nitrogen over the years has an accumulative effect. The current use and dose of various fertilizers are collected, analyzed and presented below.

They do not follow the recommended doses by the government officials and private dealers. Therefore, the farmers should learn about the application of fertilizers and plant nutrients. The government provides information to the farmers about how to use the right quantity of fertilizers and the method of using them and the time of application for increasing production. Hence, it is important to understand about the fertiliser consumption behavior. Some of the reasons expressed to follow the recommended doses of fertilizers are inadequate quantity of desired/specified fertilizers availability, sometimes the prices of the same are comparatively high, No technical advice on method and time of fertilizer application, difficult to understand and follow the recommended doses. Further is also changes/conflict in dosages by various sources like the State Agriculture department, Agricultural University Research Stations, Cooperatives/Growers' Association, Private input dealers, fellow farmers etc. These issues need to be addressed in project execution.

As far as consumption of Chemical fertilizers are concerned all the farmers have responded positively including the doses of fertilizers for the monopoly crop i.e., Paddy grown under Tanks while Bio fertilizers could not procure the attention of farmers because of their availability locally. Availability of INM products and source of knowledge, if it is within the access of the farmers they would try it out.

e) Adoption of INM Practices by Tank Ayacutdars

Only in about 6.7% tanks reported and observed with adoption of INM Practices of Krishna zone and in other zones of other tanks there is no adoption. Further the extent of INM adopted areas is almost negligible and that to restricted to second crops or subsequent crops sown after kharif.

Section 3: Key issues in Project Locations

A detailed assessment and evaluation of the positive and negative, direct and indirect, immediate and long term, and permanent and temporary impacts due to the project related activities to be undertaken as part of APIIATP project has been provided. Impacts have been assessed, either qualitative or quantitative terms, according to their inherent nature to enable predictive analysis to be undertaken. The impacts on various aspects of environment including physical, chemical, ecological and socio-economic aspects have been studied. The list of environmental impacts covered is given in the following sections:

- Land Environment: Improvement in crop productivity, Change in land use pattern and Reduction in soil erosion rates, impacts on soil quality due to greater use of agro-chemical, increase in cropping and irrigation intensities.
- Soil Quality : Contamination of soil due to oil leakage from machineries
- Water Environment : Impacts on ground water resources, Increased water requirements and Impacts due to increased use of fertilizers
- Agriculture: Increased cropping and irrigation intensity, increased agricultural productivity due to project intervention, Impacts on cropping pattern, Green manure application and organic practices, increased use of IPM and INM practices.
- Socio-Economic Environment: Improvement in the employment scenario as a result of absorption of locals in the construction activities and reduction of out migration, Incidence of water-borne diseases, formation of local institutions, impacts on vulnerable groups, improved communication systems for extension and capacity building

Currently, the adoption levels of INM are very low. The project should plan for crop specific interventions by way of proposed Demonstrations

The key observations from the visit to sample ESMF tanks are as follows:

- INM plan is not being implemented in the villages covered in the sample.
- Soil Health Cards or soil testing for Ayacut farmers of the study area are available to 45 percent of farmers. This is a very important issue since farmers tend to apply huge quantities of chemical fertilizers through improper methods in the absence of soil health cards and periodical testing. Organic cultivation training would have reduced the input cost and improve their productivity to

improve their income from agriculture. However only 0.06 percent of farmers were trained in organic cultivation practices.

- None of the farmers are using eco-friendly bio – fertilizers except 5 out of 18 farmers who were using Farm Yard Manure (FYM). No Water User Association (WUA) is implementing INM.
- Factors which impede usage of bio fertilisers are lack of adequate knowledge on them among farmers as well as lack of availability at local markets.
- The organic fertilisers used by a majority of farmers in agricultural land before tilling include cattle dung and neem cake is
- As far as consumption of Chemical fertilizers are concerned all the farmers have responded positively including the doses of fertilizers for the monopoly crop i.e., Paddy grown under Tanks. While Bio fertilizers could not procure the attention of farmers because of their availability locally.
- 95% of the nutrient needs for agricultural lands are met by chemical fertilizers. Widely used chemical fertilisers are Urea, DAP, Potash, Complex and micronutrients.
- There is lack of awareness about organic farming among the study area farmers
- There are few instances of farmers having been provided training on INM. One instance was found in Veerakanellore village, Chittoor district where a few farmers were provided training on the production of vermicompost.
- Water management practices are not being followed by study area farmers. Special programs have not been organised on water management.
- Practicing Vermi - compost units as fallout of trainings were observed only in Chittoor District while NADEP method of making compost was not known to the farmers. Field Demonstrations in the Ayacut areas of the tanks studied were only 13 percent.
- If trainings and method demonstrations were conducted there would have been some adoption of these practices.
- Though there were trainings on Water management to 2 WUAs out of 18 WUAs studied, none of the WUAs were practicing this very important aspect of Productivity enhancement.
- There is an ample scope for these WUAs to implement Water efficiency practices once they are trained. Many of the farmers are aware of modern irrigation systems like Drip and Sprinkler, but how do one can manage this modern systems and improvements in surface water irrigation procedures will only be practiced through strong Capacity building programmes.
- Availability of INM products and source of knowledge, if it is within the access of the farmers they would try it out.

Section 4: Integrated Nutrition Management Plan

Integrated Nutrient Management Plan will be prepared as a component of TIMP and implementation will be synchronized with Agricultural Extension Centers and WUAs. PMU should have a Agricultural Extension Officer with expertise in sustainable agriculture in its Environmental Management Cell. This expert will assist in designing, implementation, monitoring and studying the impacts of INM. This however, would call for activities like strengthening of soil testing facilities, capacity building of organic farming, bio-fertilizers production units, hatcheries for vermi-culture and training to the personnel engaged in the system along with the farmers through field demonstrations.

Monitoring of INM will constitute a component of overall monitoring system of project with assistance of SO. It will be scheduled according to cropping pattern using the appropriate formats developed by Agricultural Extension Officer for progress in implementation and monitoring.

Adoption of precision technologies for more efficient use of resources and nutrients becomes more relevant in the current production scenario. While technological advancements, currently available, have the potential to address the issues when implemented in the right perspective of sustaining productivity of the soil system on a long term basis, the efforts also require addressing few issues connected with cataloguing of available information on soil variability systematically using modern tools of remote sensing and GIS. This provides opportunities to integrate crop based information for effective management of the field problems and dissemination. Some of the important strategies to minimize the existing abiotic stresses and sustain productivity growth without deteriorating soil quality are listed below:

- Refinement of currently available soil test based fertilizer recommendations through on-farm studies and cataloguing under GIS environment for effective dissemination
- Extensive adoption of site and yield target-specific integrated nutrient management practices involving available organic material, biofertilizers, fertilizers, amendments and efficient genotypes.
- Restoration of biological activity of degraded and polluted soils through integrated methods of soil amelioration involving chemical, biological and cultural approaches.
- Sequestration of carbon in soil through situation specific management of all available organic sources and conservation agriculture to build up soil organic carbon and reduce gasses
Development of precise quantitative models for assessment of soil quality changes under different production systems and management and their monitoring for evolving a workable soil health care system
- Studies to understand nutrient dynamics and enhance nutrient use efficiency under changing climatic conditions.



**Andhra Pradesh Integrated Irrigation
and Agriculture Transformation
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**INTEGRATED PEST
MANAGEMENT PLAN**



**Environment and Social Management Framework:
Volume 2 – Stand Alone Document 2**



Sutra
Consulting

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Section 1: Introduction

Overview

Indian agriculture is the backbone of economy. Agriculture in India has gone through immense changes in the second half of the twentieth century. India has vast pesticide market. About 3 per cent of the total pesticides used in the world are utilized in India. The use pattern of pesticides reflects that cotton crop alone consumes 44.5% pesticides followed by rice, which accounts for 22.8% of pesticide consumption. These two crops consume more than two thirds of the total quantity of the pesticides used in the country.

Plant health is influenced by an array of biotic and abiotic stresses, which have to be managed through multipronged strategies. A strategic science based approach is needed to address the plant health risks and issues that affect productivity. The looming threat of climate change may further exacerbate the crop loss due to pests. The integrity of agro-ecosystem is vital for sustainable agriculture. Intensive use of ecosystems to enhance productivity can affect agro-ecosystems through soil erosion, water depletion / contamination, biodiversity loss and disruption in flow of ecosystem services, which will have a bearing on plant health.

The indiscriminate use of pesticides has been causing wide spread environmental pollution, resistance, resurgence of insect pest and residual effects. Successful Plant Health Management is vital for the sustainable agriculture, food security and agro based industries and economy of a country. To enhance the knowledge of the farmers on Plant Health Management, there is need to develop a cadre of extension personnel as expert in plant health management by training them on various aspects of PHM. Integrated Pest Management (IPM), Agro Ecosystem Analysis (AESA), Ecological Engineering (EE), use of bio-fertilizers, Biological control of pests through natural enemies of crop pests are the strategies for holistic management of plant health.

The mandate of the Global IPM Facility responds to an international consensus, embodied in an array of international policy instruments: Agenda 21, the Code of Conduct on the Distribution and Use of Pesticides, OECD DAC Guidelines on Aid and Environment –Pest and Pesticide Management, and the Convention on Biological Diversity. The instruments reflect an understanding that while pesticides have enhanced agricultural production and suppressed many insect-transmitted human diseases, they have also produced a host of negative side-effects on human health and the environment. High costs and concerns about environment and public health have reduced the use of pesticides in industrialized countries and have induced many farmers to adopt an IPM approach. Meanwhile, the developing world, which uses less than 50 percent of all pesticides account for more than 99 percent of the human poisonings world-wide (FAO, 2002).

Need for IPM

Effects of fertilisers and pesticides can be either direct (Immediate or short term impacts) due to harm to the organisms that come in contact with the chemical, or indirect due to changes caused by the chemical to the environment and/or food source of the organisms being studied. Time of sampling (in relation to last rainfall event, soil temperature, prevalence of food source,

background nutrient levels in soil, soil pH), can be pivotal in the outcome of results as soil environmental conditions impinge greatly on microbial activity. Other factors include time between fertilisers/ pesticide application and sampling, formulation and rate fertilisers, depth of soil sampled effects on food sources i.e. impacts on predator- prey interactions.

Pesticides depending on their purpose may have a positive (insecticides or fungicides allow increased plant production) or negative (herbicide will decrease organic matter inputs from weeds) but may also have direct impact on non-target soil biota. In broad acre agriculture, soil applied pesticides are generally uneconomic and therefore not to often used. Particular pesticides may affect short life cycle organisms such as bacteria but recover in relatively short time frames and so the productivity of the cropping system may not have been influenced at all. However, populations of longer lived organisms such as omnivorous nematodes and earthworms take longer to recover from damage and therefore effects are more likely to be seen in longer term.

The stated aim of the Global IPM Facility is to achieve “sustainable, cost effective and environmentally sound crop production for food security through improved IPM.” This goal is to be achieved through a three-pronged approach of

- a) technical cooperation among developing and emerging countries (human resource development),
- b) better deployment of information and development of standard documentation for good IPM practice, and
- c) Effective mobilization of funds.

Section 2: Integrated Pest Management (IPM)

Objectives of IPM

IPM is a holistic approach to sustainable agriculture that focuses on managing insects, weeds and diseases through a combination of cultural, physical, biological and chemical methods that are cost effective, environmentally sound and socially acceptable. This includes the responsible use of crop protection and plant biotech products.

As a problem-solving approach to pest control, IPM can be introduced at any level of agricultural development. For example, improvement of basic crop management practices, such as planting time and crop spacing, can often be effective in reducing pest attack. A useful beginning can be made with relatively limited specialized information or management input. Later, additional information, technologies, and mechanisms can be developed to enhance its effectiveness.

The goal of Integrated Pest Management (IPM) is to identify, prevent, and eliminate conditions that could promote or sustain a pest population with a food manufacturing, storage, or transportation operation. IPM relies on appropriate assessment, monitoring, and management of pest activities.

Key Components

Although no consensus exists on its precise definition, the World Bank's Operational Policy 4.09 defines integrated pest management as a mix of farmer-driven, ecologically based pest control practices that seeks to reduce reliance on synthetic chemical pesticides. It involves

- a) managing pests (keeping them below economically damaging levels) rather than seeking to eradicate them;
- b) relying, to the extent possible, on non-chemical measures to keep pest populations low; and
- c) selecting and applying pesticides, when they have to be used, in a way that minimizes adverse effects on beneficial organisms, humans, and the environment

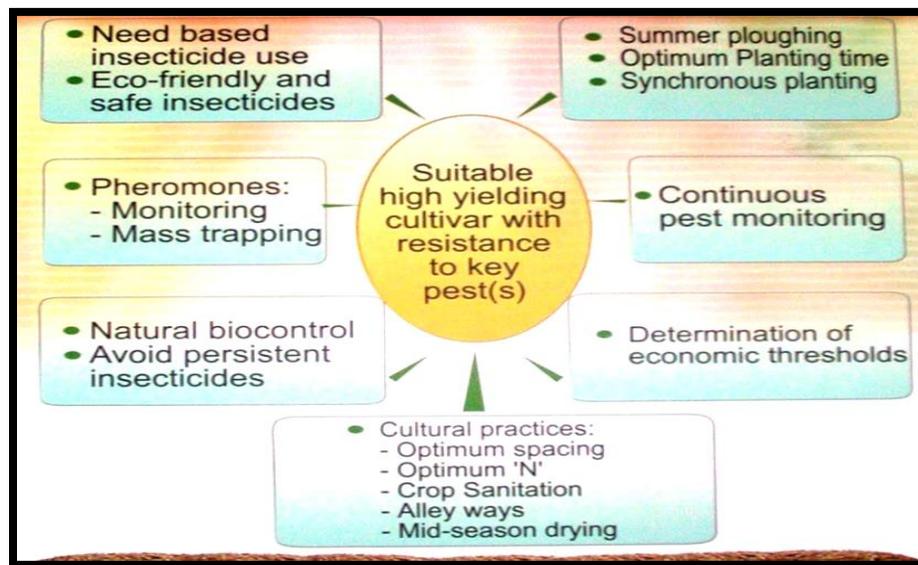


Fig. 1 Components of IPM Strategy.

IPM is a knowledge-intensive sustainable approach for managing pests by combining compatible cultural, biological, chemical, and physical tools in a way that minimizes economic, health, and environmental risks with the help of pest scouts. IPM relies heavily on knowledge of pests and crop interaction to choose the best combination of locally available pest management tools (Fig. 1).

Traditional pest control involves the routine application of pesticides. IPM in contrast focuses on pest prevention and uses pesticides only as needed. This provides a more effective, environmentally sensitive approach.

IPM is based on the following components

Monitoring: Regular observation is the cornerstone of IPM. Visual inspection, insect traps, and other measurement methods are used to monitor pest levels. Record-keeping is essential, as is a thorough knowledge of the behaviour and reproductive cycles of target pests.

Mechanical controls: Should a pest reach an unacceptable level, mechanical methods are the first options to consider. They include simple hand-picking, erecting insect barriers, using traps, vacuuming, and tillage to disrupt breeding.

Biological controls: Natural biological processes and materials can provide control, with minimal environmental impact, and often at low cost. The main focus here is on promoting beneficial insects that eat target pests.

Chemical controls: Considered as an IPM last resort, synthetic pesticides may be used when other controls fail or are deemed unlikely to prove effective. Biological insecticides, derived from plants or naturally occurring microorganisms.

IPM in Andhra Pradesh

Andhra Pradesh and Telangana account for a hefty 24 per cent share of pesticide consumption in the country. The two states are grappling with increased pesticide residue in food commodities, while pesticides can help repel insects, pests and other diseases, their excessive/irrational use can lead to health hazards, ecological disturbance and disruption, increased pesticide resistance, etc. The adverse health effects include cancers and difficult reproductive, immune or nervous system conditions.

The Ministry of Agriculture found pesticide residue in 800 food samples and residue exceeding permissible levels in 100 samples out of a total 1,920 samples in the two states in 2015 (46 per cent food samples with pesticide residues) — way higher than any other state in the country.

The consumption of chemical pesticides during Kharif 2016 was 1100.67 MTs of active ingredient and it was 1180.30 MTs during Kharif-2015. The chemical pesticide consumption decreased compared to last year's consumptions i.e., 2015-16 due to the awareness created among the farming community by the Agriculture department under Integrated Pest management Practices through Chandranna Rythu Kshetralu, Polambadi, Polampilusthondi, usage of bio-pesticides, change in cropping pattern etc., The pesticide consumption particulars from 2010- 11 to 2016-17.

Year	Pesticides Consumption (Metric Tons)
2010 – 11	4410
2011 – 12	4882
2012 – 13	4249
2013 – 14	4253
2014 – 15	4050
2015 – 16	2713
2016 – 17 (up to Sept 2016)	1101

Section 3: Key Issues Identified in Project Tank Villages

a) Received Training on various IPM Practices

The study team captured and collected information through FGD for various IPM Practices which are learned by the farmers through the training programmes conducted by the Agriculture in the past. In all only in about 20% of the tanks selected were reported with receipt of the training/Demo of the Integrated Pest Management. Bases on the learnings, the command area farmers now following the IPM practices are tabulated and presented below. Of which, Seed Treatment was practiced in all the trained commands but overall the tanks practiced with seed treatment as a part of IPM is only in 20% tanks, followed by Cultural Practices in 13% tanks. Further, growing trap crops, border crops, and use of Pheromone Traps were also found in 7% tanks.

b) Para-workers in the village and their skills up-gradation

The data in respect of availability of Para-workers in the village and methods of their skills up-gradation is also captured and tabulated below for each of the studies zones. In all, Para-workers exist in 13% tanks and the method of upgrading their skills is only Trainings. In 50% of the tanks wherever have Para-workers, not undergone any skill up gradation since long. Appointment of Para-workers and their skill up-gradation needs to be addressed during the execution of the project.

Observations on IPM

1. With regard to IPM (Integrated Pest Management) both awareness and adoption levels of these best practices is almost nil, reason being the lack of promotion of IPM, NPM, and Organic Agricultural Practices.
2. Indiscriminate use of pesticides is there in the absence of trainings and promotion of Bio pesticides. Farmers do know about bio pesticides but the unavailability of them in the local market is the main reason for non-adoption.
3. Lack of awareness about organic farming, no training or awareness generation activities were conducted.
4. Seed treatment for paddy is carried out by farmers in majority of villages in the study area.
5. Pest/disease resistant varieties of paddy are selected for cultivation.
6. Lack of awareness about pheromone traps, this practice is not used by farmers in the study area villages.
7. Soil test are not conducted to determine the fertiliser requirement. Soil health card are available only in 20% of the study area, farmers are not following the fertilizer based on the suggested quantity.
8. There are no agricultural Para-workers in the study are village to guide the farmers on fertiliser and pesticide dosage.
9. Due to lack of agricultural Para workers in the village, farmers directly buy pesticides from the private shops by informing them the symptoms of the disease/pest.

Section 4: Integrated Pest Management Plan

IPM will be prepared as a component of TIMP and implementation will be synchronized with Agricultural Extension Centers and WUAs by SO. . PMU should have Agricultural Extension Officer with expertise in sustainable agriculture in its Social and Environmental Management Cell. This expert will assist in designing, implementation, monitoring and studying the impacts of IPM. To popularize IPM technology among the extension functionaries and farmers, the demo-cum-training programmes should be taken up at large scale. Further activities of production and release of bio-control agents should also be strengthened.

Monitoring of IPM will constitute a component of overall monitoring system of project with assistance of SO. It will be scheduled according to cropping patten using the appropriate formats developed by Agricultural Extension Officer for progress in implementation and monitoring.

IPM has to be considered as integral part of sustainable development of irrigated agriculture. For improving INM system, it would be desirable to strengthen the existing soil testing laboratories, upgrade the skill of the staff through training / workshops etc. working in the field. The financial and logistic support may also be provided for capacity building of organic farming, bio-fertilizers production and hatcheries for vermiculture. Similarly for IPM, training for both field staff and farmers would be required to give thrust to the programme. Some financial incentive/ assistance may also be provided for organization of Demo-Cum- Farmers Field Schools, for IPM.

With regard to IPM (Integrated Pest Management) both awareness and adoption levels of these best practices is almost nil, reason being the lack of promotion of IPM, NPM, and Organic Agricultural Practices.

- a) Indiscriminate use of pesticides is there in the absence of trainings and promotion of Bio pesticides. Farmers do know about bio pesticides but the non-availability of them in the local market is the main reason for non-adoption.
- b) In all most all the tanks studied the only single crop that is being taken up is Paddy. Though there alternatives farmers could not switch to even millets. Water rotation systems under even rain fall shortage were also not observed.
- c) There is an urgent need to diversify the crop and cropping pattern under the tanks ayacut for increasing agricultural productivity as well as for water use efficiency. The scope for encouraging the poly cropping systems including Legume intercropping system is good, which is highly resistant to various climatic factors and to mitigate the risks of low and no rainfall.
- d) The practices such as growing Leguminous crops and ploughing them' in situ' (green Manure crops), growing cover crops, compost, vermin - composting and addition of Bio fertilizers have been useful in stabilizing soil organic matter and sequestration of carbon dioxide into the soil. This could be mostly observed in North Coastal and Krishna Godavari basin zones while it is only in some patches of Prakasam, Nellore and Rayalaseema.
- e) It is evident that the knowledge both traditional and advanced on INM and IPM is very low, perhaps the reason being no documentation and dissemination.
- f) National Program for Organic Production (NPOP) for pulses and Paddy crop by Govt., and a few NGOs working on Organic agriculture has created awareness among the farmers. But under the

tank fed conditions a very few farmers are practicing INM & IPM may be because of mono cropping of Paddy and their resource less nature.

- g) The strategy of INM and IPM practices coupled with crop rotation and diversification and an increase in soil organic matter would enhance resistance against the extreme weather events. This would also lead the farmers eventually to protect the soil and plant health ultimately the farmers welfare.

The scope for improving INM (Integrated Nutrient Management) and IPM (Integrated Pest Management) among the farmers is very high since the present adoption levels are very low. WUAs may be trained in the first to take up these practices among members and the ayacut farmers.

The Government is committed to popularize Integrated Pest Management (IPM) under a Central sector Schemes “Strengthening and Modernization of Pest Management Approach (SMPMA) in India”. The scheme seeks to promote cultural, mechanical and biological methods of pest control and recommends use of chemical pesticides as a measure of last resort. The Central Government has established 35 Central Integrated Pest Management Centres (CIPMCs) in 29 States and 01 Union Territory. The mandate of these Centres is to conduct pest /disease monitoring, production and release of bio-control agents/bio-pesticides, conservation of bio-control agents and human resource Development in IPM approach. Training is imparted to Agriculture/horticulture Extension Officers and farmers at grass root level through season long training programmes, Human Resources Development Programmes and Farmers Field Schools (FFSs). The FFS provides practical training to farmers on the principal of IPM: survey and surveillance for pests and friendly insects, use of locally available bio-control agents, cultural, physical, mechanical methods of pest control, use of bio-pesticides, effects of pesticides on natural enemies of pests and safe and judicious use of pesticides. These schools are conducted separately for the Kharif and Rabi seasons, each FFS lasting for 14 weeks. During 2016-2017(up to December, 2016), 376 FFSs were conducted in which 11,280 farmers were trained.

Mobile App for Pest and Disease Management of Crops

An app that allows farmers to identify pests and diseases using their mobile phones and provides remedial measures is the latest addition to using modern digital tools to benefit smallholder farmers. A key feature of the mobile app ‘Plantix’ is automated disease diagnosis. Farmers can upload a photo of their infected crop and the app will provide a diagnosis. Besides giving a diagnosis and steps to mitigate the disease, the app also provides information on preventing the disease in the next cropping season. Farmers are also presented biological treatment options for pest and disease control. Given the rampant overuse of chemical pesticides in India the app will also help disseminate best practice methods to reduce pesticides. The app also features a library of diseases which farmers can refer in case there is no connectivity.



**Andhra Pradesh Integrated Irrigation
and Agriculture Transformation
Project (APIIATP)**

CULTURAL PROPERTY PLAN

**Environment and Social Management Framework:
Volume 2 – Stand Alone Document 3**



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Section 1: Introduction

Tanks have been playing a pivotal role in preserving the culture of a community since immemorial periods. Cultural property includes sites having archaeological (prehistoric), paleontological, historical, religious and unique natural values. Cultural properties, encompass both remains left by previous habitants like shrines and unique natural environmental features such as canyons and waterfalls. As per The World Bank OP 4.11, the general policy regarding cultural properties is to assist in their preservation and to seek to avoid their elimination.

Cultural heritage, also termed cultural property, cultural patrimony or cultural resources, can be defined as the present manifestation of the human past. It refers to sites, structures, and remains of archaeological, historical, religious, cultural, or aesthetic value. In conserving this heritage, the project conserves those elements of the past that have the potential to contribute to our understanding of human history.

Physical Cultural Resources (PCR) aim to preserve and protect cultural heritage by avoiding, minimizing or mitigating the adverse impacts that projects might cause to cultural heritage. In addition, the project can play a role in promoting awareness of and appreciation for cultural heritage. Where the project proposes to use cultural heritage of a community, the note seeks to ensure that the development benefits accruing from the use of cultural heritage flow equitably to the affected communities. The section below outlines the process on protecting cultural heritage in the course of project operations.

Section 2: Classification of cultural properties

The cultural aspects can be classified into three broad categories i.e.

- Community-oriented
- Caste oriented and
- Individual oriented

Apart from that the structure can be classified into the following categories based on the purpose of the monument, i.e.:

- Religious Monument: Any Temple or Mosque or a church and any such sacred place with religious importance
- Other Architectural Structures: Any sort of gate or structures built by the kings of the old without any religious component to it.

Further critical cultural heritage consists of:

- The internationally recognized heritage of communities who use, or have used within living memory the cultural heritage for long-standing cultural purposes; and
- Legally protected cultural heritage areas.

The APIIATP will not significantly alter, damage, or remove any critical cultural heritage. In exceptional circumstances, where the project may significantly damage critical cultural heritage,

and its damage or loss may endanger the cultural or economic survival of communities who use the cultural heritage for long-standing cultural purposes, the PMU will: (i) meet the requirements of all policies and laws; and (ii) conduct a good faith negotiation with and document the informed participation of the affected communities and the successful outcome of the negotiation. In addition, any other impacts on critical cultural heritage must be appropriately mitigated with the informed participation of the affected communities.

Section 3: Key observations on cultural properties in sample tanks

In the visited sample tanks two religious monument and three other architectural structures built by kings of old were observed.

In Kurmasagaram tank of Burja Mandal of Srikakulam, there is a small temple adjacent to a small hillock and close to the tank bund. The hillock itself is a natural bund for the tank. But this is away from the inflows and also the sluices. It is not an obstacle to any of the tank improvement activities.

There are two ancient structures in the tank bed of Y.T. Cheruvu tank in the district of Anantapur which are in dilapidated condition. During the focused group discussion community members indicated that they do not give much importance to these as there are no deities or goddesses linked to the structures. However, these are the reminiscence of the history of the tanks which need to be left like that as they are not obstacles to the tank improvement as they are away from the sluices.

There is a low heighted ancient architectural structure in the Badvel tank of Kadapa district. The long structure is close to the tank-bund, and a new gate was constructed because of the damaged old sluice gate. This is also not an obstacle and should be left as monument. There is also a similar tank sluices gate operating system installed in Ura tank of Nellore District which needs to be protected as a monument. A temple was also observed in Gollavani Tank of West Godavari District. It was built by the villagers 30 years ago. It is situated at the end of Tank bund and is not a hindrance to the farmers.

Section 4: Anticipated impact on cultural properties

Proper management of the project is essential because damage to cultural heritage can result from activities other than direct excavation or refurbishing buildings. Some project aspects may also impact cultural heritage in less direct ways, for example by increasing erosion to a coastal site, or building a road into a previously inaccessible area. Examples of project activities that might impact PCR include:

- Civil works or construction activities may obliterate community PCR such as a public garden or cemetery.
- In a project having large work camps, PCR theft can be an issue, especially if the project is in an area well known for the trafficking of movable PCR.
- In the case of a linear project involving a long canal, highway or pipeline passing through a populated area, the project may cut off access to the community's places of worship, or sacred burial areas.

- Vibration due to the use of heavy equipment in an urban setting can damage historic or culturally important buildings in the vicinity.
- For a project involving inundation, the potential submerging of PCR such as registered and unregistered archaeological sites, is frequently an issue.

These possible impacts should be considered and addressed through appropriate measures. When in doubt about whether a structure is cultural heritage, knowledge and advice of local and international experts, government authorities, and members of local communities and Indigenous Peoples should be sought.

Note that the project's impact area is often different and much larger than the actual construction area, or 'project area'. Just as, for example, pollution impacts may take place in areas far from the project area, so PCR impacts, particularly arising from phenomena such as theft, or changes in the access, may occur in areas outside the project area.

Section 5: Cultural property management measures

Where historical remains, antiquity or any other object of cultural or archaeological importance are unexpectedly discovered during construction in an area not previously known for its archaeological interest, the following procedures should be applied. The final form of these procedures will depend upon the local regulatory environment, including any chance find procedures already incorporated in legislation dealing with antiquities or archaeology. For APIIATP, chance finds procedures will contain the following elements:

- i. Proper defining characteristics of the Physical Cultural Resource (PCR)
- ii. The identity of the owner of the artefacts found should be ascertained if at all possible. Depending on the circumstances, the owner could typically be, for example, the state, the government, a religious institution, the land owner, or could be left for later determination by the concerned authorities.
- iii. As noted above, in PCR-sensitive areas, recognition and confirmation of the specific PCR may require the contractor to be accompanied by a specialist. A clause on chance finds should be included in every contractor's specifications.
- iv. Major Procedure to be followed after any such discovery of PCR,
 - a. Suspension of Work: If a PCR comes to light during the execution of the works, the contractor shall stop the works. After stopping work, the contractor must immediately report the discovery to the Resident Engineer.
 - b. Demarcation of the Discovery Sites: With the approval of the Resident Engineer, the contractor is then required to temporarily demarcate, and limit access to, the site.
 - c. Non-Suspension of Work: The procedure may empower the Resident Engineer to decide whether the PCR can be removed and for the work to continue,
 - d. Finalising Chance Find Report: The Chance Find Report should be submitted to the Resident Engineer, and other concerned parties as agreed with the cultural authority, and in accordance with national legislation.

- e. **Arrival and Actions of Cultural Authority:** The cultural authority undertakes to ensure that a representative will arrive at the discovery site within an agreed time such as 24 hours, and determine the action to be taken.
- f. **Further Suspension of Work:** After the inspection from the Cultural Authority, they will advise on the continuation of work or further suspension of it.
- g. **Consultation:** Where a project may affect cultural heritage, the PMU will consult with affected communities who use, or have used within living memory, the cultural heritage for longstanding cultural purposes to identify cultural heritage of importance, and to incorporate into the PMUs decision-making process the views of the affected communities on such cultural heritage.
- h. **Removal of Cultural Heritage:** Most cultural heritage is best protected by preservation in its place, since removal is likely to result in irreparable damage or destruction of the cultural heritage. The PMU will not remove any cultural heritage, unless the following conditions are met:
 - i. There are no technically or financially feasible alternatives to removal
 - ii. The overall benefits of the project outweigh the anticipated cultural heritage loss from removal
 - iii. Any removal of cultural heritage is conducted by the best available technique

Section 6: Monitoring and evaluation

The activities will be monitored on a regular basis by the PMU established by the Government of Andhra Pradesh and World Bank along with the third party M&E agency which will be appointed by the State Government.



**Andhra Pradesh Integrated Irrigation
and Agriculture Transformation
Project (APIIATP)**

DAM SAFETY PLAN

**Environment and Social Management Framework:
Volume 2 – Stand Alone Document 4**



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Section 1: Introduction

Dams are complex structures and usually require a systematic review and evaluation of all aspects of the design, construction, maintenance, operation, processes, and systems affecting a dam's safety, including the dam safety management system. A dam is part of the altered natural environment and, as such, the natural environment will impose hazards on the dam that are beyond the control of the dam operator. The hazards and risks are difficult to define and quantify, and the understanding of these hazards and risks often change over time. Hence, to minimize the associated risks and ensure dam safety, a dam safety organization was established in May 1979 in Central Water Commission (CWC) to assist the State Governments in ensuring dam safety.

Section 2: Institutional Arrangements for dam safety in Andhra Pradesh

Andhra Pradesh has 163 large dams which include 10 major project dams, 45 medium project dams and rest 108 dams under minor irrigation projects. The State Dam Safety Organization (SDSO) was established in 1981 and has been responsible for monitoring the safety of these dams. Since its inception the SDSO is engaged in monitoring the health of dams and rendering necessary advice to the field units.

Dam Safety Review Panel (DSRP): A Dam Safety Review Panel has been constituted for Andhra Pradesh having engineers, geologists and hydrologists as members. The main objective of the panel is to provide independent expert review on the reports of distress observed in the investigation, analysis performed and remedial action proposed prior to initiation of rehabilitation activities. The State Dam Safety Organization facilitates the framed activities of Dam Safety Review Panel, gives feedback to its members and transmits the suggestion of the panel to Government for approval.

State Dam Safety Committee (SDSC): To carry out the Dam Safety Assurance Program, a high level committee in the name of State Dam Safety Committee [SDSC] comprising of senior Administrators and Engineers of Water Resources Department and representatives of CWC has been formed. The Secretary of DOWR is the Chairman of the Committee while the Director, Dam Safety is the Member-Secretary. This committee reviews the progress of the Dam Safety works at regular intervals.

Special Dam Safety Teams: Five Special Dam Safety Teams were constituted in the year 1998 for various regions of the State to assist the Director, Dam Safety Organization in carrying out Dam Safety inspections of all large dams of the state in a cycle of 5 years. In 2013, the Five Special Dam Safety Teams were reconstituted. The Teams inspect large dams i.e. those having 15 meter height or with 60 M m³ storage capacity.

Section 3: The objectives of dam safety

The objectives behind establishing SDSO in the state is: a) To strengthen the institutional frame work for Dam Safety assurance, b) To upgrade the physical features in and around the selected dams to enhance the safety status as required through basic safety facilities and remedial works.

Section 4: Definition of large dams

As per ICOLD, a large dam is defined as a dam which satisfies the following criteria:

- A dam above 15m in height from the lowest portion of general foundation to the crest and

- A dam between 10 and 15m height provided it complies with at least one of the following condition. As per the norm:
 - The length of crest of dam should not be less than 500m,
 - The capacity of reservoir formed by the dam to be not less than 1 Mm³.
 - The maximum flood discharge should not be less than 2000 M³/sec.
 - The dam has especially difficult foundation problem
 - The dam is of unusual design.

The World Bank defines dams which are less than 15 metre in height as small dams and those which are above 15 metre in height as large dams.

There have been some cases of earth dams requiring remedial measures owing to their site and soil conditions. As part of addressing to remedial measures of dam safety in respect of bund heights of +10m and tank bunds under distress, State dam safety Inspection team was constituted by the State Government vide G.O Rt.No.3, Dated: 03.01.2015 & G.O.Rt.No.350, Dated: 29.05.2015.

Primary function of state dam safety organization [SDSO]: Only large dams as per the ICOLD (International Commission on Large Dams) definition are under the purview of Dam Safety Organization.

Phase-I Investigation

The State Dam Safety Organisation has to make Phase-I investigation of all large dams once in 5 years to identify expeditiously the dams which may pose hazard to human life and property. The investigation include an assessment of general condition with respect to safety of the project based on available data and a visual inspection and determines the need for emergency measures and conclude if additional study, investigation and analysis are necessary and warranted.

The inspection / investigation work includes:

- Review of data book
- Review of available engineering data related to design assumptions and design of structures, construction records, post construction changes, hydrological and hydraulic assumptions and features
- Review existing record of operation of dam and appurtenant structure including mechanical and electrically operated equipment
- Review existing maintenance procedure
- Review of structural behavior based on reading of instruments mounted or embedded in Dam
- Review periodical inspection reports
- Conduct detailed field inspection as per pro-forma
- Record at the end of investigation, the assessment of safety of dam, need for additional study, investigation, analysis considered essential to assess the safety of dam, urgency of such additional investigation & advice for Phase-II investigation, if needed

Phase-II Investigation

The Phase-II investigation is supplementary to Phase-I investigation and is conducted when the results of Phase-I investigation indicates the need for additional in-depth study, investigation and analysis. The phase II investigation work includes:

- Additional visual inspection and surveillance
- Measurements through instrument mounted or embedded in dams
- Foundation exploration
- Material testing
- Hydraulic and hydrologic analysis and
- Structural stability analysis.

Pre and Post-monsoon inspection

Pre-monsoon and Post-monsoon inspection are periodical inspection done every year by the field engineers as per the guidelines prescribed by the Central Water Commission (CWC). Reports of inspections are reviewed by State Dam Safety Panel.

Organisation in each year and the Annual Health Status [AHS] of the dams is prepared and shared with Department of Water Resources and Central Water Commission for their appraisal.

Hydrological Review of Large Dam

Hydrological review of all the large dams are essential with respect to the safety of dam as in most cases the design flood has been calculated with the help of some empirical formula based on regional experience. With the advent of new methodology and development of Hydrological Science, the hydrological review of dams has become essential based on hydro-metrological approach following the guidelines fixed by the CWC. The adequacies of existing spillways are reviewed for the enhanced inflow design flood. The method of computation needs specialization of the subject as many assumption, probability, justification are connected with the subject.

Structural Review

After the hydrological review of a dam, if the spillway is found to be inadequate, alternatives like putting an auxiliary spillway / fuge plug, adding parapet walls, , strengthening the existing spillway are studied and design of such structure are studied in-depth. The structural safety of the dams is also reviewed by analyzing the instrument data.

Emergency Action Plan (EAP)

In-spite of all precautions and proper maintenance of the dam, sometimes due to unprecedented natural phenomenon or due to faulty operation of the reservoir, the dam may face emergency situation such as dam over topping, dam break etc. which may lead to disaster. To cope up with such exigency, Emergency Action Plan [EAP] is also prepared. Preparation of Emergency Action Plan involves association of Irrigation Engineers, Civil Authorities and Public administrators. In view of the importance of EAP, National Council of Dam Safety [NCDS] also emphasizing the preparation of EAP for all dams of National Importance [Major Dams]. Normally the EAP consists of three phases of work i.e. [1] dam break analysis [2] preparation of inundation map and [3] preparation of Emergency Action Plan [EAP].

Monitoring of rehabilitation work

The State Dam Safety Organisation monitors the rehabilitation works of large dams on regular basis and findings are shared with Government, Central Water Commission, and other key stakeholders.

Section 4: Assessment of tank safety

In tank improvement and management plan, maintenance by adhering to the tank safety norms is crucial. All engineering and non-engineering initiatives should be shaped up in a manner that strengthens the tank safety parameters in the long run. It is normally the destructive elements unleashed by an uncontrolled escape of water or other contents stored behind a dam have the potential to harm people, property and the local environment. The consequential losses can include loss of life, socio-economic losses, financial losses and environmental losses. The risk that a dam poses is related to both the consequences of failure and the likelihood that a failure could occur. Contextually, dam safety in a conceptual framework looks in to adopting required constructive measures to reduce the potential risks associated by bringing down the risk to an acceptable level.

There are a number of factors which can affect the potential impact of dam failure such as:

- Height of the dam i.e. the higher the height of the dam, the higher the potential energy of the water resulting with faster escape
- Volume of water stored in the dam; the bigger the storage the bigger the damage potential
- Shape and hydraulic characteristics of the downstream valley which affects the nature and extent of potential flooding
- Downstream conditions, particularly habitation or public areas and the valley environment which would be exposed to the effects of dam failure and
- Effects to a community of depriving them of the stored water which may be critical for use.

Features causing deterioration of Tanks

Regular maintenance of dams in tank based irrigation projects always seems to be the best possible way to ensure its safety. Even a well-constructed dam may face problems and difficulties if it is not properly maintained. A common feature of all irrigation projects is that construction receives a great deal of attention but maintenance gets neglected in due course due to various reasons like availability of human resources, availability of finance etc. This results in deterioration of the conditions of the tanks and water carrier systems, distributaries, causing high water losses. This is one of the prime causes of the poor efficiency of the projects. Apart from keeping required budgetary provisions for maintenance of irrigation projects, capacity improvement measures could be initiated for the staff engaged on actual operation of the reservoirs and dam safety aspects.

Physical Assessment of Tank Condition

The study intensely assessed the overall tank conditions of 18 sample tanks spread across 11 districts of Andhra Pradesh. Table 1 gives the list of sample tanks.

Table 1 List of Sample Tanks

Sl	District	Village	Tank Name	Bund Height (m)
1	Anantapur	Singanamala	Singanamala Tank	11.60
2	Anantapur	Y T Cheruvu	Y T Cheruvu	10.06
3	Kadapa	Badvel	Badvel Big Tank	13.70
4	Kadapa	Chennampalli	Chennampalli Tank	5.40
5	Chittoor	Veerakanellore	Veerakanellore Pedda Cheruvu	4.75
6	Nellore	Nakkalagandi Reservoir	Nakkalagandi Reservoir	15.00
7	Nellore	Seetharamapuram	Ura Tank	14.00
8	Nellore	Anantha Sagaram	Anantha Sagaram Tank	14.21

Sl	District	Village	Tank Name	Bund Height (m)
9	Prakasam	Markapur	Markapur Tank	12.00
10	Krishna	Borragudem	Borragudem Tank	4.90
11	West Godavari	Gollavani Kunta	Gollavani Kunta	3.90
12	East Godavari	Nallatammaiah	Nallatammaiah Tank	3.82
13	Visakhapatnam	Dattapa Tank	Dattapa Tank	4.60
14	Vizianagaram	Gunkalam	Pedda Tank	5.00
15	Srikakulam	Kurmasagaram	Kurmasagaram	4.95
16	Vizianagaram	Routhu lakshmipuram	Routhupuram pedda cheruvu	1.50
17	Visakhapatnam	Similiguda	Similiguda mini Reservoir	7.62
18	Srikakulam	Routhu lakshmipuram	Routhupuram pedda cheruvu	3.00

Out of the selected total samples, 7 tanks are considered as of large tank categories according to ICOLD guidelines. The remaining 11 tanks come under small minor irrigation category for which tank safety concerns applicable for big and medium dams would not be applicable.

The study reveals that as a result of adequate maintenance provisions, all dams are found to be in good condition. Due to this occurrence of floods did not have significant impact on the dams.

It was observed in case of 7 major dams that the physical status was in a relatively good condition and safety concerns did not prevail. Adequate supervision and sufficient institutional support mechanisms were found to be the major factor for relatively good physical status and associated safety concerns. A matrix encompassing the physical status of the sample tanks is presented in Table 2.

Table 2 Physical status of sample tanks

Tanks visited	Status / Type	Physical status	Safety status	Causes of distress and consultation outcome
Singanamala Tank	<ul style="list-style-type: none"> Minor R&B Road on the Bund 	<ul style="list-style-type: none"> Dam Fairly Good. 	Needs no action.	Adequate monitoring observed
Y T Cheruvu	<ul style="list-style-type: none"> Minor 	<ul style="list-style-type: none"> Dam Fairly Good 	Needs no action	Adequate monitoring observed
Badvel Big Tank	<ul style="list-style-type: none"> Minor B T Road on the bund 	<ul style="list-style-type: none"> Dam Fairly Good Revetment damaged 	Needs no action	Adequate monitoring observed
Nakkalagandi Reservoir	<ul style="list-style-type: none"> Minor 	<ul style="list-style-type: none"> Dam Fairly Good Jungle growth on the bund 	Needs no action	Adequate monitoring observed
Ura Tank	<ul style="list-style-type: none"> Minor 	<ul style="list-style-type: none"> Dam Fairly Good 	Needs no action	Adequate monitoring observed
Anantha Sagaram Tank	<ul style="list-style-type: none"> Minor 	<ul style="list-style-type: none"> Dam Fairly Good Revetment repair Surplus weir damaged 	Needs no action	Adequate monitoring observed
Markapur Tank	<ul style="list-style-type: none"> Minor. R&B Road on the Bund 	<ul style="list-style-type: none"> Dam Fairly Good Bund Revetment damaged Dumping of 	Needs no action	Adequate monitoring observed

Tanks visited	Status / Type	Physical status	Safety status	Causes of distress and consultation outcome
		garbage		

Assessment of structural safety of embankment

- All seven minor irrigation projects have been constructed with design flood calculation.
- It is well understood through physical verification and consultation with concerned WUA Committee and Irrigation Engineers that all are in physically good condition and adequate maintenance and supervision had been provided.
- Except for revetment issues in three tanks, jungle growth in one tank and damage of surplus weir in one tank the safety status of dams is good.

Section 5: Environmental Management Framework for Dam Safety

Table 3 presents the environmental management framework to be followed for dam safety in including challenges, mitigation measures, and implementation responsibility in APIIATP.

Table 3 Environmental management framework for dam safety in APIIATP

Environmental challenge	Key Challenges	Mitigation Measures	Stages of the project					Responsibility
			Identification phase	Pre-Planning Phase	Planning phase	Implementation phase	Post-implementation phase	
Embankment	Settlement of embankment	Strengthening of embankment by approved engineering methods based on recommendation of expert panel.			Yes	Yes		DPU
	Cracks on crest	Repair of cracks on crest as per standard procedure			Yes	Yes		DPU
	Concavity of upstream	Restore slope to designed profile by earthwork in benching or with stone riprap depending on depth of concavity.			Yes	Yes		DPU
	Rain cuts, ant hills, rodent holes	Repair of rain cuts by back filling. Remove ant hills and rodent holes up to the root and back fill with suitable earth laid in layers duly			Yes	Yes		DPU

Environmental challenge	Key Challenges	Mitigation Measures	Stages of the project					Responsibility
			Identification phase	Pre-Planning Phase	Planning phase	Implementation phase	Post-implementation phase	
		compacted. White ant treatment to be adopted when problem is wide spread.						
	Displaced riprap	Removing and repacking of stone riprap with supply of stone as necessary.			Yes	Yes		DPU
	Degraded berk of the embankment	Longitudinal slope may be constructed in the berk location, leading to slope drains. Turfing may be adopted where ever required			Yes	Yes		DPU
	Invisible toe drains due to weed growth and covered up by soil	Weed growth be cleaned by uprooting. The choked toe drains be cleaned of all earth deposit by removing and repacking. Graded filter below the drains need be replaced			Yes	Yes		DPU
	D/S area	Excavate slushy drainage to drain out the area. If required filter drains may be provided.			Yes	Yes		DPU
	Lack of surface drainage arrangement	Construct shallow earthen/ masonry drains to drain out the area			Yes	Yes		DPU
	Leakage through junctions of dam with outlet barrel and spillway	Serious matter. The leakage path to be investigated opened out and sealed with fresh earth work laid and compacted in suitable layers. Proper bonding with masonry			Yes	Yes		DPU

Environmental challenge	Key Challenges	Mitigation Measures	Stages of the project					Responsibility
			Identification phase	Pre-Planning Phase	Planning phase	Implementation phase	Post-implementation phase	
		structure to be ensured.						
Spillway / Surplus weir	Cracks, leakage in spillway	Cracks need to be sealed with cement or epoxy. Source of leakage to be located and same sealed by grouting.			Yes	Yes		DPU
	Inadequate spillway capacity	Additional length of spillway to be provided. Encroachment of free board for some extent for short duration may be allowed. Raising of height of the dam to cater to the increased maximum water level may be required.			Yes	Yes		DPU
	Degraded Energy Dissipation Arrangement	Restoration of the energy dissipation arrangement by suitable repair.			Yes	Yes		DPU
	Retrogression warranting undermining of parent structure	In specific cases additional drop walls may be constructed in the spill channel. Cut off walls may be constructed to check retrogression/undermining.			Yes	Yes		DPU
Head Regulators / Head sluice	Leakage of water through the Head regulator gates	Repair/ replacement of gates.			Yes	Yes		DPU

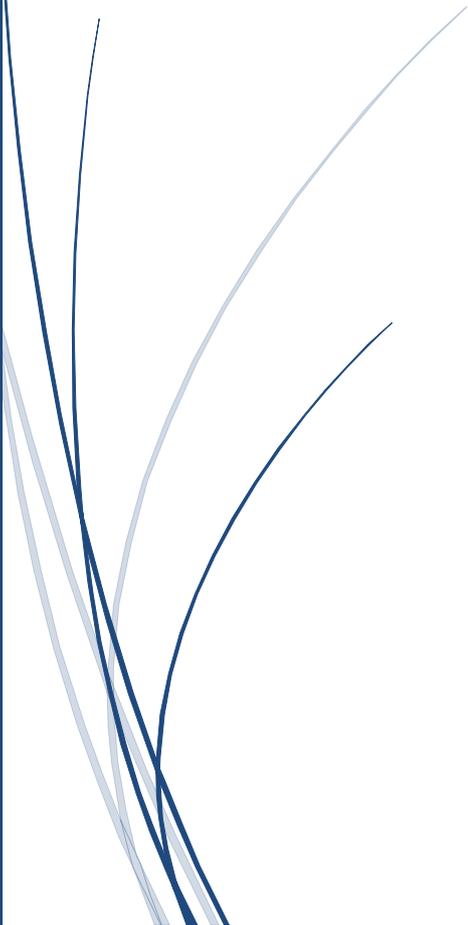


**Andhra Pradesh Integrated Irrigation
and Agriculture Transformation
Project (APIIATP)**

NATURAL HABITAT PLAN



**Environment and Social Management Framework:
Volume 2 – Stand Alone Document 5**



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Section 1: Introduction

Natural habitats are defined as land and water areas where (i) the ecosystems' biological communities are formed largely by native plant and animal species, and (ii) human activity has not essentially modified the area's primary ecological functions. All natural habitats have important biological, social, economic, and existence value. Important natural habitats may occur in tropical humid, dry, and cloud forests; temperate and boreal forests; Mediterranean-type shrub lands; natural arid and semi-arid lands; mangrove swamps, coastal marshes and other wetlands; estuaries; sea grass beds; coral reefs; freshwater lakes and rivers; alpine and sub alpine environments, including herb fields, grasslands, and paramos; and tropical and temperate grasslands.

Further critical natural habitats are defined as:

- i. Existing protected areas and areas officially proposed by governments as protected areas (e.g., reserves that meet the criteria of the World Conservation Union (IUCN) classifications), areas initially recognized as protected by traditional local communities (e.g. sacred groves), and sites that maintain conditions vital for the viability of these protected areas (as determined by the environmental assessment process); or
- ii. Sites identified on supplementary lists prepared by the Bank or an authoritative source determined by the Regional Environment Sector Unit (RESU). Such sites may include areas recognized by traditional local communities (e.g., sacred groves); areas with known high suitability for bio-diversity conservation; and sites that are critical for rare, vulnerable, migratory, or endangered species. Listings are based on systematic evaluations of such factors as species richness; the degree of endemism, rarity, and vulnerability of component species; representativeness; and integrity of ecosystem processes.

The conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development. The World Bank therefore supports the protection, maintenance and rehabilitation of natural habitats and their functions in its economic and sector work, project financing, and policy dialogue. As per the guidelines, a precautionary approach to natural resource management should be there in order to ensure opportunities for environmentally sustainable development.

Section 2: Flora and Fauna in Andhra Pradesh

Andhra Pradesh, located in the middle of Indian subcontinent is home to some magnificent representatives of animal and plant life. The topography of this location varies widely and ranges from Bay of Bengal shores to Nallamallas and Eastern Ghats hills supporting a variety of ecotypes. These ecotypes support diverse flora and fauna. State forests can be categorised into four main biotic provinces.

- i. Deccan Plateau – Fifty three percent
- ii. Central Plateau – Thirty Five percent
- iii. Eastern Highland –Eleven percent
- iv. East Coastal Plains – One percent

In Andhra Pradesh, vegetation that is seen usually belongs to dry deciduous form of vegetation that is a mix of Teak and a variety of species belonging to genera Dalbergias, Terminalia, Anogeissus, Pterocarpus etc. Diverse fauna are harboured in varied habitat including Tiger, Wolf, Panr, Wild Dog, Sloth Bear,

Hyena, Gaur, Chinkara, Black Buck, Nilgai, Chowsingha, Sambar, Cheetal and a wide variety of reptiles and birds. Nesting ground is offered by the vast sea coast for sea turtles. It also offers feed grounds for Grey Pelican and Flamingo that can be seen in Pulicat Lake's back water. Rich mangrove forests found here are supported by River Krishna and Godavari's estuaries. It contains key species of Otters and Fishing Cat.

Andhra Pradesh also possesses some rare plant species like Cycasbeddomei, Terminaliapallida, Pterocarpussantalinus, Syzygiumalternifolium, Shoreatumburgia, Shoreatalura, Psilotumnudam etc. Similarly Golden Gecko, Double banded, also referred to as Jerdon's Courser and Slender Loris that are quite endangered and rare species can be seen in this state.

Section 3: Flora and Fauna in Sample Tanks

A wide range of flora and fauna was observed in the sample tanks. The cyclic nature of the tanks, as dry bodies for some months has also helped in the diversity of species. The vegetative growth in and around the tank and its environs has attracting various forms of life- avian, amphibians, reptiles etc..

All the tanks in the sample had a good range of dissolved oxygen to support aquatic organisms. A majority of tanks are near rural areas and their major characteristics are:

- Inflows are influenced by run-off from cultivated lands with possible contamination of agrochemicals
- Tanks conversion into dry bed for a couple of months, and
- High levels of siltation

Badvelpedda tank, Ananthasagaram tank, Ura tank and Nakkalagandi Reservoir have their catchments in undisturbed areas which are either natural forest and/ or degraded natural forest with forest types of scrub forest and dry deciduous forest.

The sampleS are being used for fish culturing by fisheries society and important fishes cultured in the tank are provided in the following Table.

Common Name	Local Name
Common Carp	Bangaruteega
Katla	Bochcha
Rohu	Rangadi
White carp	Mosu
Cat fish	GaddiChepa
Tilapia	Queiloo
Fresh water prawn	Roi

A detailed survey of the avian community was carried out. Avian community being natural predators in the ecosystem, are a ready indicator for not only the quality but also ecosystem at large. The details of field survey 29 species of birds were identified in the study area.

Floral habit observed in and around the tanks is provided in the following table. Tanks with good catchment area conditions were found to have more diversity in terms of the species present.

Habit type	Number of Species
Aquatic	6
Climbers and creepers	15
Grasses	5
Herb	42
Shrub	22
Tree	22

Section 4: Key Issues Identified in Sample Tanks

The proposed tank restoration activities shall have temporary and acute impacts on fishes, other aquatic animals, birds and other native flora. Hence this project triggers the Natural Habitat OP. However no major concerns were found in the sample tanks apart from the proliferation of the invasive weed *Prosopis juliflora* which affects the aquatic ecosystem adversely.

Section 5: Environmental Management Framework for Natural Habitat Plan

To minimize the adverse impact on the ecology of the natural habitats selection of tanks should be as per guideline. An officer of Forest Department should be deputed for detailed inventory of ecological features within and near the tank. The nature and type of impact on natural habitats due to construction and related activities should be identified and the magnitude of the impact on the ecological features to the extent feasible should also be assessed.

Minimization of impacts should be through precautionary measures or through appropriate mitigation measures. In addition to the above measures, specific impacts identified on site shall be mitigated as per the recommendation of the Forest Department officer in charge of the identified natural habitat.

Pre-Construction Stage

No construction camps should be located within the natural habitat or within 500m from its boundary. Contractor in consultation with the Forest Department should prepare a schedule of construction within the natural habitat. Due consideration should be given to the time of migration, time of crossing, breeding habits and any other special phenomena taking place in the area for the concerned flora or fauna.

Construction Stage

Procurement of any kind of construction material from within the natural habitat should be strictly prohibited. No water resources within the natural habitat should be tapped for construction. Use of mechanized equipment should be kept minimum within the natural habitat. Contractor must ensure that there is no parking of vehicles machine and equipment within the natural habitat. Disposal of construction waste within the natural habitat should be strictly prohibited and as far as possible reuse should be undertaken as per guideline on Waste Management and Debris Disposal.



**Andhra Pradesh Integrated Irrigation
and Agriculture Transformation
Project (APIIATP)**

**RESETTLEMENT POLICY
FRAMEWORK**



**Environment and Social Management Framework:
Volume 2 – Stand Alone Document 6**



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Acronyms and Abbreviations

AP	Andhra Pradesh
APCBTMP	Andhra Pradesh Community Based Tank Management Project
APIIATP	Andhra Pradesh Integrated Irrigation Agriculture Transformation Project
DC	District Collector
ESMF	Environment Social Management Framework
GAP	Gender Action Plan
GoAP	Government of Andhra Pradesh
GoI	Government of India
MRO	Mandal Revenue Officer
NOC	No Objection Certificate
PIUs	Project Implementation Unit
R&R	Rehabilitation and Resettlement
RFCTLARRA	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act
RPF	Resettlement Policy Framework
SC	Scheduled Caste
SIA	Social Impact Assessment
ST	Scheduled Tribe
WUA	Water User's Associations

Definitions

Administrator	An officer appointed for the purpose of rehabilitation and resettlement of affected families under sub-section 1 of section 43 of the RFCTLARRA 2013
Affected Area	Such area as may be notified by the Appropriate Government for the purposes of land acquisition
Affected Family	Includes: (i) A family whose land or other immovable property has been acquired; (ii) A family which does not own any land but a member or members of such family may be agricultural labourers, tenants including any form of tenancy or holding of usufruct right, share-croppers or artisans who may be working in the affected area for three years prior to the acquisition of the land, whose primary source of livelihood stand affected by the acquisition of land' (iii) The Scheduled Tribes and other traditional forest dwellers who have lost any of their forest rights recognized under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 due to acquisition of land; (iv) Family whose primary source of livelihood for three years prior to the acquisition of the land is dependent on forests or water bodies and includes gatherers of forest produce, hunters, fisher folk and boatmen and such livelihood is affected due to acquisition of land; (v) A member of the family who has been assigned land by the State Government or the Central Government under any of its schemes and such land is under acquisition; (vi) A family residing on any land in the urban areas for preceding three years or more prior to the acquisition of the land or whose primary source of livelihood for three years prior to the acquisition of the land is affected by the acquisition of such land
Appropriate Government	Means: (i) In relation to acquisition of land situated within the territory of a State, the State Government; (ii) In relation to acquisition of land for public purpose in more than one State, the Central Government, in consultation with the concerned State Governments or Union territories; Provided that in respect of a public purpose in a District for an area not exceeding such as may be notified by the Appropriate Government, the Collector of such District shall be deemed to be the Appropriate Government
Collector	Means the Collector of a revenue district, and includes Deputy Commissioner and any officer specially designated by the Appropriate Government to perform the function of a Collector under the RFCTLARRA 2013
Commissioner	Means the Commissioner for Rehabilitation and Resettlement appointed under sub-section (1) of section 44 of the RFCTLARRA 2013
Cost of Acquisition	Includes: (i) Amount of compensation which includes solatium, any enhanced compensation ordered by the Land Acquisition and Rehabilitation and Resettlement Authority or the Court and interest payable thereon and any other amount determined as payable to the affected families by such Authority or Court; (ii) Demurrage to be paid for damages caused to the land and standing crops in the process of acquisition (iii) Cost of acquisition of land and building for settlement of displaced or adversely affected families; (iv) Cost of development of infrastructure and amenities at the resettlement areas; (v) Cost of rehabilitation and resettlement as determined in accordance with the provisions of the RFCTLARRA 2013 (vi) Administrative cost for (a) acquisition of land, including both in the project site

	and out of the project area lands, not exceeding such percentage of the cost of compensation as may be specified by the Appropriate Government; and (b) rehabilitation and resettlement of owners of the land and other affected families whose land has been acquired or proposed to be acquired or other families affected by such acquisition; (vii) Cost of undertaking Social Impact Assessment Study
Displaced Family	Means any family, who on account of acquisition of land has to be relocated and resettled from an affected area to the resettlement area
Family	Includes a person, his or her spouse, minor children, minor brothers and minor sisters depended on him: provided that widows, divorces and women deserted by families shall be considered separate families
Holding of Land	Means the total land held by a person as an owner, occupant or tenant or otherwise
Land	Includes benefits to arise out of land, and things attached to the ear or permanently fastened to anything attached to the earth
Landless	Means such persons or class of persons who may be: (i) Considered or specified as such under any State law for the time being in force; or (ii) In a case of landless not being specified as above, as may be specified by the Appropriate Government
Land Owner	Includes any person: (i) Whose name is recorded as the owner of the land or building or part thereof, in the records of the authority concerned; or (ii) Any person who is granted forest rights under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 or under any other aw for the time being in force; or (iii) Who is entitled to be granted Patta rights on the land under any law of the State including assigned lands; or (iv) Any person who has been declared as such by an order of the court or Authority
Local Authority	Includes a town planning authority (by whatever name called) set up under any law for the time being in force, a Panchayat as defined in article 243 and a Municipality as defined in article 243P of the Constitution
Market Value	Means the value of land determined in accordance with section 26 of the RFCTLARRA 2013
Person Interested	Means: (i) All persons claiming an interest in compensation to be made on account of the acquisition of land under the RFCTLARRA 2013 (ii) The Scheduled Tribe and other traditional forest dwellers, who have lost any forest rights recognized under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006; (iii) A person interested in an easement affecting the land; (iv) Persons having tenancy rights under the relevant State laws including share-croppers by whatever name they may be called; and (v) Any person whose primary source of livelihood is likely to be adversely affected;
Requiring Body	Means a company, a body corporate, an institution, or any other organisation or person from whom land is to be acquired by the Appropriate Government, and includes the Appropriate Government, if the acquisition of land is for such Government either for its own use or for subsequent transfer of such land is for public purpose to a company, body corporate, an institution, or any other organisation, as the case may be, under lease, licence or through any other mode of transfer of land
Resettlement Area	Means an area where the affected families who have been displaced as a result of land acquisition are resettled by the Appropriate Government
Scheduled Areas	Means the Scheduled Areas as defined in section 2 of the Provision of the Panchayats (Extension to the Scheduled Areas) Act, 1996.

Chapter 1: Introduction

Background

Andhra Pradesh (AP) has a long tradition of tank based irrigation and farmers for years have been dependent on the elaborate systems of tanks for irrigating agricultural lands. The state has about 40000 minor irrigation sources spread over the thirteen districts. The geographical area of the state is about 402.7 lakh acres out of which the total cultivable area is around 199 lakh acres. Out of this irrigation potential is created for 103 lakh acres through the existing major, medium and minor irrigation projects. The performance of the tanks system however witnessed a decline in the past two decades due to a variety of factors including heavy siltation in tank bed and inflow channels, growing forests, damages in sluices, field channels and bunds weirs etc.

The Government of AP (GoAP) with support from the World Bank implemented the Andhra Pradesh Community Based Tank Management Project (APCBTMP) with an objective of improving agricultural productivity and building capacities of Water User's Associations (WUAs) to manage tanks effectively. During the course of implementation of the APCBTMP there was a realization of the need for development of more holistic interventions which aimed not only to improve productivity of crops but also maximize returns by reducing gaps in supply and demand chain. A specific need to focus on interventions that disseminated and facilitated adoption of technology by farmers, created awareness on quality standards, organized farmers and promoted collective sale and purchase of inputs and produce was identified during the course of this project.

It is in this context that the *Andhra Pradesh Integrated Irrigation Agriculture Transformation Project (APIIATP)* has been conceptualized by the World Bank and GoAP. The project adopts a holistic and synergized approach that seeks integration across relevant stakeholders of selected minor irrigation tanks across the state under different agro climatic zones.

The *Project Development Objective* of APIIATP is to *enhance agricultural productivity, profitability and resilience to climate variability in selected tank systems of Andhra Pradesh*. In line with the "Transformation" objective, the project aims to promote inclusive rural growth, develop and disseminate new agricultural and water management technologies, climate resilient agriculture, enhance market linkages for small and marginal farmers and improve water and natural resource management. The proposed project will have positive impacts 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 would significantly reduce water and carbon footprints.

Project Area

The project area for the proposed APIIATP is spread across 89,000 Ha of agriculture land in about 1,000 tank command areas located in twelve districts of Andhra Pradesh.

Project Components

The proposed project activities have been categorized into four main components as illustrated in Exhibit 1 and summarized in subsequent paragraphs. (WRD, GoAP 2016)

Component A: Improving Irrigated Agriculture Efficiency at Farm Level

This component would improve tank-based minor irrigation to strengthen the integrated farming system (in which growing crops, agro-forestry and rearing livestock co-exist) with reduced water footprints. It will consist of three inter-related sub-components: (i) improving tank system performance and resilience; (ii) inflow hydrology management for improving water productivity and efficiency; and (iii) building synergy with the Primary Sector Mission (Agriculture, Fishery, Horticulture, Livestock and Irrigation).

Component B: Promoting Adaptive Sustainable Agriculture Practices

This component would improve production and productivity of the tank systems and increase returns to farmers and other water users through better market linkages and promotion of agribusiness. This component will have two sub-components: (i) climate smart diversified agriculture production systems; and (ii) climate-friendly market and agribusiness promotion.

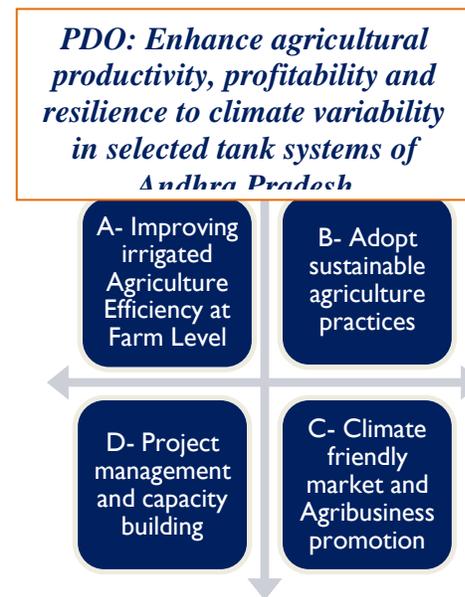
Component C: Climate-friendly Market and Agribusiness Promotion

This sub-component will aim at reducing the ‘road miles’ of goods and services, by bringing producers and consumers closer for locally produced goods and services by reviving/enhancing local farmers markets and developing alternate marketing channels to improve farm level post-harvest management and value addition. The project will support development of farmer producer organizations/companies anchored in water user associations and facilitate public-private partnerships to enable direct buying arrangements at the local level.

Component D: Project Management and Capacity Building

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. The project is designed with an expectation of coordination between four important Departments i.e. water resources, agriculture, horticulture, and fisheries.

Exhibit 1: PDO and Project Components



Objectives of the Study

As a part of the project preparation, a number of advisory and analytical studies have been undertaken. One of them relates to identifying and addressing environment and social issues. Towards this end the project has prepared an environmental management framework and social management framework and associated Management Plans. The Environmental and Social Management Framework (ESMF) approach is adopted as the selection of tanks and the nature and extent of interventions will become explicit over time, as and when they are selected.

The overall objective of the study is to identify, assess, and implement environmental and social management measures in respect of the improving tank systems performance and resilience, improving irrigation efficiency, inflow hydrology management, improving productivity, adapting sustainable agriculture practices, innovative and technology transfer for fisheries production, agri-business promotion etc.

The environmental and social management frameworks for the specific identified investments will guide the interventions to ensure that the project activities do not cause any harm, are in compliance with the applicable national and local regulations, as well as World Bank safeguards policies. These will also ensure that potential adverse impacts are adequately mitigated and potential benefits of the project are enhanced to improve effectiveness and sustainability of the project. Relevant portions of the frameworks will be suitably integrated with project contract documents to facilitate smooth implementation during the rehabilitation and operation phases.

Social Assessment

Andhra Pradesh is an ethnically diverse state with a diverse set of languages, traditions and practices. The set of beneficiaries who would be covered under the project is not homogenous and comprises of a number of sub-groups who can be identified based on their differential endowment, gender, ethnicity, different economic groups and other regional features. There are a number of stakeholder groups who would exert varying degrees of influence on the project and impact project activities. In this context it becomes important for the project to develop a framework that would enable participation of all stakeholder groups and solicit their contributions towards project design and delivery mechanisms.

A social assessment was undertaken in order to help identify key social development issues and to assess impacts of the project. This led to drawing up of necessary measures that the project is expected to take up to ensure inclusion of deprived segments, equity in accessing project benefits, strengthening decentralised governance system as per constitutional norms and ensuring gender based integration in project execution process.

The social assessment enabled the following:

- Mapping project stakeholders and conducting detailed stakeholder consultations
- Assessing social impacts of proposed project interventions
- Reviewing and suggesting legal, policy and institutional aspects to enable accomplishment of project objectives
- Developing measures to enhance positive impacts and mitigate negative impacts if any

Broad elements of the social assessment included beneficiary assessment, stakeholder analysis, social impacts, institutional assessment and risk analysis. The assessment was carried out in consistence with GoI, GoAP and the World Bank safeguard requirements, policies, regulations and guidelines.

Need and Context of Resettlement Policy Framework

The project interventions chiefly relate to repairs and rehabilitation works of the existing tanks and supplemented/complemented by effecting forward and backward linkages. While civil works are envisaged, no new construction is planned. With the result, neither involuntary land acquisition, nor physical displacement of families is envisaged. However there could be some circumstances wherein land related impacts may occur. These include cases where some kind of encroachment has taken place in the tank bed/vicinity. Such a case was observed in one of the sample tanks visited as part of the study where seasonal encroachment had taken place. In an extremely unlikely situation, technical remedial measures too may have land related impacts. It must also be noted that in some cases it may so happen that land may have to be obtained from public sources and in such cases also certain procedures (do's and don'ts) have to be followed. In this context it is essential that the project develops a framework (RPF) to be adopted as appropriate. It is in this backdrop, a RPF is developed which is essentially premised on the principle of: avoiding, minimising and mitigating adverse social impacts.

Structure of the Report

This chapter provided an overview of the project and described the context in which the RPF has been developed. The following chapters of this report and their indicative contents are as follows:

- **Chapter 1: Introduction-** This chapter provided an overview of the project and the social assessment in the context of which the Resettlement Policy Framework has been developed.
- **Chapter 2: Resettlement Policy Framework-** This chapter discusses the need for land acquisition and resettlement, the objectives of the framework and its basic principles.
- **Chapter 3: Legal Framework-** This chapter lays down the legal and policy framework in the context of which the RPF has been designed. The key principles that govern the RPF for APIIATP have been laid out and a comparison between relevant Government statutes and World Bank policies has been carried out.
- **Chapter 4: Entitlement Matrix-** This chapter lays down the management measures to address social issues and the compensation matrix for land acquisition and resettlement and rehabilitation..
- **Chapter 5: Institutional and Implementation Arrangements-** The institutional arrangements and mechanisms that would be in place for implementation have been detailed out in this chapter.
- **Annexure I:** This chapter details the process for undertaking SIA

Chapter 2: Resettlement Policy Framework

Need for Land Acquisition and Resettlement

The project interventions chiefly relate to repairs and rehabilitation works of the existing tanks and supplemented/complemented by effecting forward and backward linkages. While civil works are envisaged, no new construction is planned. However there could be some circumstances wherein land related impacts may occur. These include cases where some kind of encroachment has taken place in the tank bed/vicinity. In an extremely unlikely situation, technical remedial measures too may have land related impacts. It must also be noted that in some cases it may so happen that land may have to be obtained from public sources and in such cases also certain procedures (do's and don'ts) have to be followed.

There are four ways in which land can be secured as part of the project. These are:

- (i) Purchase of land on willing buyer and willing seller basis on negotiated price
- (ii) Voluntary donation
- (iii) Transfer of Government land to the project and
- (iv) Involuntary acquisition of land.

The RPF is applicable in instances where there is involuntary acquisition of land which in turn results in the need to rehabilitate and resettle affected families. While there is a very small possibility that some private land may need to be acquired, however, this will be done only as a demonstrable last resort.

Objective of the Policy Framework

The objective of the RPF is to appropriately identify, address and mitigate adverse socioeconomic impacts that may occur due to the implementation of projects that involve the involuntary acquisition of land and subsequent resettlement of affected families. Without proper planning and management, involuntary resettlement may result in long-term hardship for affected people. Hence, the RPF aims to avoid involuntary acquisition of land (and subsequent resettlement) wherever possible and in cases where it is unavoidable, the RPF requires the Appropriate Government to develop a robust rehabilitation and resettlement plan to effectively manage the social impacts created by the project. The plan would identify the full range of people affected by the project and justify their displacement after consideration of alternatives that would avoid or minimize displacement.

Basic Principles of the Policy Framework

The basic principles on the basis of which the RPF has been developed are:

- **Avoidance:** wherever possible, involuntary acquisition of land should be avoided
- **Least disturbance:** where involuntary acquisition is not avoidable, efforts will be made to minimize displacement, damage to / loss of property, loss of livelihood and any other negative social impact the project may have. Only the minimum amount of land required for a project is to be secured
- **Public purpose:** the land acquired must be found to serve a legitimate and bona fide public purpose and the social benefits should outweigh and potential social costs
- **Participative:** the process of land acquisition should be done through a humane, participative, informed and transparent process in which local self-government and Gram Sabhas are consulted and interested parties are fully informed and have a chance to air their grievances
- **Fair compensation:** the affected families will receive fair compensation for any loss of land along with a compensation award for resettlement
- **Maintaining the social and economic status of families:** the RPF is based on the principle that there should be minimal possible negative impacts on the livelihoods of the affected families. Where resettlement is unavoidable, the resettlement plan should attempt to ensure that affected families are able to maintain the same social and economic status as they did before displacement. Affected families will be provided appropriate compensation and where possible jobs in the project

This Resettlement Policy Framework (RPF) is to be adopted by the Andhra Pradesh Integrated Irrigation and Agriculture Transformation Project (APIIATP) whenever there is displacement of persons associated with land acquisition for such projects. This Policy has been developed generally

in accordance with the requirements of the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation & Resettlement Act, 2013 (RFCTLARRA 2013), the Andhra Pradesh Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Rules, 2014 (A.P. RFCTLARRR 2014), and the World Bank Operational Policy 4.12. As the RTFCTLARRA 2013 adheres to the requirements of the World Bank Social Safeguard guidelines, this RPF has adopted the RTFCTLARRA, 2013 in general. The RPF clearly states the situations in which the policy will be applicable, includes safeguards against involuntary acquisition of land, outlines the appropriate monetary compensation to the affected families, and identifies those who are entitled as affected families to the momentary compensation.

The next chapter provides the overall policy framework based on which the RPF has been developed. This is followed by the mitigation measures, entitlement matrix for affected families, institutional arrangements, grievance redressal mechanism and monitoring plan.

Chapter 3: Legal Framework

This RPF is based on relevant National / State laws as well as the World Bank Operational Policy for Involuntary Resettlement (OP-4.12). The National and State laws that are applicable are the RFCTLARRA 2013 and the RFCTLARRR 2014, details of which have been provided in the table below. In addition, the Andhra Pradesh Government Land Allotment Policy has been included as it covers instances when there is alienation of people residing on Government lands. Based on this framework, the impact management and mitigation measures have been elaborated in the subsequent section. The table below provides an overview of the legal and regulatory provisions applicable in such situations.

Applicable National and State Laws

SI	Act / Rules / Policies	Applicability
1	The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (RFCTLARRA), 2013	<p>RFCTLARRA, 2013 is applicable in cases where land is secured through involuntary acquisition. It has been introduced to ensure a “humane, participative, informed and transparent process for land acquisition...with the least disturbance to the owners of the land and other affected families and to provide just and fair compensation to the affected families whose land has been acquired...”</p> <p>In line with this, Chapter II Section 4 (1) requires the Appropriate Government who intends to acquire the land to consult the concerned village / ward level body and carry out a Social Impact Assessment study in consultation with them. Further Chapter II Section 8 (1) of the Act, states that the Appropriate Government shall ensure that:</p> <ul style="list-style-type: none"> - (a) There is a legitimate and bona fide public purpose which necessitates the acquisition - (b) The potential benefits and the public purpose shall outweigh the social costs and adverse social impact as determined by the Social Impact Assessment

SI	Act / Rules / Policies	Applicability
		<ul style="list-style-type: none"> - (c) Only the minimum area of land required for projects is proposed to be acquired - (d) There is not unutilized land which has been previously acquired in the area - (e) Any land acquired earlier and remaining unutilized is used for the public purpose Chapter IV Section 28 specifies the compensation for land acquired under the Act once it has fulfilled the above conditions. To determine the compensation the Collector shall take into account: <ul style="list-style-type: none"> o (i) The market value of the land (determined as per provisions of Section 26 in accordance with the First and Second Schedule of the Act) o (ii) The damage sustained by the person interested due to the taking of any standing crops and trees on the land at the time of possession by the Collector o (iii) The damage (if any) sustained due to severing of the land from other land o (iv) The damage sustained (if any) by reason of the acquisition injuriously affecting the other property or earnings of the interested party o (v) Reasonable expenses incidental to the interested party having to change residence or place of business o (vi) The damage (if any) resulting from diminution of the profits of the land between the time of notification and the time of possession o (vii) Any other ground that may be in the interest of equity, justice and beneficial to the affected families Further, as per Chapter IV Section 30, a Solatium equivalent to 100% of the compensation amount shall be awarded over and above the compensation payable <p>In addition to the compensation for acquisition of land, Chapter V provides for Rehabilitation and Resettlement Awards for each affected family in line with the terms of entitlement specified in the Second Schedule of the Act.</p>

SI	Act / Rules / Policies	Applicability
		<p>The Act also provides for institutional arrangements for ensuring proper implementation and monitoring of the Act including the appointment of an Administrator, a Commissioner for Rehabilitation and Resettlement; and project level Rehabilitation and Resettlement Committees (Chapter VI); a National Monitoring Committee for Rehabilitation and Resettlement (Chapter VII); and establishment of a Land Acquisition, Rehabilitation and Resettlement Authority (Chapter VIII)</p>
2	<p>Andhra Pradesh Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Rules, (A.P. RFCTLARRR) 2014</p>	<p>These rules have been notified by the Government of Andhra Pradesh in exercise of the powers conferred by Section 109 of the RFCTLARRA, 2013. The rules specify:</p> <ul style="list-style-type: none"> - (i) Process for carrying out the Social Impact Assessments (SIAs) - (ii) Institutional Support for SIAs - (iii) Other guidelines for carrying out the SIAs - (iv) Process for conducting public hearings - (v) Declaration of Awards and Compensation <p>As per Chapter V Sections 25, 26 and 27 of the A.P. RFCTLARRR 2014, awards and compensations are in line with the provisions of the RFCTLARRA, 2013.</p> <p>Section 28, further specifies the following that were to be notified by the State Government:</p> <ul style="list-style-type: none"> - (a) The multiplication factor mentioned in RFCTLARRA, 2013 is set at 1.25 for rural areas other than scheduled areas and 1.50 for scheduled (tribal) areas - (b) The one-time grant to artisan, small traders and certain others is set at INR 25,000 - (c) The payment of compensation shall be made expeditiously through account payee cheques / electronic mail transfer
3	<p>Andhra Pradesh Government Land Allotment Policy G.O. Ms. No. 571 – 14.09.2012</p>	<p>The Government Land Allotment Policy was formulated to create a set of uniform guidelines for the extent and rate of allocation of Government land for various purposes to Government departments and private organizations. According to the policy:</p> <ul style="list-style-type: none"> - Government land shall be allotted only for public purposes - For each category of institution, project or industry, there should be a norm on the extent of land required as stipulated by the respective administrative departments. These norms are to be

SI	Act / Rules / Policies	Applicability
		<p>scrupulously followed</p> <ul style="list-style-type: none"> - Only waste lands are to be allotted; environmentally sensitive and fragile areas such as, tank beds, river beds, hillocks with afforestation etc., shall not be alienated or allotted Government lands should not be auctioned for resource mobilization - Lands assigned to poor people for agriculture purpose should not be resumed and in case of inevitable resumption, alternate land should be given to the said assignees apart from rehabilitation. - If the assignee uses for purpose other than for which, the land was assigned or he transfers the land in favor of some other persons unauthorizedly, then the government shall have power to resume the land in their favor - For fixing cost of land, provisions of BSO-24 shall apply to all the land allotments along with the conditions stipulated by the alienating agencies/departments - The allotment / alienation shall be on market value as recommended by the Collector and the A.P. Land Management Authority (APLMA) Government lands may be given free of cost to State Government Departments for welfare and development purposes - APLMA to be constituted for processing and recommending land allotment, with the task of monitoring the utilization of land for the intended purpose and resumption of land in case of violation of conditions - NOC from Urban Local Body (ULB) or Urban Development Authority (UDA) (in case of areas falling outside Urban Local Body limits) and Directorate of Town and Country Planning (DT&CP) for the areas falling outside ULBs and UDA areas may be insisted before taking a decision on the allotment of land by APLMA. - The administrative department and the APLMA shall therefore invariably ensure that the statutory environmental and zonal regulations are strictly complied with in this regard - Government lands owned by various departments and which are not being utilized to the full extent by

SI	Act / Rules / Policies	Applicability
		<p>the respective departments shall be proposed for allotment for public purpose</p> <ul style="list-style-type: none"> - All the Departments should prepare comprehensive plans for Rehabilitation and Resettlement (R&R) where displacement of people is involved - Wherever applicable, the allottee shall also provide green buffer along the nalas, tanks and water bodies, as specified in the building rules

Comparison of National Laws with World Bank Policy

As mentioned earlier, the provisions of the RFCTLARRA 2013 and by extension the RFCTLARRR 2014 are in aligned to the World Bank Operational Policy 4.12 on Land Acquisition. The table below shows the synergy between the key requirements of the WB OP 4.12 and RFCTLARRA 2013.

World Bank OP Requirements	Coverage in RFCTLARRA 2013	Specific Provision in RFCTLARRA 2013
Involuntary resettlement should be avoided where feasible, or minimized, exploring all alternative project designs	Yes	<p>Chapter II Section 8 (1) of the RFCTLARRA 2013, states that the Appropriate Government shall ensure that</p> <ul style="list-style-type: none"> - (a) There is a legitimate & bona fide public purpose which necessitates the acquisition - (b) The potential benefits & the public purpose shall outweigh the social costs & adverse social impact as determined by the Social Impact Assessment - (c) Only the minimum area of land required for projects is proposed to be acquired - (d) There is not unutilized land which has been previously acquired in the area - (e) Any land acquired earlier and remaining unutilized is used for the public purpose <p>Chapter II Section 4 (1) of the RFCTLARRA, 2013 also requires that a Social Impact Assessment Study (SIA) be conducted in consultation with the concerned Panchayat, Municipality or Municipal Corporation. The SIA shall also include reports of public hearings conducted in the affected area.</p> <p>Chapter II Section 7 (4) of the RFCTLARRA 2013 states that if an Expert Group upon review the SIA finds that the project does not serve a public purpose, or that the costs outweigh the benefits, then the project will be abandoned and no further steps will be taken to acquire the land.</p>

World Bank OP Requirements	Coverage in RFCTLARRA 2013	Specific Provision in RFCTLARRA 2013
		Further Section 7 (5) states that if the project does serve a public purpose and its benefits outweigh the costs, then the Expert Group shall make specific recommendations on whether the extent of land proposed for acquisition is the absolute bare minimum needed and that there are no less displacing options available
Where resettlement cannot be avoided, resettlement activities should be conceived and executed as a development programme by providing sufficient resources to enable Affected Persons (APs) to share in the project. Displaced persons should be consulted and have opportunities to participate in the resettlement process	Yes	<p>The Preamble to RFCTLARRA 2013 calls for a consultative, humane, participative informed and transparent process for land acquisition.</p> <p>Chapter II Section 4 (1) of the Act requires the SIA to include public hearings. Further, ample notification for the public hearings needs to be given.</p> <p>Throughout the Act, at every stage, the Appropriate Government is required to publish the recommendations of the SIA, and notifications for any public hearings, decision on land acquisition, hearings of objections etc.</p>
Displaced persons should be assisted in their efforts to improve their livelihoods, or at least restore them, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher	Yes	<p>Chapter IV Section 16 (1b) of RFCTLARRA 2013 requires that in his survey and census of the affected families, the Administrator for Rehabilitation and Resettlement shall include an assessment of the livelihoods lost in respect of land losers and landless whose livelihoods are primarily dependent on lands being acquired</p> <p>Chapter V Section 31 (2h) of the Act states that the Rehabilitation and Resettlement Award shall include details of mandatory employment to be provided to members of the affected families.</p> <p>Further, Serial number 4 of the Second Schedule to the Act states that:</p> <ul style="list-style-type: none"> - a) where jobs are created through the project, provisions will be made for at least one member per family affected to be employed after receiving relevant training. The remuneration shall not be less than minimum wage; or - b) a onetime payment of INR 5,00,000 shall be made per family; or - c) annuity policies will be given that pay no less than INR 2,000 per month per family for 20 years, with appropriate indexation to the

World Bank OP Requirements	Coverage in RFCTLARRA 2013	Specific Provision in RFCTLARRA 2013
		<p>Consumer Price Index for agricultural labourers;</p> <p>Serial number 7 provides for a minimum compensation of INR 25,000 to any family that has lost a cattle shed or petty shop; Serial number 8 provides for a onetime grant to artisans and small traders</p>
<p>Provision of prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project</p>	<p>Yes</p>	<p>Chapter IV Sections 26-30 of the RFCTLARRA 2013 along with the First Schedule to the Act outlines the compensation to be paid. Compensation includes full market value of the land and assets multiplied by a factor that depends on distance from urban areas.</p> <p>Further a solatium of 100% is given over and above this amount. The award must be paid within 12 months and an amount calculated at the rate of 12% per annum on the market value shall be given to the affected families from the date of notification of the SIA study till the date of the award or the date of taking possession of the land, whichever is later</p>
<p>Assistance (such as moving allowances) during relocation; residential housing or housing sites as required and other advantages equivalent to the advantages of the old site; and support after displacement for a transition period</p>	<p>Yes</p>	<p>This is provided for in the Second Schedule to the RFCTLARRA 2013</p>
<p>Eligibility of benefits is to: a) those who have formal legal right to the land including customary and traditional rights b) those who do not have formal rights at the time of census but have claim to such land or assets that are recognized by the laws of the country c) those who have no recognizable rights</p>	<p>Yes</p>	<p>All three are covered in the Definitions (Section 3) of the RFCTLARRA 2013</p>
<p>Resettlement planning implementation and monitoring</p>	<p>Yes</p>	<p>Chapter II Section 16 (1) of the RFCTLARRA 2013 requires that a Resettlement Schedule be prepared; while Chapter V provides details of the Resettlement Award</p>

World Bank OP Requirements	Coverage in RFCTLARRA 2013	Specific Provision in RFCTLARRA 2013
		while Chapter VI provides the procedure for the Award; Chapter VII provides for the monitoring of the Resettlement Scheme; and Chapter VIII calls for establishment of a Land Acquisition, Resettlement and Rehabilitation Authority

Chapter 4: Entitlement Matrix

Management measures to address the issues and concerns in respect of social aspects of the project are indicated in the following Table.

Sl	Potential Issues	Management Measures
1	Loss of land	<p>The project shall secure the required land through following four methods;</p> <ol style="list-style-type: none"> i. Purchase of land on willing buyer & willing seller basis on negotiated rate; ii. Voluntary Donation; iii. Transfer of public land iv. And Involuntary Acquisition. <ol style="list-style-type: none"> i. In case of procurement of land through private purchase, project shall ensure that compensation/rate for land is not less than the rate provided in the new land acquisition act, 2013. The finalization of land price/negotiation shall be through a committee. In order to comply with this provision project may organize an awareness camp where provisions of new act in respect of basis/modalities of compensation calculation shall be explained to land owners with specific State provision if any. ii. In the case of voluntary donation of land, the following shall be ensured: <ul style="list-style-type: none"> - The land user(s) will not be subjected to undue pressure for parting of land; - All out efforts shall be made to avoid any physical relocation/displacement due to loss of land; - The project shall facilitate in extending ‘gratitude’ to the land donor(s) in lieu of the ‘contribution’ if so agreed. The same shall be documented in the shape of MoU between donor and Department and subsequently title of land transferred in the name of the Department. - All land donations (as well as purchases) will be subject to a review/ approval from a committee comprising representatives of different sections including those from the IA and GoAP iii. In case of procurement of land from public sources, necessary

Sl	Potential Issues	Management Measures
		procedures (do's and don'ts) have to be followed iv. In case of land acquired through involuntary acquisition, provisions of RFCTLARRA, 2013 shall be followed.
2	Change in land use and population relocation	Due to the fact that project intends to restore and repair existing tanks hence no relocation of population on account of construction works is envisaged. Although securing land for construction is not envisaged in an extremely unlikely situation, technical remedial measures too may have land related impacts and the project shall make all out efforts to secure such land wherein possibility of physical relocation/displacement is not envisaged.
3	Impact on Tribal	The ST population in the state is around 2.6 million accounting for 5.3% of the total state population. In compliance with Bank's Operational Policy and special provision of RFCTLARRA, 2013, a Tribal People Planning Framework has been prepared
4	Gender/ women participation	Women involvement will be planned through formal and informal group consultations so that their participation is ensured during preparation and implementation of the project. A Gender Action Plan has been developed with such a view in mind
5	Health and safety of worker/employee/ community	During construction the health and safety aspects of workers and nearby community shall be implemented through contractors with due diligence and compliance of required regulation/guidelines.
6	Inter Agency Coordination	Exclusive bodies will be set up at state/ district levels for over-seeing, reviewing and guiding the project

Compensation for Land Acquisition

The compensation shall be calculated by the Collector on the basis of the provisions laid down under section 26 to section 30 and the First Schedule of the RFCTLARRA 2013. The compensation shall be paid to all parties whose land or other immovable property or assets attached to the land or building have been acquired. As per the Act, land owners are defined as any person:

- Whose name is recorded as the owner of the land or building or part thereof, in the records of the authority concerned; or
- Who is granted forest rights under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 or under any other law for the time being in force; or
- Who is entitled to be granted Patta rights on the land under any law of the State including assigned lands; or
- Who has been declared as such by an order of the court or Authority

The Collector shall determine the market value of the land to be acquired on the basis of whichever of the following is higher:

- Market value, if any, specified in the Indian Stamp Act, 1889 for the registration of sale deeds or agreements to sell in the area where the land is situated; or
- The average sale price for similar type of land situated in the nearest village or nearest vicinity area; or

- Consented amount of compensation as agreed in case of acquisition of lands for private companies or for public private partnership project

The Collector having determined the market value of the land to be acquired shall calculate the total amount of compensation to be paid to the land owner by including all assets attached to the land. This will be done as follows:

Sl.	Component of Compensation	Manner of Determination of Value
1	Market value of land	Whichever of the following is higher: <ul style="list-style-type: none"> Market value, if any, specified in the Indian Stamp Act, 1889 for the registration of sale deeds or agreements to sell in the area where the land is situated; or The average sale price for similar type of land situated in the nearest village or nearest vicinity area; or Consented amount of compensation as agreed in case of acquisition of lands for private companies or for public private partnership project
2	Factor by which the market value is to be multiplied	<ul style="list-style-type: none"> In case of rural areas (other than Scheduled Areas) a multiplication factor of 1.25 will be applied In case of Scheduled (Tribal) Areas, a multiplication factor of 1.50 will be applied In case of urban areas, a multiplication factor of 1.00 will be applied
3	Value of assets attached to land or building	
a	Market value of the building and other immovable property or assets attached to the land or building that is to be acquired	The Collector shall use the services of a competent engineer, or any other specialist in the relevant field, as may be considered necessary
b	Damage sustained to standing trees and plats	For fruit bearing trees, the value of compensation per tree will be determined from time to time by the Horticulture Department based on the species of tree For non-fruit bearing trees, the value of compensation will be determined by the Forest Department
c	Damage sustained to standing crop	For standing crops, the compensation will be determined by the Agricultural Officer on a case by case basis
4	Solatium	The solatium shall be equivalent to one hundred percent of the market value of the land mentioned against serial number 1 multiplied by the relevant factor mentioned against serial number 2 plus the value of assets attached to land or building mentioned against serial number 3a, 3b and 3c
5	Total Compensation	The total compensation = Market value of land mentioned against serial number 1 X relevant factor mentioned against serial number 2 + Value of assets as mentioned against serial number 3 + Solatium mentioned against serial number 4

In addition to the market value of the land provided, the Collector shall, in every case, award an amount calculated at the rate of twelve per cent per annum on the market value for the period commencing on and from the date of the publication of the notification of the SIA till the date of the award of the Collector or the date of taking possession of the land, whichever is earlier.

Compensation for Rehabilitation and Resettlement

In addition to the compensation detailed above, the Collector shall pass Rehabilitation and Resettlement Awards for each affected family. According to the RFCTLARRA 2013, affected family is defined as:

- A family whose land or other immovable property has been acquired;
- A family which does not own any land but a member or members of such family may be agricultural labourers, tenants including any form of tenancy or holding of usufruct right, share-croppers or artisans or who may be working in the affected area for three years prior to the acquisition of the land, whose primary source of livelihood stand affected by the acquisition of land;
- The Scheduled Tribes and other traditional forest dwellers who have lost any of their forest rights recognized under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 due to acquisition of land
- Family whose primary source of livelihood for three years prior to the acquisition of the land is dependent on forests or water bodies and includes gatherers of forest produce, hunters, fisher folk and boatmen and such livelihood is affected due to acquisition of land;
- A member of the family who has been assigned land by the State Government or the Central Government under any of its schemes and such land is under acquisition;
- A family residing on any land in urban areas for preceding three years or more prior to the acquisition of the land or whose primary source of livelihood for three years prior to the acquisition of the land is affected by the acquisition of such land

The elements of the rehabilitation and resettlement entitlements are as follows:

Sl.	Elements of R&R Entitlements	Entitlement / Provision
1	Provision of housing units in case of displacement	<ul style="list-style-type: none"> - If a house is lost in rural areas, a constructed house shall be provided as per Indira Awas Yojana specifications; or if the family opts not to take the house, the equivalent cost of the house may be offered instead - If a house is lost in urban areas, a constructed house shall be provided, which will be no less than 50 sq mts in plinth area; or if the family opts not to take the house offered, it shall get a one-time financial assistance for house construction which shall not be less than INR 1,50,000 / - - These benefits shall also be extended to any affected family which is without homestead land and which has been residing in the area continuously for not less than three years preceding the date of notification of the affected area - No family shall be given more than one house
2	Choice of Annuity or	The Appropriate Government shall provide the following options:

Sl.	Elements of R&R Entitlements	Entitlement / Provision
	Employment	<ul style="list-style-type: none"> - Where jobs are created through the project, after providing suitable training and skill development, the Appropriate Government shall make provision for employment to at least one member per affected family in the project or arrange a job in such other project as maybe required. The wages for the job shall not be less than the minimum wages provided for in any law for the time being in force Or - Onetime payment of INR 5,00,000 / - per affected family - Or Annuity policies that shall pay not less than INR 2,000 per month per family for twenty years, with appropriate indexation to the Consumer Price Index for Agricultural Labourers
3	Subsistence grant for displaced families for a period of one year	<ul style="list-style-type: none"> - Each affected family which is displaced form the land acquired shall be given a monthly subsistence allowance equivalent to INR 3000 per month for a period of year from the date of award
4	Transportation cost for displaced families	<ul style="list-style-type: none"> - Each affected family which is displaced shall get a onetime financial assistance of INR 50,000 as transportation cost for shifting of the family, building materials, belongings and cattle
5	Cattle shed / petty shops cost	<ul style="list-style-type: none"> - Each affected family having cattle or having a petty shop shall get onetime financial assistance of such amount as the Appropriate Government may specify subject to a minimum of INR 25,000 for the construction of cattle shed or petty shop
6	Onetime grant to artisan, small traders and certain others	<ul style="list-style-type: none"> - Each affected family of an artisan, small trader or self employed person or an affected family which owned non agricultural land or commercial, industrial or institutional structure in the affected area, shall get a one-time financial assistance of INR 25,000
7	Onetime resettlement allowance	<ul style="list-style-type: none"> - Each affected family shall be give a onetime Resettlement Allowance of INR 50,000
8	Stamp duty and registration fee	<ul style="list-style-type: none"> - The stamp duty and any other fees payable for registration of the land or house allotted to the affected families shall be borne by the requiring body - The land for house allotted to the affected family shall be free from all encumbrances - The land or house allotted may be in the joint names of wife and husband of the affected family
9	Special provisions for Scheduled Castes and Scheduled Tribes	<ul style="list-style-type: none"> - Scheduled Castes and Scheduled Tribes displaced from Scheduled Areas shall receive an amount equivalent to INR 50,000 per family - Families settled outside the district shall be entitled to an additional 25% R&R benefits; - Payment of one third of the compensation amount at very outset;

Sl.	Elements of R&R Entitlements	Entitlement / Provision
		- Free land for community and social gatherings

Chapter 5: Institutional and Implementation Arrangements

Institutional Arrangements

The following institutional arrangements have been provided for in the RFCTLARRA 2013 and the A.P. RFCTLARRR 2014 for the management of rehabilitation and resettlement of affected parties:

- **1) Commissioner for Rehabilitation and Resettlement:** As per section 44(1) of the RFCTLARRA 2013, the State Government shall appoint an officer of the rank of Commissioner or Secretary of that Government for rehabilitation and resettlement of affected families. The Commissioner shall be responsible for supervising the formulation of rehabilitation and resettlement schemes or plans and proper implementation of such schemes or plans. The Commissioner shall also be responsible for the post-implementation social audit in consultation with the Gram Sabha in rural areas and municipality in urban areas.
- **2) Administrator for Rehabilitation and Resettlement:** As per section 43(1) of the RFCTLARRA 2013, where the Appropriate Government is satisfied that there is likely to be involuntary displacement of persons due to acquisition of land, then the State Government shall, by notification, appoint in respect to that project, an officer not below the rank of Joint Collector or Additional Collector or Deputy Collector or equivalent official of Revenue Department to be Administrator for Rehabilitation and Resettlement.
- **3) Powers of the Administrator for Rehabilitation and Resettlement:** As per section 30 of the A.P. RFCTLARRR 2014, the Administrator shall exercise the following powers and have the following responsibilities:
 - a. To conduct a survey and undertake a census of the affected families in the manner and within the time provided under the A.P. RFCTLARRR 2014;
 - b. To prepare a draft Rehabilitation and Resettlement Scheme;
 - c. To publish the draft scheme by the mode provided under the A.P. RFCTLARRR 2014;
 - d. To make the draft scheme available to the concerned persons and authorities;
 - e. To organize and conduct public hearings on the draft scheme;
 - f. To provide an opportunity to the Requiring Body to make suggestions and comments on the draft scheme;
 - g. To submit the draft scheme to the Collector;
 - h. To publish the approved Rehabilitation and Resettlement Scheme in the affected area;
 - i. To assist the Collector in preparing the Rehabilitation and Resettlement award;
 - j. To monitor and supervise the implementation of the Rehabilitation award;
 - k. To assist in post-implementation audit of Rehabilitation and Resettlement; and
 - l. Any other work required to be done for Rehabilitation and Resettlement
- **4) Project Level Rehabilitation and Resettlement Committee:** As per section 45(1 & 2) of the RFCTLARRA 2013, where land proposed to be acquired is equal to or more than one hundred

acres, the Appropriate Government shall constitute a Committee under the chairmanship of the Collector to monitor and review the progress of implementation of the Rehabilitation and Resettlement Scheme and to carry out post-implementation audits in consultation with the Gram Sabha in rural areas and municipality in urban areas. The Committee shall include the following members:

- a. Officers from the Appropriate Government;
- b. A representative of women residing in the affected area;
- c. A representative each of the Scheduled Castes and the Scheduled Tribes residing in the affected area;
- d. A representative of a voluntary organization working in the area;
- e. A representative of a nationalized bank;
- f. The Land Acquisition Officer of the project;
- g. The Chairperson of the panchayats or municipalities located in the affected area or their nominees;
- h. The Chairperson of the District Planning Committee or his nominee;
- i. The Member of Parliament and Member of the Legislative Assembly of the concerned area or their nominee;
- j. A representative of the Requiring Body; and
- k. Administrator for Rehabilitation and Resettlement as the Member-Convenor

As per section 31 (2) of the A.P. RFCTLARRR 2014, the Committee shall have its first meeting when a draft Rehabilitation and Resettlement Scheme has been prepared by the Administrator. The Committee shall discuss the scheme and make suggestions and recommendations. Thereafter the Committee shall meet and review and monitor the progress of Rehabilitation and Resettlement once in a month till the process is completed.

For the post-implementation social audits, the Committee shall meet once in three months. In order to monitor the progress, the Committee may visit the affected area and hold discussions with the affected families and also visit the resettlement area.

The RPF follows the strategy of avoidance, minimization and mitigation. This means that preference is given to avoiding displacement and resettlement wherever possible. If it is not possible to avoid this, utilities will strive to minimize the extent of displacement and take appropriate mitigation measures for all social impacts caused by such displacement. In order to avoid the loss of land and subsequent need for resettlement, the following safeguards are put in place:

The Appropriate Government will endeavour, wherever possible, to secure Government land for projects. Only in rare cases that Government land is not available will other methods of securing land be pursued (voluntary donation or willing buyer and willing seller) with involuntary acquisition being the last resort. Even, when Government lands are used, lands assigned to poor people for agriculture purpose will not be resumed unless unavoidable. In case of voluntary donation, no undue pressure will be put on the land owner / user to transfer ownership of the land; and in the case of willing buyer and willing seller, the compensation shall not be less than the rate provided for under RFCTLARRA 2013

There should be no unutilized land which has been previously acquired in the area where land is sought for the project. Further, any land acquired earlier and remaining unutilized is to be used for the purpose of the project before additional land is allotted.

The Appropriate Government shall ensure that a Social Impact Assessment (SIA) study is carried out in consultation with the concerned Panchayat, Municipality or Municipal Corporation in the affected area and also hold public hearings in the process.

An Expert Committee will be required to review the SIA and certify that the requested land serves a legitimate public purpose; that the social benefits of the proposed project outweigh any potential social costs; that only the minimum amount of land required is being utilized; and that no other less displacing option was available.

Where it is not possible to avoid the acquisition of land and displacement of affected families, the provisions of RFCTLARRA, 2013 and the A.P. RFCTLARRR, 2014 shall be applicable. The table below provides a snapshot of the process involved in land acquisition and determining the awards for rehabilitation and resettlement along with details who the competent authority responsible at each step of the process. Following the table, the implementation process is elaborated in detail.

Table 1: Competent Authority Responsible at Various Stages

Milestone	Process	Responsibility
Request for Land	Requisition for land: Requiring body files requisition to the concerned District Collector and the Commissioner Rehabilitation and Resettlement	Principal Secretary of Department or any Person authorised by him
	Preliminary inquiry about the correctness of particulars furnished in the requisition Report on preliminary inquiry submitted to the District Collector	Team of Revenue and Agriculture Officers along with Representative of Requiring Body including members of the PMU
Social Impact Assessment	Notification to undertake SIA	District Collector
	Disclosure of the notification	District Collector
	Select team to carryout SIA from the individuals and institutions registered or empaneled in the state database of Qualified SIA Resource Partners and Practitioners	Commissioner, Rehabilitation and Resettlement acting as state Social Impact Assessment Unit
	Undertake SIA in consultation with concerned Gram Panchayat, Mandal Parishad, Municipality or Municipal Corporation, followed by a public hearing to ascertain the views of the affected families	Appointed team to conduct SIA
	Submit SIA report to Commissioner, Rehabilitation and Resettlement within a period of six months from the date of commencement	Appointed team to conduct SIA
	Submit Social Impact Management Plan listing ameliorative measures required to be undertaken for addressing the impacts	Appointed team to conduct SIA

Milestone	Process	Responsibility
	Disclosure of SIA report and Social Impact Management Plan	Commissioner, Rehabilitation and Resettlement
Validation of SIA by Expert Group	Constitute an expert group consisting of two non-official social scientists, two representatives of panchayats, Gram Sabha, municipality or municipal corporation, two experts on rehabilitation and a technical expert in the subject related to the project	AP State Government
	Recommendations of the expert group, within two months of its constitution, on whether the proposed project should be implemented or not	Expert Group
	Disclosure of recommendations of the expert group	AP State Government
Decision by appropriate Government	Decide area for acquisition based on the Social Impact Assessment report and the recommendations of the expert group	AP State Government
	Obtain consent from the affected people, where required	AP State Government
	Disclosure of the decision	AP State Government
	Create public website to upload and disclose each acquisition case	Commissioner, Rehabilitation and Resettlement
Publication of Preliminary Notification	Preliminary notification shall be issued, after conclusion of SIA and consent of the affected persons or Gram Sabha, as the case may be, when it appears to the Government that land is required or likely to be required in any area for any public purpose	AP State Government
	Update land records within 2 months of the notification	District Collector
Preliminary survey of land proposed for acquisition	Officer authorized by District collector to conduct preliminary survey and shall have powers as provided under the Section 12 of the RFCTLARRA 2013	Officer authorized by District collector

Milestone	Process	Responsibility
Disposal of objections	Every objection shall be made to the Collector in writing and the Collector shall give the objector an opportunity of being heard in person or by any person authorized by him in this behalf. After hearing all such objections and making further inquiries as he thinks necessary, the Collector shall submit a report along with his recommendations on the objections to the District Collector for decision	Collector / District Collector
Preparation of Rehabilitation and Resettlement Scheme and Public Hearing:	The Administrator for Rehabilitation and Resettlement shall conduct a survey and undertake a census of the affected families within a period of two months from the date of publication of such preliminary notification. The Administrator shall prepare comprehensive and detailed draft Rehabilitation and Resettlement Scheme and give publicity in the affected area. The Commissioner of Rehabilitation and Resettlement shall publish the approved Rehabilitation and Resettlement Scheme in the affected area	Administrator for Rehabilitation and Resettlement Commissioner of Rehabilitation and Resettlement
Development Plan for Scheduled Castes or Scheduled Tribes Families:	Prior consent of the concerned Gram Sabha or the Panchayats at the appropriate level in the Scheduled Areas under the Fifth Schedule to the Constitution shall be obtained before issue of a notification for acquiring land in Scheduled Areas. In case there is involuntary displacement in Scheduled areas, a Development Plan will be prepared by the requiring body	PMU
Publication of Declaration Regarding Acquisition of Land	A declaration for acquisition of the land along with the summary of the Rehabilitation and Resettlement Scheme shall be made by the appropriate Government in the prescribed format	Appropriate Government
Payment of Compensation and Entitlements	The award for land acquisition shall be made within 12 months of the public declaration of the acquisition. The compensation shall be	Collector

Milestone	Process	Responsibility
	calculated on the basis of provisions laid down under section 26 to section 30 and \ the First Schedule of the RFCTLARRA 2013. In addition to the compensation for land acquisition, Rehabilitation and Resettlement Awards will also be provided to each affected family	

The detailed implementation process is as follows:

1) Request for Land: Any Requiring Body, or its representative duly authorized by it, for whom land is to be acquired shall file the Requisition to the concerned District Collector and to the Commissioner, Rehabilitation & Resettlement as per Form I found in the annexures of the A.P. RFCTLARRR 2014.

In case of acquisition for Government, the requisition shall be filed by concerned Secretary of the Department or a person authorized by him. The District Collector upon receiving requisition shall constitute a team of revenue and agriculture officers and members of the PMU to make field visit along with the representative of the requiring body to make a preliminary enquiry about the correctness of the particulars furnished in the requisition including the enquiry whether the requisition is consistent with the provisions of the Act, and submit a report to the District Collector.

2) Set up Social Impact Assessment Unit: The Commissioner, Rehabilitation & Resettlement shall be the state Social Impact Assessment Unit to arrange to carry out Social Impact Assessment Study (SIA). The Commissioner, Rehabilitation & Resettlement shall select the SIA team for each project from the individuals and institutions registered or empaneled in the State Database of Qualified SIA Resource Partners and Practitioners. The size and selection criteria for the SIA team shall be as per the project-specific ToR developed by the State SIA Unit.

The SIA team may be constituted by appointing individuals or an organization with experience in conducting SIAs or related field-based assessments and the team may include: A combination of independent practitioners, qualified social activists, academics, technical experts, who are not directly connected with the requiring body; and at least one woman member

The Requiring Body shall not be involved in any way in the appointment of the SIA team and while selecting the team it shall be ensured that there is no conflict of interest involving the team members appointed to assess the concerned project. If any team member is found to have a conflict of interest, the said member shall be disqualified.

3) Conduct Social Impact Assessment: A Social Impact Assessment (SIA) will be carried out for all land acquisition proposals except for when land is proposed to be acquired invoking urgency provisions under section 40 of RFCTLARRA 2013. In such cases, the District Collector, where he is not the Appropriate Government, shall submit a report to the State Government to issue appropriate directions. In other cases, the District Collector shall take the decision. The District Collector shall, within a period of fifteen days from the date of deposit of the processing fee for carrying the SIA study by the Requiring

Body, issue a notification for carrying out SIA in as per Form II found in the annexures of the A.P. RFCTLARRR 2014. The notification shall be made available in Telugu language to the Gram Panchayat, Mandal Parishad, Municipality or Municipal Corporation, as the case may be, and in the offices of the District Collector, the Sub-Divisional Magistrate and the Tahsildar at Mandal level.

The notification shall be published in the form of posters and pamphlets circulated in the affected area and by affixing the posters at some conspicuous places in the affected areas and shall be uploaded on the website of the State Government and the revenue district concerned. Provided that such notification shall be issued within thirty days after the deposit of the processing fee for carrying Social Impact Assessment by the Requiring Body.

The SIA shall be conducted in consultation with concerned Gram Panchayat, Mandal Parishad, Municipality or Municipal Corporation, as the case may be, at village level or ward level in the affected areas. This will be followed by a public hearing at the affected areas to ascertain the views of the affected families; these views shall be recorded in writing. Adequate publicity about the date and time and venue for the public hearing shall be given.

The SIA report shall be submitted as per Form III found in the annexures of A.P. RFCTLARRR 2014 to the Commissioner, Rehabilitation & Resettlement within a period of Six months from the date of commencement and shall include the views of the affected families recorded in writing.

The SIA Report including summaries shall be prepared and divided into three parts; The Project Feasibility Report; The Project Impact Report, and The Social Impact Management Plan

4) Develop Social Impact Management Plan: A Social Impact Management Plan listing the ameliorative measures required to be undertaken for addressing the impact of the project shall be submitted as per Form IV found in the annexures of A.P. RFCTLARRR 2014 along with the SIA report to the Commissioner, Rehabilitation & Resettlement.

The SIA team must provide a conclusive assessment of the balance and distribution of the adverse social impacts and social costs and benefits of the proposed project and land acquisition, including the mitigation measures, and provide an assessment as to whether the benefits from the proposed project exceed the social costs and adverse social impacts that are likely to be experienced by the affected families or even after the proposed mitigation measures, the affected families remained at risk of being economically or socially worse, as a result of the said land acquisition and resettlement.

5) Publicizing the SIA Report and Social Impact Management Plan: The SIA Report and the Social Impact Management Plan shall be made available in the Telugu language to the concerned Gram Panchayat, Mandal Parishad, Municipality or Municipal Corporation, at village level or ward level in the affected areas and in the Offices of the District Collector, the Sub-Divisional Officer and Tahsildar. It shall also be published by way of a public notice by affixing at some conspicuous places in the affected areas and shall be uploaded on the website of the State Government and the revenue district concerned.

6) Validation of SIA by Expert Group: The Appropriate Government shall ensure that the SIA report is validated by an independent multi-disciplinary Expert Group, as may be constituted by it. The Expert Group shall have: Two non-official social scientists; Two representatives of Panchayat, Gram Sabha, Municipality or Municipal Corporation; Two experts on rehabilitation, and a technical expert in the subject relating to the project. If the Expert Group determines that the project does not serve any public

purpose, or the social costs and adverse social impacts of the project outweigh the potential benefits, it shall make a recommendation within two months from the date of its constitution and the project shall be abandoned forthwith and no further steps to acquire land will be initiated in respect of the same.

If the Expert Group believes that there is a public purpose and that the benefits outweigh social costs, it shall make recommendations within two months of its constitution as to whether the extent of land proposed to be acquired is the absolute bare-minimum extent needed for the project and whether there are no other less displacing options available.

All recommendations of the Expert Group shall be recorded in writing along with details and reasons for their decisions. The recommendations shall be made available in the Telugu language to the Panchayat, Municipality, or Municipal Corporation; and the offices of the District Collector, the Sub-Divisional Magistrate and the Tehsil; and shall be published in the affected areas and also uploaded on the website of the Appropriate Government.

7) Decision by Appropriate Government: The Appropriate Government shall examine the Social Impact Assessment report, the recommendations of the Expert Group, if any, and decide such area for acquisition which would ensure minimum displacement of people, minimum disturbance to the infrastructure, ecology and minimum adverse impact on the individuals affected.

Before taking a decision the appropriate Government shall ensure that consent is obtained in the cases where such consent is required. The decision of the Appropriate Government shall be made available in the local language to the Panchayat, Municipality, or Municipal Corporation; and the offices of the District Collector, the Sub-Divisional Magistrate and the Tehsil; and shall be published in the affected areas and also uploaded on the website of the Appropriate Government.

Each acquisition case will be uploaded, on a public website that is to be created by the Commissioner, Rehabilitation & Resettlement. All details regarding the case beginning with the notification of the SIA and tracking each step of decision making, implementation and audit will be made available on the website.

8) Publication of Preliminary Notification: After conclusion of the SIA and consent of the affected persons or Gram Sabha, as the case may be, when it appears to the appropriate Government that land is required or likely to be required in any area for any public purpose, a preliminary notification shall be issued as per Form VI (a & b) found in the annexures of A.P. RFCTLARRR 2014.

The notification shall be published in the following manner: In the Andhra Pradesh Gazette; In two daily newspapers circulating in the locality of such area of which one shall be in the Telugu language In the Telugu language in the Panchayat, Municipality or Municipal Corporation, as the case may be and in the offices of the District Collector, the Sub-divisional Magistrate and the Tehsil; Uploaded on the website of the Appropriate Government; In conspicuous places in the affected areas and shall also be informed to the public by beat of Tom-tom. After issuing the preliminary notification, the Collector shall update land records within a period of two months.

9) Preliminary survey of land proposed for acquisition: The officer authorized by the District Collector to conduct preliminary survey shall have all the powers as provided under section 12 of the RFCTLARRA 2013.

10) Disposal of objections: Any person interested in any land which has been notified as being required or likely to be required for a public purpose, may within sixty days from the date of the publication of the preliminary notification object to: The area and suitability of land proposed to be acquired; Justification offered for public purpose; The findings of the SIA report.

Every objection shall be made to the Collector in writing and the Collector shall give the objector an opportunity of being heard in person or by any person authorized by him in this behalf or by an Advocate and shall, after hearing all such objections and making such further inquiry, if any, as he thinks necessary,

shall submit a report along with his recommendations on the objections to the District Collector for decision. The decision of the District Collector shall be final.

11) Preparation of Rehabilitation and Resettlement Scheme and Public Hearing: On publication of the preliminary notification by the Appropriate Government, the Administrator for Rehabilitation and Resettlement shall conduct a survey and undertake a census of the affected families within a period of two months from the date of publication of such preliminary notification.

For the survey and the census of the affected families the Administrator shall collect data based on the SIA report as well as data from secondary sources such as Panchayat and Government records and verify that data by door visit of the affected families and by site visits in case of infrastructure in the affected area.

The draft Rehabilitation and Resettlement Scheme prepared by the Administrator shall include particulars of the rehabilitation and resettlement entitlements of each land owner and landless whose livelihoods are primarily dependent on the lands being acquired: Where resettlement of affected families is involved the scheme shall contain the following: List of Government buildings to be provided in Resettlement Area, Details of public amenities and infrastructural facilities which are to be provided in Resettlement Area, List of likely to be displaced families; List of infrastructure in the affected area; List of land holdings in the affected area; List of trades/business in the affected area; List of landless people in the affected area; List of persons belonging to disadvantageous groups like persons belonging to Scheduled Castes or Scheduled Tribes, handicapped persons in the affected area; List of landless agricultural labourers in the affected area; List of unemployed youth in the affected area.

The Administrator shall prepare comprehensive and detailed draft Rehabilitation and Resettlement Scheme, as per Form VIII found in the Annexures of the A.P. RFCTLARRR 2014, and give wide publicity in the affected area.

The Administrator or an officer authorized by him shall conduct a public hearing in the affected areas on such date, time and venue as decided by giving advance notice of fifteen days. The Commissioner of Rehabilitation and Resettlement shall publish the approved Rehabilitation and Resettlement Scheme in the affected area by affixing in conspicuous places in addition to making it public by other means as described above in the case of the preliminary notification.

12) Development Plan for Scheduled Castes or Scheduled Tribes Families: As far as possible, no acquisition of land shall be made in Scheduled Areas; and where this is done, it shall be only as a demonstrable last resort.

Further the prior consent of the concerned Gram Sabha or the Panchayats at the appropriate level in the Scheduled Areas under the Fifth Schedule to the Constitution shall be obtained before issue of a notification. This prior consent shall be taken in all cases, even in the case of urgency. In cases of a project involving land acquisition on behalf of a requiring body which involves involuntary displacement of the Scheduled Castes or Scheduled Tribes families, a Development Plan shall be prepared in the prescribed format. The Development Plan shall lay down the details of the procedure for settling land rights due, but not settled and restoring titles of the Scheduled Tribes as well as the Scheduled Castes on the alienated land by undertaking a special drive together with land acquisition. The Development Plan shall also contain a programme for development of alternate fuel, fodder and non-timber forest produce resources on non-forest lands within a period of five years, sufficient to meet the requirements of tribal communities as well as the Scheduled Castes.

The affected families of the Scheduled Tribes shall be resettled preferably in the same Scheduled Area in a compact block so that they can retain their ethnic, linguistic and cultural identity. Further, the resettlement areas predominantly inhabited by the Scheduled Castes and the Scheduled Tribes shall get land, to such extent as may be prescribed by the Appropriate Government free of cost for community and social gatherings.

All the benefits, including the reservation benefits available to the Scheduled Tribes and Scheduled Castes in the affected areas shall continue in the resettlement area. Any alienation of tribal lands or lands belonging to members of the Scheduled Castes in disregard of the laws and regulations for the time being in force shall be treated as null and void.

13) Publication of declaration for acquisition: A declaration for acquisition of the land along with the summary of the Rehabilitation and Resettlement Scheme shall be made by the appropriate Government in the prescribed format. However, no such declaration shall be made unless the requiring body has deposited an amount in full towards the cost of acquisition of the land. Every declaration shall be published in the same manner as described above in the case of the preliminary notification.

14) Land acquisition award: The Collector shall make an award for land acquisition within a period of twelve months from the date of publication of the declaration for acquisition. If no award is made within this period, the entire proceedings for the acquisition of the land shall lapse.

15) Mode of payment of compensation: The payment of compensation shall be made expeditiously through account payee cheques/electronic mail transfer.

Dispute Settlement

As per section 51(1) of the RFCTLARRA 2013, the Appropriate Government shall, for the purpose of providing speedy disposal of disputes relating to land acquisition, compensation, rehabilitation and resettlement, establish one or more Authorities to be known as “the Land Acquisition, Rehabilitation and Resettlement Authority”. Section 52(1, 2 & 3) specifies that the Authority shall consist of one person only (Presiding Officer) who will be appointed by the Appropriate Government in consultation with the Chief Justice of a High Court in whose jurisdiction the Authority is proposed to be established. The Presiding Officer must be, or have been, a District Judge; or a qualified legal practitioner who has been practicing for not less than seven years. The Presiding Officer shall hold office for a term of three years or until the age of sixty-five, whichever is earlier. The Appropriate Government shall also provide the Authority with a Registrar and such other officers and employees as it deems fit. As per section 33 of the A.P. RFCTLARRR 2014, the salaries, allowances, and conditions of service of the Registrar and other Officers and employees of the Authority shall be the same as applicable to the officers and employees of similar grades working in the Judicial Department of the State Government; while the salaries and allowances of the Presiding Officer shall be the same as that applicable to a District Judge working in the State.

Any person interested who has not accepted the rehabilitation and resettlement award may, by written application to the Collector, require that the matter be referred by the Collector to the Authority for determination. The objection of the interested person may concern:

- a. Measurement of the land;
- b. The amount of the compensation;
- c. The person who is payable;
- d. The rights of Rehabilitation and Resettlement; or
- e. The appointment of the compensation among the interested persons
- The application objecting to the award will be accepted if the application is made:
 - a. Within six weeks from the date of Collector’s award, in the case that the person making the application was present or represented before the Collector at the time when the award was made; or
 - b. In other cases, within six weeks of receipt of the notice from the Collector, or within six months from the date of the Collector’s award, whichever period shall expire first. However, the Collector may entertain an application within a further period of one year

after the expiry of the stipulated period if there is sufficient cause for not filing it within the specified time period.

Once the Collector receives the application, he shall refer it to the Authority within a period of thirty days from the date of receipt of the application. If the Collector fails to refer the matter within the stipulated time period, the applicant may apply to the Authority, requesting it to direct the Collector to make the reference.

While making the reference to the Authority, the Collector shall specify:

- a. The situation and extent of the land, with particulars of any tress, buildings or standing crops on it;
- b. The names of the persons interested in the land;
- c. The amount awarded for damages and paid or tendered, and the amount of compensation awarded;
- d. The amount paid or deposited under any other provisions of the RFCTLARRA 2013; and
- e. If the objection is to the amount of the compensation or the grounds on which the amount of compensation was determined.

On receiving the reference, the Authority shall issue a notice specifying the day on which the objection will be determined and direct that the applicant and all interested persons appear on the notified date. The proceedings shall take place in public and all persons entitled to appear in any Civil Court in the State shall be entitled to appear, plead and act in such proceedings. In determining whether the amount of compensation awarded for land acquisition and rehabilitation and resettlement entitlements is appropriate, the Authority shall take into consideration whether the Collector has followed the parameters set under section 26 to section 30 of the RFCTLARRA 2013. If the Collector's award is not upheld by the Authority, the cost of the proceedings shall be paid by the Collector. If the Authority believes that the compensation should have been in excess of that awarded by the Collector, the Authority may direct the Collector to pay interest on such excess at the rate of nine percent per annum from the date on which the Collector took possession of the land to the date of payment of the excess amount. If the payment of the excess amount is after the expiry of one year from the date the Collector took possession, the interest rate applied will be fifteen percent per annum for the period after the expiry of one year to the time the excess payment is made.

In such cases where the Authority awards compensation in excess of the amount awarded by the Collector, any person interested in any other land covered by the same preliminary notification, may submit a written application to the Collector to re-determine the amount of compensation made to them. Such applications should be made within three months of the Authority's awards. If the Requiring Body or any person aggrieved by the Authority's award may file an appeal to the High Court within sixty days from the date of the award. This period maybe extended by a further sixty days if the High Court determines that the appellant was prevented by sufficient cause from filing the appeal in the stipulated period. The high Court will be required to dispose off any such appeal within six months from the date on which the appeal is presented to the High Court.

Monitoring Mechanism

As per section 50 (1 & 2) of the RFCTLARRA 2013, the State Government shall constitute a State Monitoring Committee for reviewing and monitoring the implementation of rehabilitation and resettlement schemes or plans. The Committee may, besides having representatives of the concerned Ministries and Departments of the State Government, associate with eminent experts from the relevant fields.

Further, as per section 32(1) of the A.P. RFCTLARRR 2014, the State Monitoring Committee shall have its first meeting for review and monitoring the implementation of the rehabilitation and resettlement scheme within a month of the date that the said scheme is approved and published by the Commissioner for Rehabilitation and Resettlement. Thereafter, the meetings of the Committee shall be held once in three months to review and monitor the implementation of the rehabilitation and resettlement schemes. Section 32(2) of the A.P. RFCTLARRR 2014 prescribes that the experts associated with the State Monitoring Committee shall be paid an amount of INR 1,000 as sitting fee and travelling and daily allowance at the rate admissible to the Class-I rank Officers of the State Government for journeys outside headquarters.

Annexure I: Process for Undertaking SIA

The process of carrying out the SIA is provided for in Section 10 of the A.P. RFCTLARRR 2014. The process is as follows:

- (1) The SIA team shall collect and analyse a range of quantitative and qualitative data, undertake detailed site visits, use participatory methods such as focused group discussions, participatory rural appraisal techniques and informant interviews in preparing the Social Impact Assessment report.
- (2) All relevant project reports and feasibility studies shall be made available to the SIA team throughout the SIA process, as required. Any request for information from SIA team shall be met at the earliest but not exceeding seven days. The District Collector shall be responsible for providing the information requisitioned by the SIA team.
- (3) A detailed assessment based on a thorough analysis of all relevant land records and data, field verification, review and comparison with similar projects shall be conducted by the SIA team.

The assessment shall determine the following, namely:-

- (a) Area of impact under the proposed project, including both land to be acquired and areas that will be affected by environmental, social or other impacts of the project;
- (b) Area and location of land proposed to be acquired for the project;
- (c) The land proposed for acquisition is the bare minimum required;
- (d) Possible alternative sites for the project and their feasibility;
- (e) Whether the land proposed for acquisition is irrigated multi-cropped land and if so, whether the acquisition is a demonstrable last resort;
- (f) Land, if any, already purchased, alienated, leased or acquired, and the intended use for each plot of land required for the project;
- (g) The possibility of use of any public, unutilized land for the project and whether any of such land is under occupation;
- (h) Nature of the land, present use and classification of land and if it is an agricultural land, the irrigation coverage for the said land and the cropping pattern;
- (i) The special provisions with respect to food security have been adhered to in the proposed land acquisition;
- (j) Size of holdings, ownership patterns, land distribution, number of residential houses, and public and private infrastructure and assets; and
- (k) Land prices and recent changes in ownership, transfer and use of lands over the last three years.

- (4) Based on the land assessment, land records and field verification, the SIA team shall provide an accurate estimate of the number of affected families and the number of displaced families among them and ensure that, as far as possible, all affected families are enumerated.
- Provided that where enumeration is not possible, a representative sample shall be done.
- (5) A socio-economic and cultural profile of the affected area must be prepared, based on available data and statistics, field visits and consultations as per FORM-III:
- Provided that in projects where resettlement is required, the identified resettlement sites shall be visited and a brief socio-economic profile of the land and its current resident population shall be indicated.
- (6) Based on the data collected in processes listed above and in consultation with the affected communities and key stakeholders, the SIA team shall identify and assess the nature, extent and intensity of the positive and negative social impacts associated with the proposed project and land acquisition as per FORM-III.
- (7) The SIA process includes the preparation of a Social Impact Management Plan (SIMP), which will present the ameliorative measures to be undertaken to address the social impacts identified in the course of the assessment. The SIA team must assess the viability of impact mitigation and management strategies with clear indication of costs, timelines and capacities. The Social Impact Management Plan (SIMP) shall include the following measures-
 - (a) That have been specified in the terms of Rehabilitation and Resettlement and compensation for all the categories of affected families as outlined in the Act;
 - (b) That the Requiring Body has stated that it will undertake in the project proposal and other relevant project documents; and
 - (c) That additional measures being undertaken by the Requiring Body, which have been undertaken by it in response to the findings of the SIA process and public hearings.
- (8) The SIA team must provide a conclusive assessment of the balance and distribution of the adverse social impacts and social costs and benefits of the proposed project and land acquisition, including the mitigation measures, and provide an assessment as to whether the benefits from the proposed project exceed the social costs and adverse social impacts that are likely to be experienced by the affected families or even after the proposed mitigation measures, the affected families remained at risk of being economically or socially worse, as a result of the said land acquisition and resettlement.

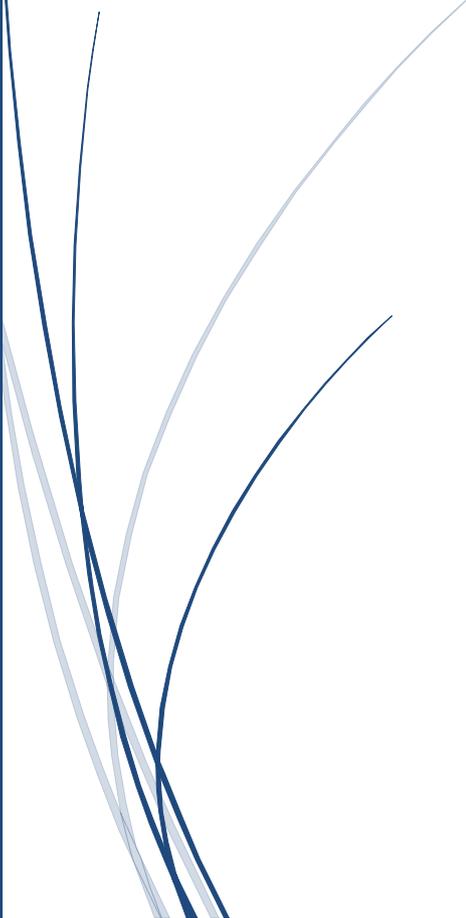


**Andhra Pradesh Integrated Irrigation
and Agriculture Transformation
Project (APIIATP)**

**TRIBAL PEOPLE'S PLANNING
FRAMEWORK**



**Environment and Social Management Framework:
Volume 2 – Stand Alone Document 7**



Sutra
Consulting

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Section 1: Project Introduction

Overview of the Study

Andhra Pradesh (AP) has a long tradition of tank based irrigation and farmers for years have been dependent on the elaborate systems of tanks for irrigating agricultural lands. The state has about 40000 minor irrigation sources spread over the thirteen districts. The geographical area of the state is about 402.7 lakh acres out of which the total cultivable area is around 19.9 Million acres. Out of this irrigation potential is created for 103 lakh acres through the existing major, medium and minor irrigation projects. The performance of the tanks system however witnessed a decline in the past two decades due to a variety of factors including heavy siltation in tank bed and inflow channels, growing forests, damages in sluices, field channels and bunds weirs etc.

The Government of AP (GoAP) with support from the World Bank implemented the Andhra Pradesh Community Based Tank Management Project (APCBTMP) during 2007-2016 with an objective of improving agricultural productivity and building capacities of Water User's Associations (WUAs) to manage tanks effectively. During the course of implementation of the APCBTMP there was a realization of the need for development of more holistic interventions which aimed not only to improve productivity of crops but also maximize returns by reducing gaps in supply and demand chain. A specific need to focus on interventions that disseminated and facilitated adoption of technology by farmers, created awareness on quality standards, organized farmers and promoted collective sale and purchase of inputs and produce was identified during the course of this project.

It is in this context that the *Andhra Pradesh Integrated Irrigation Agriculture Transformation Project (APIIATP)* has been conceptualized by the World Bank and GoAP. The project adopts a holistic and synergized approach that seeks integration across relevant stakeholders of selected minor irrigation tanks across the state under different agro climatic zones.

The *Project Development Objective* of APIIATP is to **enhance agricultural productivity, profitability and resilience to climate variability in selected tank systems of Andhra Pradesh**. In line with the "Transformation" objective, the project aims to promote inclusive rural growth, develop and disseminate new agricultural and water management technologies, climate resilient agriculture, enhance market linkages for small and marginal farmers and improve water and natural resource management. The proposed project will have positive impacts 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 would significantly reduce water and carbon footprints.

Project Components

The proposed project activities have been categorized into four main components as illustrated in Exhibit 1 and summarized in subsequent paragraphs (WRD, GoAP 2016)

Component A: Improving Irrigated Agriculture Efficiency at Farm Level

This component would improve tank-based minor irrigation to strengthen the integrated farming system (in which growing crops, agro-forestry and rearing livestock co-exist) with reduced water footprints. It will consist of three inter-related sub-components: (i) improving tank system performance and resilience; (ii) inflow hydrology management for improving water productivity and efficiency; and (iii) building synergy with the Primary Sector Mission (Agriculture, Fishery, Horticulture, Livestock and Irrigation).

Component B: Promoting Adaptive Sustainable Agriculture Practices

This component would improve production and productivity of the tank systems and increase returns to farmers and other water users through better market linkages and promotion of agribusiness. This component will have two sub-components: (i) climate smart diversified agriculture production systems; and (ii) climate-friendly market and agribusiness promotion.

Component C: Climate-friendly Market and Agribusiness Promotion

This sub-component will aim at reducing the ‘road miles’ of goods and services, by bringing producers and consumers closer for locally produced goods and services by reviving/enhancing local farmers’ markets and developing alternate marketing channels to improve farm level post-harvest management and value addition. The project will support development of farmer producer organizations/companies anchored in water user associations and facilitate public-private partnerships to enable direct buying arrangements at the local level.

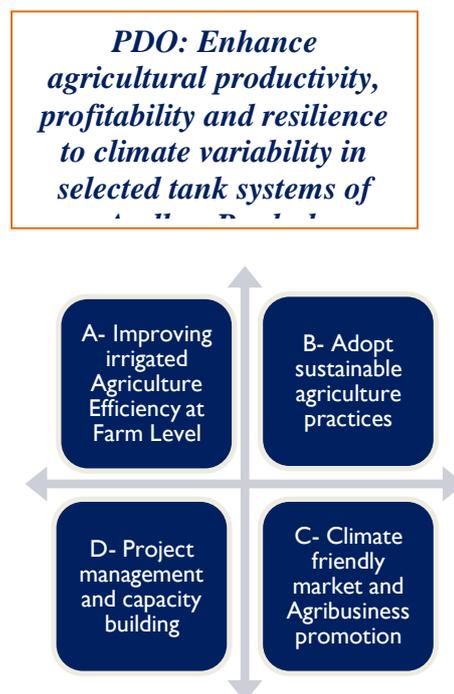
Component D: Project Management and Capacity Building

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. The project is designed with an expectation of coordination between four important Departments, i.e., Water Resources, Agriculture, Horticulture, Ground Water, and Fisheries.

Project Preparation

As a part of the project preparation, a number of advisory and analytical studies were undertaken. One of them—social and environmental assessment-- relates to identifying and addressing environment and social issues. The assessments enabled in identifying, and assessing key issues, and subsequently draw environmental and social management measures to address them. It is expected that the measures will result in enhanced tank systems performance and resilience, improving irrigation efficiency, inflow hydrology management, improving productivity, adapting sustainable agriculture practices, innovative

Exhibit 1: PDO and Project Components



and technology transfer for fisheries production and agri-business development. To fructify this, the project has prepared an environmental and social management framework (ESMF) and associated Management Plans.

The Environmental and Social Management Framework (ESMF) approach is adopted as the selection of tanks and the nature and extent of interventions will become explicit over time, as and when they are selected. The environmental and social management frameworks for the specific identified investments will guide the interventions to ensure that the project activities do not cause any harm, are in compliance with the applicable national and local regulations, as well as World Bank safeguards policies. These will also ensure that potential adverse impacts are adequately mitigated and potential benefits of the project are enhanced to improve effectiveness and sustainability of the project. Relevant portions of the frameworks are suitably integrated with project contract documents to facilitate smooth implementation during the rehabilitation and operation phases. The ESMF approach has been adopted as the selection of tanks and nature / extent of investments/ interventions will become explicit over time, as and when the tanks are selected.

Social Assessment

Andhra Pradesh is an ethnically diverse state with a diverse set of languages, traditions and practices. The set of beneficiaries who would be covered under the project is not homogenous and comprises of a number of sub-groups who can be identified based on their differential endowment, gender, ethnicity, different economic groups and other regional features. There are a number of stakeholder groups who would exert varying degrees of influence on the project and impact project activities. In this context it becomes important for the project to develop a framework that would enable participation of all stakeholder groups and solicit their contributions towards project design and delivery mechanisms.

A social assessment was undertaken in order to help identify key stakeholder groups and evince their expectations/ issues/ concerns and draw measures to reach each of the sub groups effectively. The were drawn such as to ensure inclusion of deprived segments, equity in accessing project benefits, strengthening decentralised governance system as per constitutional norms and ensuring gender based integration in project execution process.

The social assessment enabled the following:

- Mapping project stakeholders and conducting detailed stakeholder consultations
- Assessing social impacts of proposed project interventions
- Reviewing and suggesting legal, policy and institutional aspects to enable accomplishment of project objectives
- Developing measures to enhance positive impacts and mitigate negative impacts if any

Broad elements of the social assessment included beneficiary assessment, stakeholder analysis, social impacts, institutional assessment and risk analysis. The assessment was carried out in consistence with GoI, GoAP and the World Bank safeguard requirements, policies, regulations and guidelines. One of the key social management instruments emanating from this is the Tribal Peoples Planning Framework (TPPF).

Need for Tribal People's Planning Framework

Inclusive growth is the essence of developmental strategy across the economies. Since the introduction of economic reforms in early nineties, there has been greater focus on

development and planning towards enhancement of human well-being and reduction in inequalities along with growth of per capita income especially targeting vulnerable social groups, viz. Scheduled Tribes (STs), Scheduled Castes (SCs) etc.¹

STs are amongst the most marginalised and vulnerable segments of the society. The Constitution of India provides safeguard with regard to their traditions, socio-cultural practices and governance mechanisms etc. Any development project or intervention is required to adhere to principles that protect the interests of these groups.

A Tribal People's Planning Framework (TPPF) is necessary in order to address issues faced by tribals and focus on inclusive growth with includes tribal development. The project components and its indicators will as such not have an adverse impact on the tribal population. Rather, the project will be beneficial to them in terms of improving their skill base in areas such as climate resilient agricultural practices and agri-business promotion. Despite this, attention is still required, within the scope of the project, based on their current status of development and in order to meet the safeguard provisions that are constitutionally provisioned for tribals. The TPPF has been prepared in accordance with the World Bank's Operational Policy (OP) 4.10 on indigenous peoples as well as legal provisions of Government of India and Government of Andhra Pradesh. The objectives of the TPPF are to ensure that tribals are adequately and fully consulted prior and during the course of the project; receive benefits and compensation equal to that of the mainstream population; are provided with special assistance as per laws and policies because of their vulnerabilities; and receive adequate protection against adverse impacts of the project on their cultural identities.

Report Structure

Section 1: Project Introduction

The first section of this report defined the basic project objective of the Andhra Pradesh Integrated Irrigation Agriculture Transformation Project and described the project components, Further, it stated the project objectives and the basic features of the social assessment which has been conducted for the tanks spread across 12 project districts of APIIATP. This was followed by a discussion on the need for a Tribal People's Planning Framework as part of this project.

Section 2: Tribal Scenario in Andhra Pradesh

The second section provides basic information on the tribal scenario in Andhra Pradesh including demographic data on the ST population in Andhra Pradesh. It also provides information on the Scheduled Areas and list of Notified Scheduled Tribes in Andhra Pradesh.

Section 3: Baseline Findings and Observations

This section provides primary information and analysis of data collected in the three tribal project tanks visited by a team of experts during the course of the assignment. It describes the participation and co-option of tribal people in Water User Association and various meetings. It also lists the issues identified and inferences drawn from the field study.

Section 4: Legal and Institutional Framework

¹<https://tribal.nic.in/ST/StatisticalProfileofSTs2013.pdf>

This section primarily deals with the findings from the desk review of various policies and schemes for tribal development established by Government of India and Government of Andhra Pradesh. Further, it discusses the applicable Operational Policies of the World Bank.

Section 5: Stakeholder Analysis

A stakeholder analysis has been undertaken to identify the issues and the concerns of the stakeholders who are supposed to be directly or indirectly impacted/benefited by the project or assume a position wherein they can have a significant role to play in project implementation. It identifies direct and indirect stakeholders at various levels and also lists their expectations from the project followed by major findings from the consultations.

Section 6: Tribal People's Planning Framework

Tribal People's Planning Framework has been developed to maintain inclusion of vulnerable groups of the society and ensure their participation and development through the proposed project minimising any adverse impacts. This section discusses the objective of having a Tribal People's Planning Framework and the strategy behind this. Further it provides a Tribal Inclusion Approach and Tribal Development and Inclusion Framework.

Section 7: Implementation and Institutional Arrangement

Proper implementation and institutional arrangements are essential for the project to be effectively implemented. This section details the institutional arrangements, Monitoring and Evaluation structure and the Grievance Redressal Mechanism for the project with a focus on the tribal population.

Section 2: Tribal Scenario in Andhra Pradesh

Defining “Tribals”

The term “Indigenous People” or “Tribal People” is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:

- Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;
- Customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
- An indigenous language, often different from the official language of the country or region.

The term ‘Scheduled Tribe’ is defined in Article 366 (25) of Indian constitution as “such tribes or tribal communities or parts of or groups within such tribes or tribal communities as are deemed under Article 342 to be Scheduled Tribes for the purposes of this Constitution”.²Article 342 prescribes the procedure to be followed in the matter of specification of Scheduled Tribes. The criteria followed for specification of a community as a Scheduled Tribe, as per Ministry of Tribal Affairs, Government of India include:

- Indications of primitive traits
- Distinctive culture
- Geographical isolation
- Shyness of contact with the community at large, and
- Backwardness

Distribution of ST Population in Andhra Pradesh

Andhra Pradesh (AP) is the tenth largest state in India with a population of 49.4 Million (4.08% of India’s population) and a population density of 304 persons per Sq. Km. There are 126.65 Lakh households in the state and the average size of the household is 3.95. AP is largely rural with 70.42% of the population living in rural areas and 29.58% living in urban areas.³Tribal population aggregates to 0.25 million (about 6% of the total). While tribals are spread across the state, Visakhapatnam has the largest concentration of with 14.42% of the total, and the least in Kurnool with 2.04%.

Table 1 Distribution of Tribal Population in Andhra Pradesh, 2011

Sl	District	Population (per Census 2011)		
		Total	ST	% of ST
1	Vishakhapatnam	4,290,589	618,500	14.4
2	Vizianagaram	2,344,474	235,556	10
3	SPSR Nellore	2,963,557	285,997	9.7
4	Srikakulam	2,703,114	166,118	6.1
5	Prakasam	3,397,448	151,145	4.4
6	East Godavari	5,285,824	297,044	5.6
7	Chittoor	4,174,064	159,165	3.8

²The terms ‘tribals’ and ‘scheduled tribals’ are used inter-changeable and akin to indigenous peoples.

³AP TPPF (Power Transmission and Distribution Project)

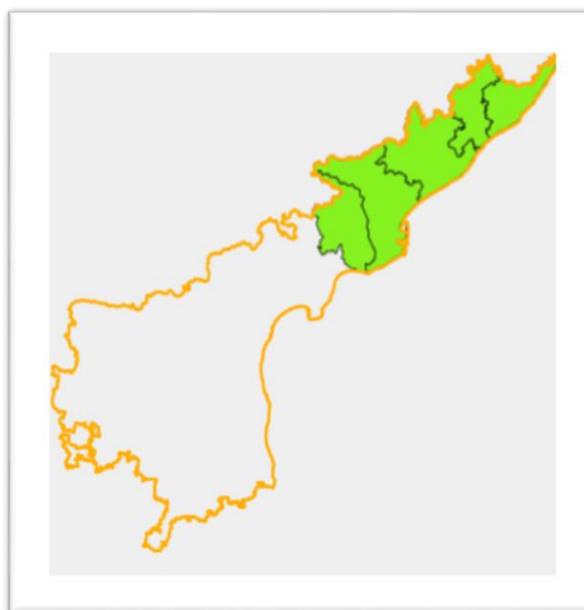
Sl	District	Population (per Census 2011)		
		Total	ST	% of ST
8	Anantapur	4,081,148	154,127	3.8
9	Krishna	4,517,398	132,464	2.9
10	West Godavari	3,994,410	133,997	3.4
11	YSR Kadapa	2,882,469	75,886	2.6
12	Kurnool	4,053,463	82,831	2
	State	44,687,958	2,492,830	5.58

Scheduled Areas in Andhra Pradesh

Andhra Pradesh's tribal scenario is quite unique as it has certain pockets listed as 'scheduled'. This is in accordance with the provisions of the Indian Constitution - Article 244 and 5th Schedule. Scheduled areas are those areas which are treated differently from other areas in a state in the sense that whole of the administrative machinery operating in the state is **not** extended to these areas. The objective of which is to provide protection to the tribals living in the Scheduled Areas from alienation of their lands and natural resources to non-tribals. The criteria followed for declaring an area as Scheduled Area are preponderance of tribal population, compactness and reasonable size of the area, under-developed nature of the area and marked disparity in economic standard of the people. In common parlance, in AP, scheduled areas are called as Agency areas due to the presence of specialized tribal development agencies. The scheduled areas in Andhra Pradesh are as follows:

The Scheduled Areas of Andhra Pradesh

- Visakhapatnam Agency area 1 (excluding the areas comprising the villages of Agency: Lakshmipuram, Chidikada, Konkasingi, Kumarapuram, Krishnadevipeta, Pichigantikothagudem, Golugondapeta, Gunupudi, Gummudukonda, Sarabhupalapatnam, Vadurupalli, Pedajaggampeta)
- Sarabhupathi Agraharam, Ramachandrarajupeta Agraharam, and Kondavatipudi Agraharam in Visakhapatnam district
- East Godavari Agency area 2 (excluding the area comprised in the village of Ramachandrapuram including its hamlet Purushothapatnam in the East Godavari district)
- West Godavari Agency area in West Godavari district. The data includes the villages of 7 mandals from Khammam district to the A.P. State (as per Reorganisation Act, 2014): Nellipapaka, Kunavaram, Chintoor and V.R. Puram in East Godavari district and Burgampad, Kukunoor and Valaipadu in West Godavari district.



List of Notified Scheduled Tribes in AP

A scheduled tribe (ST) is identified by the Constitution of India, taking into consideration various factors such as (i) primitive traits, (ii) distinctive culture, (iii) geographical isolation, (iv) social and economic backwardness, and others. However, identification of tribes is a state subject. Tribes notified for Andhra Pradesh State are ST in Andhra Pradesh only, and their category may vary in other states. The list of Scheduled Tribes of Andhra Pradesh as per the Scheduled Castes and Scheduled Tribes Orders (Amendment) Act, 2002 is provided in Table 2.

Table 2 List of Scheduled Tribes in Andhra Pradesh

Sl	Name of Tribe	Sl	Name of Tribe
1	Andh, Sadhu Andh	18	Koya, DoliKoya, GuttaKoya, Kammara, Koya, MusaraKoya, OddiKoya, Pattidi, Koya, Rajah, RashaKoya, Lingadhari, Koya (ordinary), KottuKoya, Bhine and Koya, Rajkoya
2	Bagata	19	Kulia
3	Bhil	20	Malis
4	Chenchu	21	Manna Dhora
5	Gadabas, Bodo Gadaba, GutobGadaba, KallayiGadaba, ParangiGadaba, KatheraGadaba, KapuGadaba	22	MukhaDhora, NookaDhora
6	Gond, Naikpod, Rajgond, Koitur	23	Nayaks
7	Goudu	24	Pardhan
8	Hill Reddis	25	Porja, Parangiperja
9	Jatapus	26	Reddidora
10	Kammara	27	Rona, Rena
11	Kattunayakan	28	Savaras, KapuSavaras, MaliyaSavaras, KhuttoSavaras
12	Kolam	29	Sugalis, Lambadis, Banjara
13	Konda Dhoras, Kubi	30	Valmik
14	Konda Kapus	31	Yenadis, ChellaYenadi, KappalaYenadi, ManchiYenadi, ReddiYenadi
15	Kondareddis	32	Yerukulas, Koracha, DabbaYerukula, KunchapuriYerukula, UppuYerukula
16	Kondhs, Kodi, Kodhu, DesayaKondhs, DongriaKondhs, KuttiyaKondhs, Tikiria, Kondhs, YenityKondhs, Kuvinga	33	Nakkala, Kurvikaran
17	Kotia, Benthoriya, Bartika, Dulia, Holva, Sanrona, Sidhopaiko	34	Dhulia

Section 3: Baseline Findings and Observations

Major Baseline Findings

The study team visited a total of 18 sample tanks across all agro climatic zones in the state. Of the 18 tanks covered, 3 tanks (in Srikakulam, Visakhapatnam and Vizianagaram districts) were located in Fifth Schedule Areas and had a majority tribal population.

Table 3 List of Tribal Tanks selected for the Study

Sl	District	Village	Tank
1	Vizianagaram	Dummangi	Dummangi Cheruvu
2	Visakhapatnam	Similiguda	Similiguda Mini Reservoir
3	Srikakulam	Routhupuram	Routhupuram Pedda Cheruvu

In case of the remaining 15 tanks negligible tribal population was found. The baseline findings for the tribal development plan are therefore drawn from the three sample tanks located in the Fifth Schedule Areas and discussed in the following paragraphs.

Land Holdings

The land holding details of the farmers in the command area are given in Table. This includes the total land held by the farmers in the command area of the tank and outside. Total command area under three tanks is 461.00 acres. Data revealed that, land holdings of selected households (for Baseline study) are 84.42 acres in command area and 16.40 outside command area.

Table 4 Land distribution in sample tribal tanks

District	Tank Name	In command area (acre)	Outside tank command area (acre)
Srikakulam	R. L. Puram Pedda Tank	8.62	0.9
Visakhapatnam	Similiguda Tank	39.80	0
Vizianagaram	Domangani Tank	36.00	15.5
Overall		84.42	16.40
% Share		84	16

A majority (76%) of the ST respondents is marginal farmers, 16% small farmers, 45% medium farmers and 4% large farmers.

Table 5 Land ownership by farmer category in selected tribal tanks

District	Tank Name	Marginal	Small	Medium	Large	Total
Visakhapatnam	Similiguda Tank	11	2	2	0	15
Vizianagaram	Domangani Tank	10	3	0	2	15
Srikakulam	R. L. Puram Pedda Tank	13	2	0	0	15
Overall		34	7	2	2	45
% Share		76	16	4	4	100

Farmers are growing paddy in both Kharif and Rabi seasons in three tanks. Only Similiguda tank is cultivating horse gram crop during rabi season and no other crops grown by other two

tanks. *Some of the farmers 11 (24%) are gone to fields as agriculture labourers and cultivating their own land also observed in three tanks and no migration observed in three tanks.*

Land Owners and Leased-out in Command Area

Under the three tribal tanks 170 farmers (83%) ayacutdars were cultivating lands on their own, of this 20% were women ayacutdars. Whereas 35 farmers (17%) were farmers who leased, of this 15 farmers (7%) were women ayacutdars. Farmers who lease were found only in Srikakulam district.

Table 6 Land ownership pattern of tribal tanks

District	No. of WUAs	No. of Land Owners		Total Land Owners	No. of Farmers who lease		Total Farmers who Leased	Total Farmers	% farmers who lease to Land Owners
		Male	Female		Male	Female			
Visakhapatnam	1	46	9	55	0	0	0	55	0
Vizianagaram	1	25	25	50	0	0	0	50	0
Srikakulam	1	58	7	65	20	15	35	100	53.8
Total	3	129	41	170	20	15	35	205	20.6
% Share		63	20	83	10	7	17		

Crop Productivity

The main crop that was cultivated in the sample tanks was paddy in both the seasons. Instances of cultivation of any other crop were not found barring cultivation of horsegram in the Similiguda tank. The average productivity of paddy across the three sample tanks was 3.52 Tonne/Ha in Kharif season. The highest productivity of 3.92 Tonne/Ha is observed in Routhpuram Pedda Cheruvu of Srikakulam district and the lowest of 3.12Tonne/Ha observed in the Similiguda tank of Visakhapatnam district. During the Rabi season only two tanks namely Similiguda of Visakhapatnam district and Dommangi tank of Vizianagaram district cultivated paddy. The average productivity of paddy in rabi season is 3.99 T/Ha. Other than paddy, Horsegram crop cultivated in Similiguda tank with average productivity of 0.56T/ha.

Awareness Levels on Agricultural Practices

The levels of awareness of farmers on agricultural practices in the tribal tanks were found to be quite low. For instance, only 2.4% of the sample was aware of Integrated Nutrient Management and a similar proportion was aware of application of Farm Yard Manure and Vermi compost. There was no awareness regarding green manuring, micronutrient application, seed treatment, and weeding and water management.

Water User Association Organization and Stakeholders

Constitution of Water User Association (WUA): The baseline study shows that the WUAs were formed in all tanks as per the APFMIS Act. However, elections had not been conducted for WUAs after 2008. This however is not peculiar to tribal tanks but has been observed across all sample tanks.

Localized and Non-localized Ayacut: The major objectives of establishment of the institution of WUAs were to systematize the water distribution system, encourage judicious use of water and to help the Revenue Department in collection of water cess/ tax regularly from localized Ayacutdars. The data collected shows that apart from localized Ayacutdars, there are non-localized farmers (cultivators outside the command area) who also utilize tank

water for cultivation. The details of localized and non-localized areas under the tank indicated that an average of 6.5 per cent households is using tank water.

Managing Committee (MC) Membership: It was observed that all the sample tanks had WUA members as per the APFMIS Act provisions. However, there was no representation of females in the MCs.

Caste and Gender Wise Distribution of WUA MC Members: It was observed that most of the MC members were from ST community (88.9%), followed by the BC community (11.1%). There were no OC and SC members in any of the tanks. Women representation was not observed in any of the MCs.

Table 7 Caste and Gender wise distribution of WUA MC Members

Sl	District	Total WUA	Expected Number of Members	Actual Number of Members Present	Caste				
					SC	ST	BC	OC	Total
1	Visakhapatnam	1	6	6	0	6	0	0	6
2	Vizianagaram	1	6	6	0	5	1	0	6
3	Srikakulam	1	6	6	0	5	1	0	6
	Total	3	18	18	0	16	2	0	18
			%	100.0	0.0	88.9	11.1	0.0	100.0

Location of Land of MC Members in Command Area: Representation of middle reach farmers in WUAs was higher compared to head and tail reach farmers.

Table 8 Location of Land of MC Members in Command Area

Sl	District	Total WUA	Expected Members	Members Present	Location			
					Head	Middle	Tail	Total
1	Visakhapatnam	1	6	6	1	3	2	6
2	Vizianagaram	1	6	6	1	2	3	6
3	Srikakulam	1	6	6	3	3	0	6
	Total	3	18	18	5	8	5	18
				100.00	27.8	44.4	27.8	100.0

Educational Status of MC Members: Of the total 13 MC members 72.2% had received primary education and the remaining 27.8% had received secondary level education. MC members had not been provided any training since their election. They were not aware of the Andhra Pradesh Farmer Management of Irrigation Systems (APFMIS) Act, their roles and responsibilities and functioning of WUAs and all of them indicated that they required training.

Table 9 Educational Status of MC Members

Sl	District	Total WUA	Total Expected Members	Actually Present	Education			
					Primary	Secondary	College	Total
1	Visakhapatnam	1	6	6	5	1	0	6
2	Vizianagaram	1	6	6	5	1	0	6
3	Srikakulam	1	6	6	3	3	0	6

Sl	District	Total WUA	Total Expected Members	Actually Presented	Education			
					Primary	Secondary	College	Total
	Total	3	18	18	13	5	0	18
	%			100.0	72.2	27.8	0.00	100.0

Co-option of GP members: The APFMIS Act 1997 was amended in the year 2003 wherein co-option of GP members was incorporated in the WUAs. This is in line with the 73rd and 74th Amendment of Panchayat Raj Act. The amendment also focused on gender equity and suggested incorporation of one male and one female member in the WUA. This is the only specific provision in the Act to ensure women's representation in tank management. Co-option of GP members also becomes crucial to strengthen joint working of WUA and GP as the GP is seen as the 'owner' of all common property resources. The field study indicated lack of awareness and understanding of this important modality and co-option was not observed in any of the tanks.

Constitution of Sub-Committees: The APFMIS Act suggests constitution of sub-committees to carry out functions of tank management. As per the act, each WUA should constitute 4 sub-committees viz., works, finance, water management, and M&E and training. The Act suggests incorporation of other WUA members also in the constitution of these committees besides the Managing Committee members. This provision of the Act provides for facilitating day-to-day operations as well as helps in further decentralization / sharing responsibilities by tank users for tank improvement, maintenance and management along with the Managing Committee. The field study revealed that none of the WUAs had constituted sub-committees. This could primarily be attributed lack of awareness on constitution of Sub-Committee among members.

Office establishment and record maintenance: None of the tanks had offices and WUAs were operating either from the President's house or were using the Gram Panchayat office for meetings. The WUAs indicated that they were constrained by lack of funds in running the WUA offices and required funds for office establishment.

Meetings of MCs and GBs: As per the APFMIS Act MCs should conduct at least one meeting in a month and General Body meetings should be conducted twice a year. However, it was found that neither MC nor GB meetings were being conducted in any of the three tanks.

Water Management: Water management is one of the most important functions of WUA. Placing Neeruganti (Water distribution person) is a traditional practice followed in Andhra Pradesh and Government appointed lascars. Neither Lascars nor Neeruganti had been appointed for water management in any of the sample tanks and farmers were managing water distribution on their own.

Water Distribution: Water distribution schedules were not being prepared in any of the three tanks. There was no formal practice of water assessment and allocation before the season. Farmers had an informal understanding on rotation of ayacut based on water availability. Plans were not made for water scheduling and release and water when available in the tank was released continuously without rotation.

Disputes over Water Distribution: Disputes over water distribution were found in one tank in Srikakulam district and this related to inadequate water supply. The dispute was resolved through the efforts of the WUA.

Water Saving Methods: Efforts have been made to introduce micro irrigation technology (sprinklers and drips) among the farming community keeping. Adoption of water saving technology was quite low in tank areas. Only one tank had adopted of micro irrigation. Sprinkler technology was not used in any of the WUAs. Drip technology was used by ten farmers in Srikakulam district.

Financial Resources with WUA: None of the tanks had received funds from other sources and O&M plans were not being prepared. Water tax was not being collected in the sample three tanks. Revenue Department officials indicated that water tax was not being collected due to draught conditions in most tanks and this was corroborated by farmers.

Inferences from the Baseline Findings

Key inferences from the social assessment study include the following:

- **Economic Vulnerability:** A majority of the ST population is poor and has limited access to natural, financial and productive assets. A large proportion of the population is landless or has small and uneconomic land-holdings and has subsistence living conditions. The economic vulnerability of ST households lends them more susceptible to other shocks and distresses.
- **Low Crop Diversification and Productivity:** Low levels of crop productivity were observed in the sample tanks. This can be attributed to lack of adoption of improved practices of cultivation, inadequate water availability, inadequate access to advanced farm inputs and technical know-how and inadequate access to extension and support services.
- **Limited Access to Alternate Livelihood Sources:** Lack of adequate access to information and technical know-how affects the extent to which individuals from the ST community can take up alternative livelihood sources be it pisci-culture, piggery, goater, back-yard farming, poultry, duck-rearing, etc. They are also constrained in taking up newer occupations due to lack of capital for making initial investments.
- **Limited Ability to Negotiate with Intermediaries and Buyers:** Owing to the lack of appropriate marketing and negotiation skills members of the ST community are unable to appropriately bargain with intermediaries and buyers in the supply chain of their produce.
- **Limited Awareness on WUA Operations:** A majority of the community members and Ayacutdars are unaware of the provisions of the APFMIS and have low levels of access to information on aspects such as WUA and operations and management of tank systems. This affects their ability to effectively manage and contribute to WUA operations and activities such as conducting meetings and record keeping.
- **Lack of Awareness on Skill and Livelihood Development Programme:** Tribal youth have low levels of awareness of skill and livelihood development programs. This renders them constrained in terms of the extent to which they were able to become economically empowered.
- **Lack of Adequate Agricultural Marketing Infrastructure:** Discussions revealed that tribals perceived the existing marketing infrastructure such as agriculture market yards at the mandal level were unable to meet their needs. They were therefore mostly dependent on commission agents for sale of their commodities and produce.

- **Absence of Economies of Scale:** The quantities that the tribal communities are able to make available for sale are limited and there are no instances of collective purchases of inputs and sale of produce. Most the tribal population were not aware of farmer producer organizations/companies or any other organizations for collective sale and purchase.
- **Limited Involvement of Government Agencies:** The operations of Tribal Cooperative Marketing Development Federation of India (TRIFED) and Girijan Co-operative Corporation(GCC) were found to be limited and private agencies were found to be more active. For instance, some private agencies were found to be procuring medicinal herbs at cheap prices from tribals.

The data presented from the household surveys illustrates that despite constitutional safeguards, various policy provisions and regulations and different development programs being implemented in the state, tribal sections continue to remain backward and poor. Keeping in view these problems and issues which have evolved overtime and with a view to remove the socio-economic constraints faced by them, there is a need for the PPF to address the issues specific to the proposed tank management project. This being a project focused on minor irrigation tanks, it would be unrealistic to assume that all the issues discussed will be addressed in their entirety by the project. There are several programs of the GoAP and GOI addressing most of these issues (discussed in the following section) and it would be appropriate that the project create implementation strategies to dovetail such development programs for the benefits of the tribal community in sub-project areas. The project would also focus on issues that directly relate to tribal people accessing project benefits.

Section 4: Legal and Institutional Framework

Applicable Legislations of GoI and GoAP

The Government of India has framed many policies and laws to safeguard the interest of the Scheduled Tribes. Article 366(25) of the Indian constitution refers to STs as those communities who are scheduled in accordance with Article 342 of the Constitution. According to Article 342 of the constitution, STs are the tribes or tribal communities or part of or groups within these tribes and tribal communities which have been declared as such by the President through a public notification. The applicable national and State legislations and World Bank Operational Guidelines are provided in Table 10:

Table 10 Applicable Legislations of GoI and GoAP

Sl	Act / Policy	Salient Features
Government of India		
	The Constitution (73rd Amendment) Act, 1992	<ul style="list-style-type: none"> • The Constitution (73rd Amendment) Act, 1992 vests power in the State Government to endow Panchayats with such powers and authority as may be necessary to enable them to function as institutions of self-government such as: preparation of plans and their execution for economic development and social justice in relation to 29 subjects listed in the XI schedule of the Constitution. It vests authority to Panchayats to levy, collect and appropriate taxes, duties, tolls and fees and transfers taxes, duties, tolls and fees collected by the States to Panchayats. • The Act mandates provisions for: <ul style="list-style-type: none"> ▪ Establishment of a three-tier structure (Village Panchayat, Panchayat Samiti or intermediate level Panchayat and Zilla Parishad or district level Panchayat). ▪ Establishment of Gram Sabhas at the village level. Regular elections to Panchayats every five years. ▪ Proportionate seat reservation for SCs and STs. ▪ Reservation of not less than 1/3 seats for women. ▪ Constitution of State Finance Commissions to recommend measures to improve the finances of Panchayats.
	5th Schedule of Constitution (Article 244 (1))	<ul style="list-style-type: none"> • The schedule has been added to the Constitution to protect the cultural identity and economic rights of the tribal people. • The schedule provides for the administration and control of Scheduled Areas and Scheduled Tribes. In pursuance of this schedule, the President of India had asked each of the states to identify tribal dominated areas. Areas thus identified by the states were declared as Fifth Schedule Areas. • The schedule enables the Government to enact separate laws for governance and administration of the tribal areas. Para 5 of the schedule divulges the power to the Governor of the State to define laws applicable to the Scheduled Areas. Specifically, the Governor of the state can make regulations that may: <ul style="list-style-type: none"> ▪ Prohibit or restrict the transfer of land by or among members of the Scheduled Tribes in such areas;

SI	Act / Policy	Salient Features
		<ul style="list-style-type: none"> ▪ Regulate allotment of land to members of the Scheduled Tribes in such area • Some of the proposed projects will be located in the Schedule V areas and in such cases the provisions of Tribal Peoples Planning Framework (TPPF) will be triggered
	<p>The Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Rules, 1995</p>	<ul style="list-style-type: none"> • The Act provides for specific provisions to prevent atrocities on the Scheduled Castes and the Scheduled Tribes and suggests State Government to frame rules for the same. • Provisions include identification of areas where atrocity may take place or there is an apprehension of reoccurrence of an offence under the Act. The State Government is required to set up a Scheduled Castes and the Scheduled Tribes Protection Cell at the State headquarters under the charge of Director of Police, Inspector-General of Police. This Cell is responsible for conducting survey of the identified area; maintaining public order and tranquillity in the identified area; recommending to the State Government for deployment of special police force or establishment of special police post in the identified area; and restoring feeling of security amongst the members of the Scheduled Castes and the Scheduled Tribes
	<p>Panchayat Extension to Scheduled Areas Act (PESA), 1996</p>	<ul style="list-style-type: none"> • The Act provides for extension of provisions of Part IX of Constitution relating to Panchayats to the Scheduled Areas. As per the provisions, every village in Schedule V areas will have a Gram Sabha which will approve of the plans, programmes and projects for social and economic development before such plans, programmes and projects are taken up for implementation at village level. • Some of the proposed projects will be located in the Schedule V areas and in such cases the provisions of Tribal Peoples Planning Framework (TPPF) will be triggered
	<p>The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006</p>	<ul style="list-style-type: none"> • This Act grants legal recognition to rights of traditional forest dwelling communities/s • This Act is for those who either primarily reside in forests and forest lands or depend on forests and forest land for a livelihood.
Government of Andhra Pradesh		
	<p>Andhra Pradesh (Andhra Scheduled Areas) Estate (Abolition and conversion into Ryotwari) Act; Andhra Pradesh Mutta (Abolition and conversion into Ryotwari) Regulation, 1948 and 1969</p>	<p>These are land mark enactments and promulgations that facilitated state ownership of private estates and lands in the scheduled areas and paved way for settlement of land tenure. Prior to these enactments and promulgations lands in the scheduled areas were under private ownership in the form of estates. In the scheduled areas of Visakhapatnam and East Godavari districts, the then rulers granted 'Mokasas' and 'Mutta rights' to certain individuals in recognition of service rendered by them like assisting in collection of land revenue, maintaining law and order etc. Since these were basically grants, the tribals did not have absolute rights over these properties. Through abolition of Estates the state paved way for settlement of rights of all the tribal tenants who tilled these lands. Further through abolition of</p>

SI	Act / Policy	Salient Features
		Mutta rights and their conversion as Ryotwari Pattas, the Mokasas and the Mutta rights were settled in favour of the tribals who tilled these lands.
	Andhra Pradesh Scheduled Areas Land Transfer Regulation, 1959	This promulgation extended the provisions of the Agency Tracts Interest and Land Transfer Act, 1917 of the former Madras presidency to the scheduled areas of the Andhra region (Srikakulam, Vizianagaram, Visakhapatnam, East Godavari and West Godavari districts) of the reorganized state of Andhra Pradesh
	Andhra Pradesh Scheduled Castes Sub Plan and Tribal Sub Plan (Planning, Allocation and Utilization of Financial Resources) Act No. 1, 2013	The Act aims to ensure accelerated development of Scheduled Castes and Scheduled Tribes with emphasis on achieving equality focusing on economic, educational and human development along with ensuring security and social dignity and promoting equity among SCs and STs by earmarking a portion in proportion to the population of SC and ST in the state, of the total plan outlay of the state of Andhra Pradesh as the outlay of the SC Sub Plan/ Tribal Sub Plan of the state.

Schemes for Tribal Welfare and Development

A list of the key schemes established for tribal welfare and development is provided in Table 11.

Table 11 Applicable Legislations of GoI and GoAP

Sl.	Scheme	Description
1.	Tribal Sub-Plan (TSP)	<ul style="list-style-type: none"> TSP falls within the ambit of state plan meant for the welfare and development of tribals. It is a part of the overall plan of the state and the benefits given to the tribals and tribals areas from the TSP are in addition to what percolates from the overall plan of a state. The sub-plans identify the resources for TSP areas, prepare a broad policy framework for the development and define a suitable administrative strategy for its implementation. The most significant aspect of this strategy is to ensure flow of funds for TSP areas at least in equal proportion to the Scheduled Tribes population of the state. In Andhra Pradesh State, the TSP area covers the Scheduled Areas and non-scheduled villages with 50 per cent of tribal concentration in the districts of West Godavari, East Godavari, Visakhapatnam, Vizianagaram and Srikakulam. For the purpose of taking up an appropriate programme for the tribals the tribal areas under the TSP have been categorized into ITDAs, MADA, Cluster, DTDP and PTDP.
2.	Integrated Tribal Development Agencies (ITDA)	In order to give operational effect to the tribal sub-plan approach, areas of concentration tribal population have been identified and separate administrative units in the form of ITDAs were established for integrated development in 1975. Under the sub-plan approach ITDAs were established in the districts of West Godavari, East Godavari, Vishakhapatnam, Vizianagaram, Srikakulam and Nellore.

Sl.	Scheme	Description
3.	Modified Area Development Approach (MADA)	After removal of area restriction as per the provisions of Scheduled Castes and Scheduled Tribes Orders (Amendment) Act 1976, the Yerukala, and Lambadas became Scheduled Tribes. This change necessitated extending developmental activities on large scale to tribals living in plain areas. Three criteria have been laid down for identification of the tribal pockets under MADA. (1) A minimum Population of 10,000. (2) 50 per cent of the population in the pockets should belong to Scheduled Tribes. (3) Village in the pockets should be contiguous. In accordance with above guidelines MADA pockets are identified and sanctioned in Andhra Pradesh. These pockets are in Srikakulam, Krishna and Guntur districts.
4.	Cluster Approach	Beyond the MADA pockets, there are small areas of tribal concentration. These are called as clusters. Contiguous areas having a population of 5000 or more with at least 50 per cent tribal concentration are identified as clusters. These clusters are smaller pockets of tribal concentration. In Andhra Pradesh, the districts are Vizianagaram, Vishakhapatnam and West Godavari districts. For all round development of tribals in these clusters, assistance is provided for implementation of individual and community benefit-oriented programmes.
5.	Micro Points for Primitive Tribal Groups (PTDP)	<ul style="list-style-type: none"> • Micro level planning was considered quite essential for the primitive tribes. The developmental projects meant for the primitive tribal communities are known as Micro projects. To ensure special attention for the development of the primitive tribes as well as to bring about their all-round uplift. • These Micro Projects aim at bringing about socio-economic development of a group of families in a compact area. They are made to refine and improve upon the traditional vocation of primitive tribes residing in the micro project areas while planning for their social and economic development. Emphasis is given on implementation of individual benefit-oriented schemes as well as development of critical infrastructure in the project area. Unlike the tribes of other areas, the primitive tribes covered under micro project are allowed to avail 100 per cent subsidy under individual benefit schemes. The projects also aim at developing the core economic sectors like agriculture, horticulture, soil conservation and animal husbandry. Besides them facilities of drinking water, education and health are also provided under these projects. The schemes that are being introduced for the development of the other tribes will not be applicable to them. Based on their cultural specialties, ecosystem and aptitude, core programmes have been identified for different primitive groups.
6.	Dispersed Tribal Development Programme (DTDP)	<ul style="list-style-type: none"> • The programme for the development of the dispersed tribal population remaining outside the coverage of ITDA, MADA and Micro Projects, is being implemented from the Sixth Five Year Plan. This programme is known as Dispersed Tribal Development

Sl.	Scheme	Description
		Programme. Implementation of DTDP has been extended to cover the entire dispersed tribal population in the Andhra Pradesh State.
7.	Andhra Pradesh Tribes Cooperative Finance Corporation Limited (TRICOR)	Andhra Pradesh Tribes Cooperative Finance Corporation Limited was established in 1976 and its area of operation extends over the entire state of Andhra Pradesh. TRICOR provides financial assistance, agriculture credit, skill upgradation and support to self-help groups.
8.	Girijan Cooperative Corporation Limited (GCC)	The GCC is a public sector undertaking of Government of Andhra Pradesh. The GCC established for the socio-economic uplift of tribals in the state of Andhra Pradesh. The GCC is a state level organization with one regional office, 10 divisional offices, 43 Girijana Primary Cooperative Marketing societies (GPCMS) and 839 DR Depots which work in close coordination with ITDAs.
Economic Development Schemes		
9.	Economic Support	Financial assistance is given to take up economic development programmes for Scheduled Tribes under schemes such as agriculture, horticulture, sericulture, coffee plantation etc.
10.	Integrated Area Development Programme	<ul style="list-style-type: none"> • This programme has been established to take up family oriented income generating schemes for Scheduled Tribes (Special Central Assistance to Tribal Sub-Plan). • Schemes under Article 275(1) - to bridge critical gaps in infrastructure by taking up infrastructure development facilities such as BT roads, minor irrigation schemes, amenities to tribal welfare educational institutions etc. • Schemes under Tribal Area Sub-Plan -to provide quality education and amenities/additional accommodation to tribal welfare educational institutions/educational institutions in tribal areas.
11.	Development of Primitive Tribal groups	<ul style="list-style-type: none"> • Special projects approved by Government of India for development of PTGs are taken up under this with equal matching grants from state government.
12.	Coffee Plantation Project	<ul style="list-style-type: none"> • Under this the coffee plantation project is taken up in ITDA, Paderu at Vishakhapatnam district and about one lack acres of area is under coffee plantation.
13.	Other Schemes	<ul style="list-style-type: none"> • Monetary Relief and Legal Aid to the Victims of Atrocities • Promotion of Inter Caste Marriages • Research Fellow Scholarships • Laying of Roads - Infrastructure facilities are taken up in tribal areas with assistance from NABARD. Under this BT roads, drinking water sources etc. are provided. • Health Insurance -The department of tribal welfare has introduced a "Student Health Insurance" and "Personal

Sl.	Scheme	Description
		<p>Accident Policy” under the name of Rajeev Girijana Raksha to provide immediate medical care through reputed private hospitals up to Rs. 5000 in all cases and up to Rs. 50,000 in emergency cases.</p> <ul style="list-style-type: none"> • Grain Banks - To provide food security to all PTGs families. 4563 Grain Banks are established in tribal areas in the ITDAs of Andhra Pradesh state.

Applicable World Bank Operational Policy Guideline

The World Bank Safeguard Policy with regards to Scheduled Tribes is indicated in Table 12.

Table 12 Applicable World Bank Safeguard Policy with regards to STs

<p>OP/BP 4.10: Indigenous People</p>	<ul style="list-style-type: none"> • This policy refers to a distinct, vulnerable, social and cultural group such as Scheduled Tribes or Tribal Folks. People who have lost collective attachment to geographically distinct habitats or ancestral territories in project areas because of forced severance remain eligible for coverage under this policy. Majority of tribals are socially and economically weak, prone to vulnerability and often feel excluded from development initiatives • To ensure project benefits on par with others, specific targeting is essential and accordingly in line with the Bank's OP 4.10, a Tribal Peoples Planning Framework (TPPF) has been prepared which includes measures to enhance the positive impact of the project for Scheduled Tribes
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Section 5: Stakeholder Analysis

A stakeholder analysis has been undertaken to identify the issues and the concerns of the stakeholders who are supposed to be directly or indirectly impacted/benefited by the project or assume a position wherein they can have a significant role to play in project implementation. The analysis has been carried out to identify existing relationships and also to understand the roles, responsibilities and relations of these stakeholders in context of shaping social issues with respect to the proposed project.

Identification of Major Stakeholders

Stakeholders across tank, village, panchayat, sub-district, district and state levels were interacted with. While some of these stakeholders are directly benefitted/involved and others would be indirectly involved. A list of project stakeholders at various levels is provided in Table 13.

Table 13 List of Project Stakeholders

Village/ Tank level	
Primary Stakeholders	Secondary Stakeholders
1. Community: <ul style="list-style-type: none"> ○ Scheduled Tribe Community including farmers, women, fisher folk, agricultural labourers, non-farm wage workers, cattle grazers etc. 2. Groups: <ul style="list-style-type: none"> ○ Water User Associations ○ Women's SHGs 3. Government and PRI Representatives <ul style="list-style-type: none"> ○ Ward members/representative ○ Government functionaries such as Village Revenue Officer, Minor Irrigation Work Inspector, Village Agriculture Worker, Panchayat Secretary etc. 4. Other service providers	1. Traders and Retailers 2. Local credit institutions (money lenders, pawn brokers etc.) 3. Government Staff: <ul style="list-style-type: none"> ○ Anganwadi staff and ANMs ○ Primary school teachers
Panchayat level	
Primary Stakeholders	Secondary Stakeholders
1. President/Sarpanch (Gram Panchayat) 2. Technical Assistants (NREGA) 3. Village Agriculture Worker 4. Fishery Department officers 5. Animal Husbandry/Livestock Department officers 6. Horticulture Department officers 7. Forest Department officers 8. Integrated Tribal Development Agency (ITDA) and other Tribal Welfare and Development Agencies staff	1. Traders (rice traders and fish traders, vegetable and fruit vendors etc.) 2. Retailers (sellers of products like agriculture seeds, pesticides, fertilizers and implements) 3. Millers 4. Transporters 5. Money Lenders 6. Media
Sub-division Level	
Primary Stakeholders	Secondary Stakeholders
1. Water Resources Department Staff - Assistant Engineers, Deputy Executive Engineers 2. Support Organization (SO) Staff 3. Agriculture Officer, Additional District Agriculture Officer 4. Horticulture Officer 5. Fisheries Development Officer	1. Traders (rice traders and fish traders, vegetable and fruit vendors etc.) 2. Retailers (sellers of products like agriculture seeds, pesticides, fertilizers and implements) 3. Millers 4. Transporters 5. Bankers/ Financial Institutions

Village/ Tank level	
Primary Stakeholders	Secondary Stakeholders
6. Agriculture Market Yard Officer 7. Integrated Tribal Development Agency (ITDA) and other Tribal Welfare and Development Agencies staff	6. Media
District Level	
Primary Stakeholders	Secondary Stakeholders
1. Water Resources Department Staff- Executive Engineer 2. DPU, APIIATP 3. Joint Director and Additional District Agriculture Officer 4. Soil Conservation Officer 5. Assistant Director, Horticulture 6. Revenue Divisional Officer 7. Assistant Director Veterinary Officer 8. Divisional Forest Officer 9. Project Director-DRDA 10. District Fishery Officer 11. Support Organization (SO) Staff	1. Public Representatives 2. NGOs, Resource Organizations and Activists working on Tribal issues 3. Media 4. Technical and Research Institutions
State Level	
Primary Stakeholders	Secondary Stakeholders
1. Project Management Unit, APIIATP 2. Chief Engineer, Minor Irrigation 3. Directorate of Agriculture and Food Production 4. Directorate of Horticulture 5. Directorate of Soil Conservation 6. SC & ST Development department 7. Directorate of Animal Husbandry & Veterinary Services 8. Directorate of Fisheries; Revenue Department; 9. Department of Water Resource 10. Training Institutions 11. Department of Women & Child Development 12. Department of Forest	1. Public Representatives 2. NGOs, Resource Organizations and Activists working on Tribal issues 3. Media

Expectation of Stakeholders

Stakeholders have a number of expectations from the proposed project. Key expectations indicated by some of the major stakeholders during the course of discussions are summarized in Table 13.

Table 13 Key Expectations of Major Stakeholders

Stakeholders	Expectations
Scheduled Tribe Community	<ul style="list-style-type: none"> • Protection of their socio, economic, political rights • Access to project activities and benefits • Capacity building to contribute more effectively in WUAs • Capacity building to undertake activities in agriculture and other allied sectors more effectively and efficiently • Financial assistance for purchase of seeds, fertilizers, pesticides etc.

Stakeholders	Expectations
	<ul style="list-style-type: none"> • Assured irrigation during dry seasons through steps like drilling of bore wells • Financial assistance for income-generating activities in livestock sector- mostly dairying and sheep/goat rearing • Backward and forward linkages such as marketing, fodder and veterinary services
Farmers	<ul style="list-style-type: none"> • Renovation of tank structures and water distributary systems • Adequate water storage in tank reservoirs for all season cultivation • Mechanisms through which tail end farmers can access tank water • Availability of extension services such as subsidized seeds, fertilizers, pesticides and technical know-how on aspects such as multi-cropping, cultivation of cash crops and light-duty crops • Inclusion of marginal and vulnerable farmers in WUAs and consideration of their requirements
Agricultural Labour and Landless	<ul style="list-style-type: none"> • Availability of wage earning opportunities on account of renovation, operation and maintenance of tank systems • Increased number of annual cultivations leading to increased agricultural labour work • Increased involvement in various tank based livelihood opportunities like pisciculture, duck rearing, fingerling cultivation, fodder cultivation etc. and in household enterprises such as rice processing units etc.
Fisheries Groups	<ul style="list-style-type: none"> • Round the year water retention in tanks • De-siltation of tank bed for creating adequate water storage facility for pisciculture • Clearing weeds and stumps in the tank bed for making it suitable for pisciculture • Adoption of a transparent mechanism for leasing out tanks by Panchayats • Effective resolution of conflicts with farmers by Panchayat • Training and infrastructural support such as boats, nets, fish-houses etc. • Consultation by farmers or WUA Committee members with fishery groups prior to opening sluice gates
Women's SHGs	<ul style="list-style-type: none"> • Increased involvement in tank development activities • Convergence between APIIATP and various livelihood schemes such as Mahatma Gandhi National Rural Employment Guarantee Scheme which would enable women to take up income-generating activities • Involvement in supervision of treatment activities • Provision of a special grant or fund for SHGs • Interventions for improving level of drinking water availability • Participation in monitoring tank development activities • Training and capacity building for development of livelihood and leadership skills
Cattle Grazers and Livestock Owners	<ul style="list-style-type: none"> • Increased fodder availability; new and drought-resistant forage crops; use of common lands for growing fodder crops • Increased water availability for livestock through water conservation measures • Veterinary services • Market facilities

Stakeholders	Expectations
	<ul style="list-style-type: none"> • Financial assistance for either starting or improving livestock-based activities
PRI Members	<ul style="list-style-type: none"> • Capacity building on provisions of tribal acts • Awareness on project activities
Minor Irrigation Department	<ul style="list-style-type: none"> • Provision of adequate funds for renovation of tank systems • Sensitization of tank users through awareness programs • Training and capacity building of WUA members before handing over tank renovation work • Increased field staff support e.g. increase deployment of Work Inspectors, AEs and JEs • Convergence systems at block and district levels to ensure inter-departmental coordination • Support from social development agencies for formation and strengthening of WUAs • Adequate fund flow for regular and timely renovation and maintenance work of tank systems
Tribal Welfare and Other Tribal Development Agencies of the Government	<ul style="list-style-type: none"> • Capacity building of tribals on project and other government schemes • Capacity building to WUAs to perform better in tank management activities • Adequate funds to the agencies to provide required support to tribals
Agriculture Department	<ul style="list-style-type: none"> • Construction of proper water distribution channels which would benefit farmers • Availability of support for providing trainings to farmers on agriculture practices • Provision for appointing village level animators to assist WUAs in awareness and mobilisation activities • Availability of support to provide agriculture inputs to farmers and take up demonstrations and exposure visits
Fishery Department	<ul style="list-style-type: none"> • Maintained of adequate water levels in the tank to allow for fishing activity • Availability of support from Government for stocking of fingerlings at tank level • Availability of support from Minor Irrigation Department in developing fish nursery tanks • Availability of support from Minor Irrigation Department in clearance of weeds and stumps in the tank bed • Availability of support to start polyculture or single prawn crop culture • Fund support for training of Fishing Cooperative Society and providing infrastructural support like boats, nets, pump-sets, etc. • Preference to traditional fishermen groups in project design • Collection of water charges from fishery groups in proportion to quantity of fish production

Findings and Consultations

Consultations were held at tank and district levels and the key aspects and issues that emerged from these discussions are summarized as follows:

- There was poor awareness among the community on existing schemes of the Government for the development of tribals
- Domination by a few well to do / influential / opinion leaders in the local planning process was observed
- There was lack of awareness on modern agricultural technologies leads to excessive application of fertilizers and pesticides, leading to high expenditure on inputs and low returns
- None of the tribal households had bore wells adopted drip or sprinkler technologies.
- Due to poor awareness on tank management and institutional arrangements at Government level, articulation of issues related to these aspects was found to be low.
- Though majority of the WUA MC members were from tribal communities, their roles were found to be minimal. The members were found to be poorly informed about the APFMIS Act and their respective roles and responsibilities. Records and registers and other infrastructure facilities were not provided to Committees to discharge their duties.
- Participation in planning processes and operation and maintenance of tank system was nominal.
- General Body meetings and Managing Committee meetings were not conducted and recording of maintenance was completely absent. The Committees were also found to rarely if at all take charge of tank management
- The financial position of WUAs was found to be poor and they were not in a position to take up simple tasks.

Section 6: Tribal People’s Planning Framework

Objective

The objectives of the TPPF are to ensure that if tribal people are affected by a project/scheme,

- Tribal people are adequately and fully consulted;
- Tribal people take part in the entire process of preparation, implementation and monitoring of project activities;
- Project benefits are equally accessible to the tribal living in the project area; they are provided with special assistance as per prevailing laws and policies because of their culture identities and to minimize further social and economic imbalances within communities;
- Developing an institutional and implementation arrangements as well as capacity building measures for the implementation of the TPPF, associated disclosure mechanisms and addressing any grievances; and
- Monitoring and reporting arrangements, including mechanisms and benchmarks appropriate to the project. This includes a grievance redress mechanism has also been developed to resolve grievances, if any.

Strategy

Representation in Water User Association

Water User Associations are basic units at the tank level to ensure that the tribal families participate in the process and derive project benefits. In the scheduled areas majority of the WUA members and Managing Committee members would be tribals, however in non-scheduled areas also inclusion of tribals in committees needs to be increased. Inclusion of tribals will be instrumental in bringing in transparency and accountability in project implementation. As WUAs will have greater participation of tribal people in scheduled areas, they will ensure that project benefits are accessed by target tribal families. Association with WUAs in local planning process will be helpful to identify and address the needs of tribals in a more comprehensive manner.

Participatory Planning in Project Development at tank-level

The planning will help to identify key expectations of the households under the tank of the project. The planning process, will help in improving participation of the all households including women and create a platform where they can share their issues and suggest solutions. The plans prepared by the WUA will be presented at the Gram Sabha for approval. Participatory planning in project development at tank-level would include the following presented in Table 14:

Table 14 Issues and Challenges, and Proposed Project Interventions

Sl	Issues and Challenges	Project Intervention
1.	Poor understanding and awareness on tank management, agriculture and related activities	Ensuring mandatory representation in the WUA for tribals in the scheduled areas. Encouraging and enabling tribal people to get elected as members of Managing Committees in the non-scheduled areas. Conducting exclusive training programmes for tribal people.

SI	Issues and Challenges	Project Intervention
2.	Poor participation in planning process	Conducting net planning (household level planning) Engaging community through conducting planning on participatory methods such as transect walk, and resource mapping Conducting planning on tank management, agriculture, horticulture, fisheries, groundwater, water management Organizing self-monitoring of project activities Engaging the services of NGOs and Participatory Planning Experts for organizing participatory planning exercises Display of plan documents on village maps

Project Administration as per PESA Act Provisions

Execution of the project and its administration in the scheduled area will abide by the PESA Act, i.e., planning will be made at the GP level and approval of the plan at the Gram Sabha and its implementation.

Capacity Development

The project has made provisions for the capacity development of all stakeholders, including tribal. They will be oriented on different tank management, agriculture, horticulture, fisheries, water management in a structured manner. Exposure visits will also be organized for them to make them learn along with exposure to development models. Further, farmers will be linked to resource organizations like Agriculture Regional Institutions, Universities, Research Stations and Subject Experts.

Tribal Inclusion Approach

Under APIIATP project 177 tribal tanks were selected and the list of tanks has been given as annexure with this document. A combination of strategies and actions discussed earlier are linked to the four stages of the project cycle; pre-planning, planning, implementation and post-implementation. The project will have exclusive strategic focus for greater inclusion and representation of tribal in scheduled areas and their active association in project interventions. The strategy proposed for inclusion of tribal communities is presented in Tables 14.

Table 14 Project Approach and Strategy and Expected Outcomes by Project Stages

Project Stages	Project Approach and Strategy	Expected Outcome
<i>Pre-planning</i>	<ul style="list-style-type: none"> ▪ Discussion with tribal families/ farmers of the project tanks in scheduled areas on project components and activities. ▪ Forming groups with tribal households for focussed attention ▪ Identifying key issues for their greater involvement and benefitting from the project interventions ▪ Identifying and training resource agencies and persons for conducting planning process 	<ul style="list-style-type: none"> ▪ Key intervention areas are identified and guidelines prepared for improved participation of tribal in general and tribal farmers, in particular. ▪ List of actions finalized for implementation to ensure greater Involvement and participation of tribal by activities.

Project Stages	Project Approach and Strategy	Expected Outcome
	<ul style="list-style-type: none"> ▪ Preparing required templates and resource material 	<ul style="list-style-type: none"> ▪ Tribal households form into groups.
<i>Planning state</i>	<ul style="list-style-type: none"> ▪ Conducting farmers-wise and cluster wise planning ▪ Applying multiple participatory methods for identification of works and activities to be taken up under the project ▪ Preparing list of activities based on the priority given by the tribal farmers ▪ Preparing household specific plan of action for better inclusion of tribals in different activities 	<ul style="list-style-type: none"> ▪ All farmers' requirements are listed. ▪ Greater participation of tribals, WUA leaders, resource agencies and women in planning process. ▪ Tribal families will have knowledge of different works to be taken up under the project.
<i>Implementation</i>	<ul style="list-style-type: none"> ▪ Priority to tribal farmers in providing project inputs ▪ Equal opportunities to tribal farmers in non-scheduled tribal and dispersed areas. ▪ Priority to activities that are identified during the planning process ▪ Promoting community contribution ▪ Entrusting certain works to the community ▪ Convergence with Tribal Welfare and other government departments ▪ Priority to tribal households in creating infrastructure ▪ Ensuring greater participation of tribal farmers in implementation of project activities and sub-activities ▪ Taking measures, adhering to the scope of the project to build the capacity of tribal farmers in agriculture technologies, marketing, institution management as per the project requirement. ▪ Taking measures that are legally binding under PESA 	<ul style="list-style-type: none"> ▪ Participation of tribal families in implementation of project activities ▪ Participation of tribals in community contribution activities. ▪ Better operation and maintenance of tanks systems. ▪ Better monitoring of project activities. ▪ Adoption of effective water management and agriculture practices by the tribal farmers.
<i>Post Implementation</i>	<ul style="list-style-type: none"> ▪ Training of tribals on self-monitoring of project activities ▪ Promoting community involvement through physical and financial contributions ▪ Initiating corrective measures based on community monitoring feedback ▪ Documenting success that ensures greater participation of tribals. 	<ul style="list-style-type: none"> ▪ Better monitoring systems in place ▪ Greater participation of tribals in participation in monitoring and documenting project activities. ▪ Better operation and

Project Stages	Project Approach and Strategy	Expected Outcome
		maintenance of tank and other systems established through the project.

Tribal Development and Inclusion Framework

Table 15 Tribal Development and Inclusion Framework: Activities, Key Challenges and Project Approach

Activity	Sub-Activities	Key Challenges	Project Approach
Component A: Improving Irrigated Agriculture Efficiency at Farm level			
Institutional Strengthening & Capacity Building of WUAs	<ul style="list-style-type: none"> • Formation of New WUAs • Capacity Building of WUAs • WUA Office Infrastructure • Engagement of Para Workers • Transparency & Public Disclosure • Support Organisation 	<ul style="list-style-type: none"> • The present approach of Water Resource Department towards forming and strengthening of Committees is unsound and weak • Less importance to capacity building activities 	<ul style="list-style-type: none"> • The project will sensitize WUA members to adopt democratic methods in selection of their leaders. • The project will give due importance to capacity building interventions
Improving Small Holder Irrigation System Performance and Resilience	<ul style="list-style-type: none"> • Cascade Identification and Tank Selection Process • Cascade Development Plan (CDP) • Dam Safety Plan Preparation • Tank Bund Strengthening & Aligning • Catchment Treatment of Cascades • Installation / Repair of Head Regulator / Sluice • Construction / Repair of Canal System • Cleaning Feeder Channels • Cleaning Main Canal, Branch Canal & Distributaries 	<ul style="list-style-type: none"> • Water Resource Department field level staff indifferent to participatory system of planning processes • Viewing operation and maintenance of tank systems not WUA responsibility 	<ul style="list-style-type: none"> • Engaging the services of support organization for mobilization of farmers and sensitizing them on operation and maintenance issues
Improving Water Productivity and Efficiency	<ul style="list-style-type: none"> • Crop Water Budgeting • Strengthening the Data Centres • Resource Estimation Using the Data • Satellite Based Imaging and Data Analysis on 	<ul style="list-style-type: none"> • Poor participation in WUA meetings • Paddy predominance • Insufficient knowledge on raising other crops • Lack of seed and other inputs 	<ul style="list-style-type: none"> • Project will engage the services of Support Organization and intensive activities on social mobilization and

Activity	Sub-Activities	Key Challenges	Project Approach
	Cascade Basis <ul style="list-style-type: none"> • Crop Planning • Training of WUA / Farmers • Crop and Technology Adoption • Water Flow Measurement • Water Use Efficiency: Micro Irrigation • Water Productivity • Participatory Groundwater Management (PGM) 	<ul style="list-style-type: none"> • Absence of progressive farmers to take up innovative methods 	meetings would be taken up. <ul style="list-style-type: none"> • Training and placing progress individuals from the community. • Sensitization through exposure visits and trainings.
Component B: Promoting Adaptive Sustainable Agriculture Practices			
Climate Smart Diversified Agriculture Production System	<ul style="list-style-type: none"> • Agriculture Intervention • Horticulture Intervention • Implementation Arrangement 	<ul style="list-style-type: none"> • Farmers under tank irrigation comfortable with paddy and may not prefer horticulture and plantation 	<ul style="list-style-type: none"> • Sensitization through exposure visits and input support
Innovation and Technology Transfer for Fish Production	<ul style="list-style-type: none"> • Augment Quality Fish Seed Production • Enhance Fish Production • Post-Harvest and Market Access / Linkage • Capacity Building 	<ul style="list-style-type: none"> • Fishing season is limited in tank • Water levels could not be maintained • Market is within the village and nearby villages 	<ul style="list-style-type: none"> • Secondary source of water in addition to tank water (borewells) • Provision of refrigerators at tank level
Component C: Climate Friendly Market and Agri-Business Promotion			
Post-Harvest Management, Market and Agribusiness Model for Horticultural Crops	<ul style="list-style-type: none"> • Rural Markets / Apni Mandi / Direct Markets • Low Cost Produce Storage Structures Error! Bookmark not defined. • Refrigerated Transport Vehicles • Evaporative Low Energy Cool Chamber Error! Bookmark not defined. • Establishment of Cold Storage 	<ul style="list-style-type: none"> • Majority of the farmers are growing paddy and few are in horticulture and shifting may take time 	<ul style="list-style-type: none"> • To include farmers who are raising horticulture crops to take up storage activities • Linkage with National Horticulture Mission for technical and financial assistance • Exposure visits to existing storage units and markets • Extensive training

Activity	Sub-Activities	Key Challenges	Project Approach
			on the subjects <ul style="list-style-type: none"> • Linkages with Resource and Technical agencies
Agriculture Market Transformation and Value Addition (Agribusiness)	<ul style="list-style-type: none"> • Establishing Market Linkage-eNAM • Supply and Value Chain Analysis • Export Direct Linkage with FPOs / FPCs • Agri Watch • Risk Mitigation Fund (RMF) 	<ul style="list-style-type: none"> • Farmers unwillingness to come forward to collective activities with regards to marketing. • Powerful middlemen in marketing • Dependency on input dealers for inputs 	<ul style="list-style-type: none"> • Conducting feasibility studies in participatory methods. • External Agencies support and handholding.

Section 7: Implementation and Institutional Arrangements

Institutional Arrangement for Tribal Development

Institutional arrangements proposed for tribal development activities in APIIATP are presented in Table 16.

Table 16 Institutional Arrangements for Tribal Development

Level	Institution	Location	Vested Authority	Key Function
State	Project Steering Committee	Vijayawada	Chairman of PSC	<ol style="list-style-type: none"> 1. Overall Policy Guidance; 2. Support in Planning (from state perspective); 3. Facilitate / Foster Convergence; 4. TPPF Review and Control
State	PMU	Vijayawada	State Project Director (SPD)	<ol style="list-style-type: none"> 1. TPPF Planning and Management; 2. Coordination with Partner Departments / Institutions; 3. Rendering Technical and Financial Support to DPMUs; 4. Monitoring, Learning and Documentation of TPPF.
District	DPMU	12 districts	Chairman DLIC District Project Director (DPD)	<ol style="list-style-type: none"> 1. Implementation of TPPF; 2. Coordination with Support Organizations / Other Support Entities; 3. Implementation Planning (Monthly / Annual Planning); 4. TPPF Review; 5. Support to SOs
Cascade	Cascade Coordination and Management Committee	All identified cascades	President of CCMC	<ol style="list-style-type: none"> 1. Planning and coordination of relevant activities amongst the WUAs; 2. Conflict Resolution.
Tank	Water User Association	All identified project tanks	President of WUA	<ol style="list-style-type: none"> 1. Activities as per TPPF

Monitoring and Evaluation

Monitoring and evaluation activities assume a high level of importance on timely achievement of project objectives and an emphasis on quality outputs and processes. The primary objective of monitoring is to verify the absence of or record environmental and social impacts resulting from the sub-project activities and to ensure compliance with the mitigation measures identified earlier in order to prevent or reduce adverse impacts and enhance positive impacts from project activities. The key indicators for monitoring are presented in Table 17:

Table 17 Key indicators for Monitoring Tribal Development Activities in APIIATP

Activity	Sub-Activity	Tribal Inclusion and Development Indicators
Component A: Improving Irrigated Agriculture Efficiency at Farm level		
Institutional Strengthening & Capacity Building of WUAs	<ul style="list-style-type: none"> ▪ Formation of New WUAs ▪ Capacity Building of WUAs ▪ WUA Office Infrastructure ▪ Engagement of Para Workers ▪ Transparency & Public Disclosure ▪ Support Organisation 	<ul style="list-style-type: none"> ▪ No. of tribal farmers including women participate in GP meetings ▪ No. of tribal farmers including women participated in training programmes ▪ No. of WUA offices established in tribal areas ▪ Physical and financial contribution in tribal areas ▪ No. of Para workers identified and trained ▪ No. of meetings held to disclose the plans and its costs ▪ Engagement of services of SO
Improving Small Holder Irrigation System Performance and Resilience	<ul style="list-style-type: none"> ▪ Cascade Identification and Tank Selection Process ▪ Cascade Development Plan (CDP) ▪ Dam Safety Plan Preparation ▪ Tank Bund Strengthening & Aligning ▪ Catchment Treatment of Cascades ▪ Installation / Repair of Head Regulator / Sluice ▪ Construction / Repair of Canal System ▪ Cleaning Feeder Channels ▪ Cleaning Main Canal, Branch Canal & Distributaries 	<ul style="list-style-type: none"> ▪ No. of tribal households participated in preparation of plans ▪ No. of trainings conducted on plan preparation ▪ No. of tribals participated in training programmes on plans preparation ▪ No. of tanks systems repaired against the issues identified
Improving Water Productivity and Efficiency	<ul style="list-style-type: none"> ▪ Crop Water Budgeting ▪ Strengthening the Data Centres ▪ Resource Estimation Using the Data ▪ Satellite Based Imaging and Data Analysis on Cascade Basis ▪ Crop Planning ▪ Training of WUA / Farmers ▪ Crop and Technology Adoption ▪ Water Flow Measurement ▪ Water Use Efficiency: Micro Irrigation ▪ Water Productivity ▪ Participatory Groundwater Management (PGM) 	<ul style="list-style-type: none"> ▪ No. of meetings held in a year on preparing crop water budgeting, and crop planning ▪ No. of satellite images available for tanks against the total number ▪ No. of tribal farmers participated in training programmes ▪ No. of modules completed in tribal areas ▪ Construction of Cut-throat-flumes against the total tanks in tribal areas. ▪ Area under drip, sprinkler and other water saving methods in

Activity	Sub-Activity	Tribal Inclusion and Development Indicators
		tribal areas <ul style="list-style-type: none"> ▪ No. of tribal farmers adopted water saving methods ▪ No. of tribal PGM farmers
Component B: Promoting Adaptive Sustainable Agriculture Practices		
Climate Smart Diversified Agriculture Production System	<ul style="list-style-type: none"> ▪ Agriculture Interventions ▪ Horticulture Interventions ▪ Implementation Arrangement 	<ul style="list-style-type: none"> ▪ No. of tribal farmers benefited from agriculture interventions ▪ No. of tribal farmers benefited from horticulture interventions ▪ Area under horticulture interventions in tribal areas
Innovation and Technology Transfer for Fish Production	<ul style="list-style-type: none"> ▪ Augment Quality Fish Seed Production ▪ Enhance Fish Production ▪ Post-Harvest and Market Access / Linkage ▪ Capacity Building 	<ul style="list-style-type: none"> ▪ No. of tribal farmers engaged in fisheries activity ▪ Percentage of increase in fish production and productivity ▪ No. of trainings conducted on fisheries for tribal farmers ▪ No. of tribal farmers participated on fisheries activity
Component C: Climate Friendly Market and Agri-Business Promotion		
Post-Harvest Management, Market and Agribusiness Model for Horticultural Crops	<ul style="list-style-type: none"> ▪ Rural Markets / Apni Mandi / Direct Markets ▪ Low Cost Onion / Other Produce Storage Structures ▪ Refrigerated Transport Vehicles ▪ Mobile Pre-Cooling Unit ▪ Evaporative Low Energy Cool Chamber ▪ Establishment of Cold Storage 	<ul style="list-style-type: none"> ▪ No. of rural godowns constructed in tribal areas ▪ No. of tribal farmers taken refrigerated transport vehicles ▪ No. of tribal farmers taken mobile pre-cooling unit ▪ No. of cool chambers constructed in tribal areas ▪ No. of cold storage structures constructed in tribal areas.
Agriculture Market Transformation and Value Addition (Agribusiness)	<ul style="list-style-type: none"> ▪ Establishing Market Linkage-eNAM ▪ Supply and Value Chain Analysis ▪ Agri Watch ▪ Risk Mitigation Fund (RMF) 	<ul style="list-style-type: none"> ▪ No. of WUAs able to establish market linkages ▪ No. of WUAs done supply and value chain analysis ▪ No. of WUAs developed Risk Mitigation Fund.

Data on the indicators will be collected and reported at appropriate intervals as indicated above as part of the regular project reporting. Project authorities will use this information to aid adaptive management to ensure that targeted environmental and social outcomes are achieved.

Grievance Redressal Mechanism

A GRM will be in place for addressing social, environmental and project related grievances. The GRM will have multi-level structures and processes. An Executive Committee for Grievance Redressal would be set up at the state level and would be chaired by the Principal Secretary, DoWR. This Committee would meet once in every six months and be in charge of overall appeals and supervision of grievance redress

A Project level Grievance Redressal Committee (GRC) would be up at the state level and will be housed within the PMU. It would be headed by the Project Coordinator and would convene monthly meetings. This Committee would prepare six monthly reports and submit to the Executive Committee.

A District Level Grievance Redressal Committee headed by the District Project Directors would supervise addressal of grievances and would meet once every month. The Committee would submit quarterly reports to the District Collector.

Efforts would be made to create awareness about GRC mechanism to the beneficiaries through use of flyers and pamphlets at the village, block and district levels. The GRC will receive and redress all complaints and grievances that relate to project implementation that are formally brought to the GRC by individuals and groups of individuals.

Scope of GRC

The GRC will receive and redress grievances and complaints that are formally brought to the GRC in writing by the persons and/or group of persons who have a grievance because of the project's adverse impact on him/her and them. The grievance would, among others, relate to payment of compensation and involuntary resettlement assistance to all project affected persons in accordance with the eligibility criteria as set out in this TPPF.

Process of GRC

The GRC will receive all grievances/complaints and enter them in the Grievance Register. It will work out a timeframe to redress grievances/complaints if such grievances/complaints are not redressed during the first meeting. It shall be responsible to acknowledge receipt of all grievances/complaints, by registered post. Further, the GRC will consider and redress grievances/complaints through public and transparent process in which all those who have lodged their grievances and complaints in order to facilitate transparency and accountability. It will communicate its decisions/redress in writing to the complainants within a time limit depending on the nature of complaints. GRC decisions are not the final and the grieved and complainants have the right to seek judicial redress if they are not happy with the decisions of GRC. But it should not the paraphrase the constitution fundamental rights.

Names and contact details of all District Project Directors would be communicated to the community along with the process of registering grievances which would include the following steps:

- Open House at the Mandal/ Division and District levels
- By ordinary/registered/speed post addressed to concerned DPD of their area
- Through the Online portal

Complaints/Grievances Register will contain (a) Serial Number; (b) Case Number; (c) Name of the Grieved/Complainant; (d) Name of Father/Husband; (e) Gender (f) Age; (g) Full Address; (h) Brief details of grievance/complaint; (i) List of documents, if any, attached; (j) Details of previous grievance/complaint, if any; (k) Date of receipt of grievance/complaint and (l) Date of acknowledgement of grievance/complaint

When closing the complaint, agreement should be made with the complainant on remedy, and both parties should sign their approval of the case being closed and outcome accepted. Copies would be kept in both hard copy and electronic by both parties.

Right to Seek Legal Redress

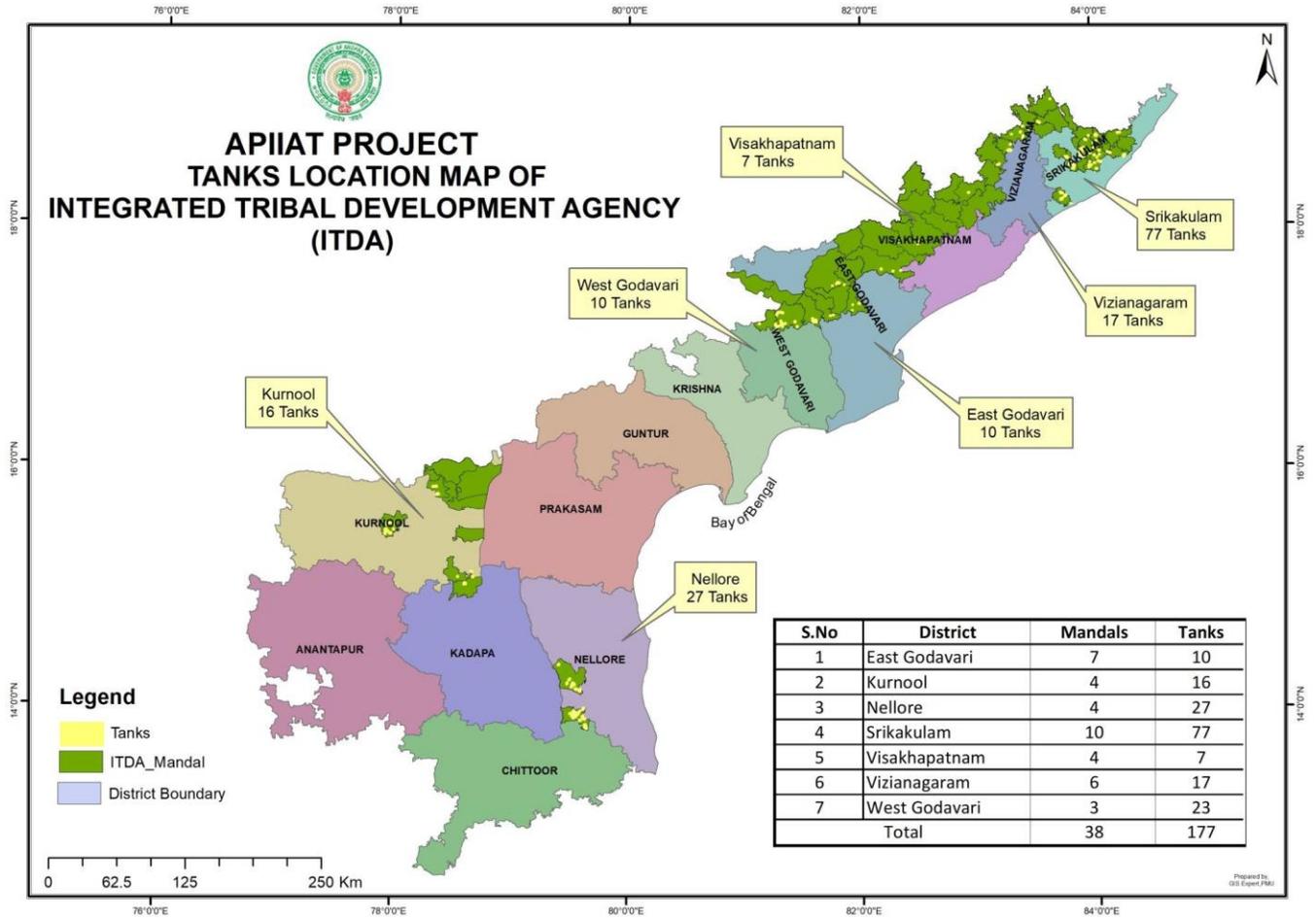
The grieved/complainant will have the right to seek legal redress through the judicial system if he/she or they are not satisfied with the decisions of the GRC. The option of seeking redress through the GRC or through the judicial system will be explained to project affected persons during the process of public consultation and participation. But it should not paraphrase the constitutional fundamental rights.

Mid-Term Evaluation

There will a mid-term assessment of TPPF to take stock of project impact on tribal communities in Scheduled Areas and non-Scheduled Areas; and to recommend corrective action, as necessary. This mid-term assessment of TPPF could be conducted prior to the Mid-term Review (MTR) mission.

ANNEXURES

Figure 1 Map showing ITDA Mandals and Number of APIIATP tanks



Annex Table 1 APIIATP List of selected tanks in ITDA Mandals

Sl	No. of Tanks	District	Mandal	Tank Name	Cascade No.	Village	Remarks	ITDA
1	1	East Godavari	Gangavaram	Yerrakonda MI tank	Independent	Vemula	250	ITDA_Tanks
2	2	East Godavari	Maredumilli	Garricalava	Independent	Narasapuram	Phase_II	ITDA_Tanks
3	3	East Godavari	Maredumilli	P.G.Lanka MI Tank	Independent	P.G.Lanka	Phase_II	ITDA_Tanks
4	4	East Godavari	Devipatnam	Janakamma Tank	Independent	Devaram	Phase_II	ITDA_Tanks
5	5	East Godavari	Maredumilli	D.V.Kota MI Tank	Independent	D.V.Kota	Phase_II	ITDA_Tanks
6	6	East Godavari	Maredumilli	Setagondi Vagu	Independent	Nurupudi	Phase_II	ITDA_Tanks
7	7	East Godavari	Maredumilli	Gorramamidi MI Tank	Independent	Gorramamidi	Phase_II	ITDA_Tanks
8	8	East Godavari	Gangavaram	Neelepudi Anicut Scheme	Independent	Neelepudi	Phase_II	ITDA_Tanks
9	9	East Godavari	Gangavaram	Pedagarilapadu MI Tank	Independent	Pedagarilapadu	Phase_II	ITDA_Tanks
10	10	East Godavari	Devipatnam	Devaram	Independent	Devaram	Phase_II	ITDA_Tanks
11	1	Kurnool	Chagalamarri	Mutyalapadu MI Tank	Cascade 04	Mutyalapadu	250	ITDA_Tanks
12	2	Kurnool	Allagadda	Pothuraju Cheruvu	Cascade 04	Ahobilam	250	ITDA_Tanks
13	3	Kurnool	Veldurthy	Khandan MI Tank	Cascade 12	Veldurthy	Phase_II	ITDA_Tanks
14	4	Kurnool	Jupadu Bunglow	Thangadencha MI.Tank	Independent	Thangadencha	Phase_II	ITDA_Tanks
15	5	Kurnool	Veldurthy	Bhogolu Tank	Cascade 11	Bhogolu	Phase_II	ITDA_Tanks
16	6	Kurnool	Veldurthy	Sudepalli MI Tank	Cascade 11	Sudepalli	Phase_II	ITDA_Tanks
17	7	Kurnool	Veldurthy	Vittalarayamorsu Katta MI Tank	Independent	Govaradhanagiri	Phase_II	ITDA_Tanks
18	8	Kurnool	Veldurthy	Narsapuram MI Tank	Cascade 12	Narsapuram	Phase_II	ITDA_Tanks
19	9	Kurnool	Veldurthy	L.Banda MI Tank	Independent	Laxminagaram	Phase_II	ITDA_Tanks
20	10	Kurnool	Veldurthy	Veerannagattu MI Tank	Independent	Veldurthi	250	ITDA_Tanks
21	11	Kurnool	Veldurthy	Chowti Cheruvu	Cascade 12	Ratnapalli	Phase_II	ITDA_Tanks
22	12	Kurnool	Veldurthy	Peremula Tank	Independent	Peremula	Phase_II	ITDA_Tanks
23	13	Kurnool	Allagadda	Bhavasi and Utlavagu (Matamvari Cheruvu)	Independent	Ahobilam	250	ITDA_Tanks
24	14	Kurnool	Jupadu Bunglow	Mandlem Tank	Independent	Mandlem	250	ITDA_Tanks
25	15	Kurnool	Jupadu Bunglow	Parumanchala MI Tank	Independent	Parumanchala	250	ITDA_Tanks
26	16	Kurnool	Allagadda	Vakkileru Anicut	Independent	Kotakandukuru	250	ITDA_Tanks
27	1	Nellore	Rapur	Jorepalli Tank	Independent	Jorepalli	250	ITDA_Tanks
28	2	Nellore	Rapur	Dabala Tank	Independent	Rapur	250	ITDA_Tanks
29	3	Nellore	Rapur	Siddavaram Tank	Independent	Siddavaram	250	ITDA_Tanks

Sl	No. of Tanks	District	Mandal	Tank Name	Cascade No.	Village	Remarks	ITDA
30	4	Nellore	Venkatagiri	Kalavalapudi Tank	Independent	Kalavalapudi	250	ITDA_Tanks
31	5	Nellore	Venkatagiri	Petlur Tank	Independent	Petlur	250	ITDA_Tanks
32	6	Nellore	Venkatagiri	Tripuranthakam bhtlapalli Tank	Cascade 24	T.B.Palle	Phase_II	ITDA_Tanks
33	7	Nellore	Venkatagiri	Palakondasatram Tank	Cascade 24	Palakondasatram	Phase_II	ITDA_Tanks
34	8	Nellore	Venkatagiri	Somasani Gunta	Cascade 24	Somasanigunta	Phase_II	ITDA_Tanks
35	9	Nellore	Venkatagiri	Dharmapuram tank	Cascade 24	Dharmapuram	Phase_II	ITDA_Tanks
36	10	Nellore	Venkatagiri	Chintagunta Tank	Cascade 25	Chintagunta	Phase_II	ITDA_Tanks
37	11	Nellore	Venkatagiri	Venkatagiri Tank	Cascade 25	Venkatagiri	Phase_II	ITDA_Tanks
38	12	Nellore	Venkatagiri	Bangarupuram Tank	Cascade 25	Bangarupuram	Phase_II	ITDA_Tanks
39	13	Nellore	Venkatagiri	Kalapadu Tank	Cascade 25	Kalapadu	Phase_II	ITDA_Tanks
40	14	Nellore	Venkatagiri	Kandalalapadu Tank	Cascade 26	Kandalalapadu	Phase_II	ITDA_Tanks
41	15	Nellore	Venkatagiri	Papamambapuram Tank	Cascade 26	Papamambapuram	Phase_II	ITDA_Tanks
42	16	Nellore	Venkatagiri	Palemkota Tank	Cascade 27	Palemkota	Phase_II	ITDA_Tanks
43	17	Nellore	Venkatagiri	Siddavaram Tank	Cascade 27	Siddavaram	Phase_II	ITDA_Tanks
44	18	Nellore	Venkatagiri	Balagamudram Tank	Cascade 27	Balagamudram	Phase_II	ITDA_Tanks
45	19	Nellore	Venkatagiri	Busapalem Tank	Independent	Busapalem	Phase_II	ITDA_Tanks
46	20	Nellore	Rapur	Tegicherla Tank	Independent	Tegicherla	Phase_II	ITDA_Tanks
47	21	Nellore	Venkatagiri	K Upparapalli Tank	Independent	K Upparapalli	250	ITDA_Tanks
48	22	Nellore	Kaluvoya	Chilakalampadu Tank	Independent	Chelikalampadu	Phase_II	ITDA_Tanks
49	23	Nellore	Jaladanki	Gotlagunta Tank	Independent	Gotlagunta	Phase_II	ITDA_Tanks
50	24	Nellore	Rapur	Pangali Large Tank	Independent	Pangali	Phase_II	ITDA_Tanks
51	25	Nellore	Rapur	Paravolu Tank	Independent	Paravolu	Phase_II	ITDA_Tanks
52	26	Nellore	Rapur	Yepuru Tank	Independent	Yepuru	Phase_II	ITDA_Tanks
53	27	Nellore	Rapur	Rapur Big Tank	Independent	Rapur	Phase_II	ITDA_Tanks
54	1	Srikakulam	Burja	Gundamma Tank	Cascade 01	Sankurada	150	ITDA_Tanks
55	2	Srikakulam	Burja	Laxmi Tank	Cascade 01	PL Devi Peta	150	ITDA_Tanks
56	3	Srikakulam	Burja	Buchanna Karra Tank	Cascade 01	Sankurada	150	ITDA_Tanks
57	4	Srikakulam	Burja	Kurmasagaram	Cascade 02	T.V. Ramabhadra Raju Peta	150	ITDA_Tanks
58	5	Srikakulam	Burja	Peramma Cheruvu	Cascade 02	Somidavalasa	150	ITDA_Tanks
59	6	Srikakulam	Burja	Nallakarra Tank	Cascade 02	Thimadam	150	ITDA_Tanks
60	7	Srikakulam	Burja	Kotha Tank	Cascade 03	Singannapalem	150	ITDA_Tanks

Sl	No. of Tanks	District	Mandal	Tank Name	Cascade No.	Village	Remarks	ITDA
61	8	Srikakulam	Burja	Singanna Cheruvu	Cascade 03	Singannapalem	150	ITDA_Tanks
62	9	Srikakulam	Burja	Neredumanu Cheruvu	Cascade 03	Singannapalem	150	ITDA_Tanks
63	10	Srikakulam	Etcherla	Pilakavani Tank	Cascade 04	Kuppili	150	ITDA_Tanks
64	11	Srikakulam	Etcherla	Mangala Tank	Cascade 04	Kuppili	150	ITDA_Tanks
65	12	Srikakulam	Tekkali	Pothala Tank	Cascade 10	Patha Nowpada	Phase_II	ITDA_Tanks
66	13	Srikakulam	Tekkali	Gangaram Tank	Cascade 10	Patha Nowpada	Phase_II	ITDA_Tanks
67	14	Srikakulam	L.N. Peta	Racha Tank	Cascade 13	Karaka Valasa	Phase_II	ITDA_Tanks
68	15	Srikakulam	L.N. Peta	Vajja Banda	Cascade 13	Karaka Valasa	Phase_II	ITDA_Tanks
69	16	Srikakulam	L.N. Peta	Chittivani Tank	Cascade 14	Karaka Valasa	Phase_II	ITDA_Tanks
70	17	Srikakulam	L.N. Peta	Chinna Tank	Cascade 14	Cintala Badavanji	Phase_II	ITDA_Tanks
71	18	Srikakulam	Saravakota	Vooru Tank	Cascade 15	Bydalapuram	Phase_II	ITDA_Tanks
72	19	Srikakulam	saravakota	Naidu Tank	Cascade 15	Bydalapuram	Phase_II	ITDA_Tanks
73	20	Srikakulam	Meliaputti	Kanapala Cheruvu	Independent	Surjini	Phase_II	ITDA_Tanks
74	21	Srikakulam	Pathapatnam	Nayudu Cheruvu	Cascade 27	Routhupuram	Phase_II	ITDA_Tanks
75	22	Srikakulam	Pathapatnam	Neradi Cheruvu	Cascade 27	Routhupuram	Phase_II	ITDA_Tanks
76	23	Srikakulam	Pathapatnam	Pedda Cheruvu	Cascade 27	Routhupuram	Phase_II	ITDA_Tanks
77	24	Srikakulam	Hiramandalam	Pedda Cheruvu	Independent	Tampa	Phase_II	ITDA_Tanks
78	25	Srikakulam	L.N. Peta	Ramasagaram Tank	Independent	Mallikarjunapuram	Phase_II	ITDA_Tanks
79	26	Srikakulam	L.N. Peta	Ganga Sree Cheruvu	Independent	Kaviti	Phase_II	ITDA_Tanks
80	27	Srikakulam	Pathapatnam	Jodu Cheruvu	Independent	Routhupuram	Phase_II	ITDA_Tanks
81	28	Srikakulam	L.N. Peta	Kotha Tank	Independent	Yanbram	Phase_II	ITDA_Tanks
82	29	Srikakulam	L.N. Peta	Vooru Cheruvu	Cascade 36	Mallikarjunapuram	Phase_II	ITDA_Tanks
83	30	Srikakulam	L.N. Peta	Injamna Cheruvu	Cascade 36	Sumanthapuram	Phase_II	ITDA_Tanks
84	31	Srikakulam	L.N. Peta	Badhrakali Sagaram	Cascade 38	Shyamalapuram	Phase_II	ITDA_Tanks
85	32	Srikakulam	L.N. Peta	Regula Karra Cheruvu	Cascade 38	Shyamalapuram	Phase_II	ITDA_Tanks
86	33	Srikakulam	Tekkali	Komati Tank	Independent	Lingalavalasa	Phase_II	ITDA_Tanks
87	34	Srikakulam	Laveru	Devulavani Tank	Independent	Bejjipuram	Phase_II	ITDA_Tanks
88	35	Srikakulam	Burja	Kasi Sagaram Tank	Independent	Burja	Phase_II	ITDA_Tanks
89	36	Srikakulam	Laveru	Narayana Sagaram Tank	Independent	Budumuru	Phase_II	ITDA_Tanks
90	37	Srikakulam	Hiramandalam	Dhammanna Tank	Independent	Jagannadhapuram	Phase_II	ITDA_Tanks
91	38	Srikakulam	Hiramandalam	Vooru Tank_Rugada	Independent	Rugada	Phase_II	ITDA_Tanks
92	39	Srikakulam	Laveru	Rowthuvani Tank	Cascade 47	Gurralapalem	Phase_II	ITDA_Tanks

Sl	No. of Tanks	District	Mandal	Tank Name	Cascade No.	Village	Remarks	ITDA
93	40	Srikakulam	Laveru	Nidagantlam Tank	Cascade 47	Adapaka	Phase_II	ITDA_Tanks
94	41	Srikakulam	Saravakota	Naidu Tank	Independent	Maluva	Phase_II	ITDA_Tanks
95	42	Srikakulam	Saravakota	Kanapala Tank	Independent	Bonthu	Phase_II	ITDA_Tanks
96	43	Srikakulam	Saravakota	Bandaruvani tank	Independent	Kummarigunta	Phase_II	ITDA_Tanks
97	44	Srikakulam	Saravakota	Gopala Sagaram	Independent	Gopalapuram	Phase_II	ITDA_Tanks
98	45	Srikakulam	Saravakota	Pedda Tank_Anguru	Independent	Anguru	Phase_II	ITDA_Tanks
99	46	Srikakulam	Saravakota	Pedda Tank_Chodasamudram	Independent	Chodasamudram	Phase_II	ITDA_Tanks
100	47	Srikakulam	Burja	Komati Cheruvu	Independent	Kondapet	Phase_II	ITDA_Tanks
101	48	Srikakulam	Burja	Vooru Cheruvu	Cascade 43	Lakkupuram	Phase_II	ITDA_Tanks
102	49	Srikakulam	Burja	Patrudu Cheruvu	Independent	Tuddali	Phase_II	ITDA_Tanks
103	50	Srikakulam	Burja	Kotta Cheruvu	Cascade 44	Gangammepeta	Phase_II	ITDA_Tanks
104	51	Srikakulam	Burja	Rayikara Cheruvu	Independent	K.K.Rajapuram	Phase_II	ITDA_Tanks
105	52	Srikakulam	Burja	Pedda Cheruvu	Cascade 43	Marripada	Phase_II	ITDA_Tanks
106	53	Srikakulam	Burja	Neelamma Cheruvu	Cascade 44	Neeladevipuram	Phase_II	ITDA_Tanks
107	54	Srikakulam	Burja	Venkata Sagaram	Independent	O V Peta	Phase_II	ITDA_Tanks
108	55	Srikakulam	Burja	Rambhadra Sagaram	Cascade 44	T.Ramabhadrarajupeta	Phase_II	ITDA_Tanks
109	56	Srikakulam	Jalumuru	Gopanna Cheruvu	Independent	Yalamanchili	Phase_II	ITDA_Tanks
110	57	Srikakulam	Jalumuru	Nagamma Cheruvu	Independent	Gotivada	Phase_II	ITDA_Tanks
111	58	Srikakulam	Jalumuru	Pedda Cheruvu	Independent	Gotivada	Phase_II	ITDA_Tanks
112	59	Srikakulam	Jalumuru	Munu Kotu Ramayya Cheruvu	Independent	Jalumuru	Phase_II	ITDA_Tanks
113	60	Srikakulam	Jalumuru	Pedda Cheruvu	Independent	Pedda Dugam	Phase_II	ITDA_Tanks
114	61	Srikakulam	Jalumuru	Gavamma Cheruvu	Independent	Sairigam	Phase_II	ITDA_Tanks
115	62	Srikakulam	Jalumuru	Pedda Tank	Independent	Talatarya	Phase_II	ITDA_Tanks
116	63	Srikakulam	L.N. Peta	Kari Tank	Cascade 09	Chorlangi	250	ITDA_Tanks
117	64	Srikakulam	L.N. Peta	Pedda Cheruvu	Cascade 09	Ravi Chendri	250	ITDA_Tanks
118	65	Srikakulam	L.N. Peta	Boorja Cheruvu	Cascade 09	Ravi Chendri	250	ITDA_Tanks
119	66	Srikakulam	Tekkali	Chinnappa Tank	Independent	Pata Nowpada	250	ITDA_Tanks
120	67	Srikakulam	L.N. Peta	Jalarivani Tank	Independent	Venkampeta	250	ITDA_Tanks
121	68	Srikakulam	Tekkali	Nandasagaram Tank	Independent	Raipadu	250	ITDA_Tanks
122	69	Srikakulam	Tekkali	Ramasagaram	Cascade 07	Patha Nowpada	250	ITDA_Tanks
123	70	Srikakulam	Tekkali	Anantasagaram	Cascade 07	Patha Nowpada	250	ITDA_Tanks
124	71	Srikakulam	Tekkali	Kotha Tank_Tekkali	Cascade 07	Patha Nowpada	250	ITDA_Tanks

Sl	No. of Tanks	District	Mandal	Tank Name	Cascade No.	Village	Remarks	ITDA
125	72	Srikakulam	L.N. Peta	Tamara Cheruvu	Cascade 08	Yembram	250	ITDA_Tanks
126	73	Srikakulam	L.N. Peta	Chakali Cheruvu	Cascade 08	Kommuvalasa	250	ITDA_Tanks
127	74	Srikakulam	L.N. Peta	Lingam Naidu Chruvu	Cascade 08	Kommuvalasa	250	ITDA_Tanks
128	75	Srikakulam	Saravakota	Saribanti Tank(Kanapala Tank)	Independent	Govardhanapuram	Phase_II	ITDA_Tanks
129	76	Srikakulam	Meliaputti	Pedda Tank	Independent	Banapuram	Phase_II	ITDA_Tanks
130	77	Srikakulam	Hiramandalam	Asirinaidu Tank	Independent	Kondaragolu	Phase_II	ITDA_Tanks
131	1	Visakhapatnam	Koyyuru	Kinchavanipalem Reservoir	Independent	Kinchavanipalem	Phase_II	ITDA_Tanks
132	2	Visakhapatnam	Koyyuru	Lubharthi Reservoir	Independent	Lubharthi	250	ITDA_Tanks
133	3	Visakhapatnam	Chintapalle	Tjangi Reservoir	Independent	Tjangi	250	ITDA_Tanks
134	4	Visakhapatnam	Chintapalle	Pedda Tank	Independent	Choudupalli	250	ITDA_Tanks
135	5	Visakhapatnam	Golugonda	Latchiraju Tank	Cascade 01	Narayanapuram	150	ITDA_Tanks
136	6	Visakhapatnam	Golugonda	Singanna Tank	Cascade 01	Narayanapuram	150	ITDA_Tanks
137	7	Visakhapatnam	Arukuvalley	Mini Reservoir across Gowdigedda	Independent	Gowdigedda	Phase_II	ITDA_Tanks
138	1	Vizianagaram	Makkuva	Chenchunaidu tank	Cascade 10	M.Venkampeta	Phase_II	ITDA_Tanks
139	2	Vizianagaram	Makkuva	Yerra Tank	Cascade 10	Kannanpeta	Phase_II	ITDA_Tanks
140	3	Vizianagaram	Makkuva	Mallamma tank	Cascade 11	A.Venkampeta	Phase_II	ITDA_Tanks
141	4	Vizianagaram	Makkuva	V Ayyappa Tank	Cascade 11	A.Venkampeta	Phase_II	ITDA_Tanks
142	5	Vizianagaram	Salur	Perasagan tank	Cascade 14	Salur	Phase_II	ITDA_Tanks
143	6	Vizianagaram	Salur	Chepavani banda	Cascade 14	Salur	Phase_II	ITDA_Tanks
144	7	Vizianagaram	Komarada	Sabinesh Tank	Independent	Parasurampuram	Phase_II	ITDA_Tanks
145	8	Vizianagaram	Makkuva	Appala Naidu Tank	Independent	Chappa Butchammepeta	Phase_II	ITDA_Tanks
146	9	Vizianagaram	Makkuva	Chintala Tank	Independent	Venkata Bhairipuram	Phase_II	ITDA_Tanks
147	10	Vizianagaram	Gl Puram	Dummandi Reservoir	Independent	Dummandi	Phase_II	ITDA_Tanks
148	11	Vizianagaram	Komarada	Chepalakrishnamma Dora Tank	Independent	Konavalasa	Phase_II	ITDA_Tanks
149	12	Vizianagaram	Kurupam	Nagulagedda Tank	Independent	Kurupam	Phase_II	ITDA_Tanks
150	13	Vizianagaram	Kurupam	Lakela Tank	Independent	Kurupam	Phase_II	ITDA_Tanks
151	14	Vizianagaram	Parvathipuram	Lankela Tank	Independent	Balagudaba	Phase_II	ITDA_Tanks
152	15	Vizianagaram	Parvathipuram	Kanumalla tank	Independent	Venkataraidupeta	Phase_II	ITDA_Tanks
153	16	Vizianagaram	Parvathipuram	Muduraju Tank	Independent	Venkatanissankapuram	Phase_II	ITDA_Tanks
154	17	Vizianagaram	Parvathipuram	Boddidevaragedda System	Independent	Mulaga	Phase_II	ITDA_Tanks

Sl	No. of Tanks	District	Mandal	Tank Name	Cascade No.	Village	Remarks	ITDA
155	1	West Godavari	Buttaigudem	Akamma Rangapuram tank	Independent	Buttaigudem	250	ITDA_Tanks
156	2	West Godavari	Buttaigudem	Allicalava Tank	Independent	Manchulavarigudem	250	ITDA_Tanks
157	3	West Godavari	Buttaigudem	Andachandala Tank	Independent	Antarvedigudem	250	ITDA_Tanks
158	4	West Godavari	Polavaram	Burugugadda vari Kunta Tank	Independent	Burugugadda vari Kunta Tank	250	ITDA_Tanks
159	5	West Godavari	Polavaram	Kothuru tank	Independent	Pragadapalli	250	ITDA_Tanks
160	6	West Godavari	Buttaigudem	Puntha Tank	Independent	Reddi Ganapavaram	250	ITDA_Tanks
161	7	West Godavari	Polavaram	Venkanna Tank	Cascade 06	Polavaram	250	ITDA_Tanks
162	8	West Godavari	Polavaram	Kamayamma Tank	Cascade 06	Polavaram	250	ITDA_Tanks
163	9	West Godavari	Polavaram	Gadala Tank	Cascade 06	Polavaram	250	ITDA_Tanks
164	10	West Godavari	Jeelugumilli	Ura Tank	Independent	Jeelugumilli	250	ITDA_Tanks
165	11	West Godavari	Buttaigudem	Jagppa tank	Cascade 04	Buttaigudem	250	ITDA_Tanks
166	12	West Godavari	Buttaigudem	Desalavarikattu Tank	Cascade 04	Lakshmugudem	250	ITDA_Tanks
167	13	West Godavari	Buttaigudem	Talla Tank	Cascade 04	Bosarajupalli	250	ITDA_Tanks
168	14	West Godavari	Buttaigudem	Lothuvagu Tank	Independent	Buruguvada	250	ITDA_Tanks
169	15	West Godavari	Buttaigudem	Gubbisakunta tank	Independent	Buttaigudem	250	ITDA_Tanks
170	16	West Godavari	Buttaigudem	Tank across Junnulajolu	Independent	Gowrampeta	Phase_II	ITDA_Tanks
171	17	West Godavari	Buttaigudem	Utacalava Tank	Independent	Rajanagaram	Phase_II	ITDA_Tanks
172	18	West Godavari	Buttaigudem	Malamettavagu Tank	Independent	Merakagudem	Phase_II	ITDA_Tanks
173	19	West Godavari	Buttaigudem	Chinna Tank	Independent	Seetharamanagaram	Phase_II	ITDA_Tanks
174	20	West Godavari	Buttaigudem	Moddula tank	Independent	Jainavarigudem	Phase_II	ITDA_Tanks
175	21	West Godavari	Buttaigudem	Yerra Tank	Independent	Kotanagavaram	Phase_II	ITDA_Tanks
176	22	West Godavari	Polavaram	Govindarajulu Tank	Independent	Vinjaram	Phase_II	ITDA_Tanks
177	23	West Godavari	Buttaigudem	Local Vagu Tank	Independent	Inumuru	Phase_II	ITDA_Tanks

**Andhra Pradesh Integrated Irrigation
and Agriculture Transformation
Project (APIIATP)**

**ENVIRONMENT MANAGEMENT
PLANS – 4 SAMPLE TANKS**

**Environment and Social Management Framework:
Volume 2 – Stand Alone Document 8**

Environmental Management Plan -1

EMP FOR BORRAGUDEM TANK

Borragudem village, Mylavaram Mandal,
Krishna District

Andhra Pradesh Integrated Irrigation and Agriculture
Transformation Project

Introduction

The Environmental Management Plan (EMP) integrates the baseline conditions, impacts likely to occur, and the measures which need to be implemented for amelioration of adverse impacts for proposed category-B sub-projects. EMP for the proposed category-B sub-projects includes rehabilitation of tanks and increased use of agro-chemicals. The EMP shall give particular attention to project sustainability issues such as EHS, construction camps and site office, prevention of pollution, user conflicts, etc. This detail is to be included in Bid document and to be implemented by the prospective Contractor.

About APIIATP

The Andhra Pradesh Community Based Tank Management Project (APCBTMP) was implemented during 2007 and 2016 by the Government of Andhra Pradesh with support from the World Bank with an objective of improving agricultural productivity and building capacities of Water User's Associations (WUAs) to manage tanks effectively. (ISEC, 2006) During the course of implementation of the APCBTMP there was a realization of the need for development of more holistic interventions which aimed not only to improve productivity of crops but also maximized returns by reducing gaps in the supply and demand chain. A specific need to focus on interventions that disseminated and facilitated adoption of technology by farmers, created awareness on quality standards, organized farmers and promoted collective sale and purchase of inputs and produce was identified.

The bank supported APCBTMP has made magnificent development impacts in the state by rehabilitating 2,157 tanks, which resulted in 32% increase in tank command area and contributed to increase in paddy, maize and ground nut productivity by 36%, 72% and 97% respectively. In addition tank rehabilitation resulted in 388% increase in fish productivity over baseline value.

It is in this context that the Andhra Pradesh Integrated Irrigation Agriculture Transformation Project (APIIATP) has been conceptualized by the World Bank and the Government of Andhra Pradesh (GoAP). The project adopts a holistic and synergized approach that seeks integration across relevant stakeholders of the selected minor irrigation tanks across the state under different agro climatic zones.

Project details

Borragudem tank is a cascade tank located in Chandragudem village, Mylavaram Mandal of Krishna district. The tank is located about 70 m asl, catchment area of the tank is 6.32 sq.km. Total storage capacity of the tank is 16.358 mcft designed to irrigate an area of 226.01 Acres. Average rainfall in the area is about 950.30 mm.

Key Issues related to Borragudem Tank

a) Earth Bund:

- i. Earth Bund slopes are covered with jungle (Prosopis and other weeds).
- ii. Rain cuts of gullies formed on rear side of bund and the slopes are not up to the mark.
- iii. The existing bund is not as per Minor Irrigation standards.
- iv. There is no revetment on u/s of bund.

b) Outlet Sluice:

Presently there are 4 irrigation sluices existing at km 0.110, km 0.370, km 0.555 and km 0.730 on Earth bund to supply water to total ayacut under this tank. During the walk through survey it is observed that sluice - II is in good condition and sluice - I & III & IV headwalls have leakages and silted up on u/s and damages are observed and shutter is not functioning.

c) Irrigation Channel:

The existing free board is not as per MI standards. The average free board of bund is varying between 1.420m to 0.90 m.

d) Distribution system

There are 4 irrigation channels for supply of water to the registered ayacut; the channels are unlined and silted.

e) Supply Channel:

The Supply channel is not in a position to carry the adequate discharge. It is covered with jungle and silted up canal.

Proposed Sub-project for tank improvement

- a. Strengthening of the tank bund
 - Clearing thick jungle growth (less than 50 percent open space) including bushes up to 30 cm / parthenium and other weeds.
 - Providing homogeneous embankment with selected soil from approved borrow areas
 - Providing and laying Hariyala or other approved quality turfing sods for the slopes of earthen embankments
 - Providing revetment with dry rubble stone pitching on the u/s of the bund
- b. Repairing of Surplus weir
- c. Reconstruction of Sluice I, III, and IV.
- d. Improvement of Irrigation Channels
 - Channel Walls For Irrigation Canal under Sluice –I, II, III and IV
- e. Improvement of Supply Channel
 - Clearing thick jungle growth (less than 50 percent open space) including bushes up to 30 cm / parthenium and other weeds
 - Silt Removal in bed from Supply channel and Surplus course

Engineering details, designs and cost estimates of the proposed activities are provided in the detailed project report (DPR)

Environmental Management Plan

The potential impacts on the environment during the construction and operation of the project and the environmental management plan including the mitigation measures and monitoring programs necessary to minimize potential adverse impacts on the environment is presented.

The plan covers pre-construction and construction phases of the project. The EMP includes the organizational structure, specific mitigation actions and monitoring program.

At this stage of project development and information available, a detailed EMP has been provided in the following table.

Applicable World Bank Safeguard Policies

a) Natural Habitat Plan

The proposed restoration activities shall have temporary and acute impacts on Aquatic animals, avifauna and other native vegetation. To minimize the associated impacts, a Natural Habitat Plan (NHP) has been prepared.

b) Pest Management Plan

The proposed project shall improve the water availability for irrigation resulting in diversification of crops and intensification of agricultural production. Due to this the consumption of Pesticide, fertilizer and other agro-chemical consumption might increase. To minimize the associated impacts, a Pest Management Plan (PMP) has been prepared that includes an Integrated Pest Management and Integrated Nutrient Management strategy.

Pre-construction environmental management measures

Pre-construction phase activities	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
<p>Site preparation Clearing of bushes from the bund, irrigation channel and feeder channel Waste handling and transportation Soil compaction</p>	<p>Isolate the construction area with flexible enclosure/curtains so that the air emissions will not spread in the surroundings. Sprinkling of water in the construction area and unpaved roads Proper maintenance of vehicle shall be done Minimize dust generating activities Cover heavy vehicles moving offsite Restrict vehicle speed on construction site ensure vehicles use only dedicated construction roads. Visually monitor particulate</p>	<p>Contractor</p>	<p>One time</p>	<p>SPU/DPU</p>
<p>Labour deployment and camp setting Construction of labour sheds to accommodate labour, supply of drinking water, supply of fuel/energy, waste handling and disposal, sewage disposal.</p>	<p>Follow all relevant provision of the Factory Act, 1948 and the Building and the other construction workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp. The location, layout and basic facility provision of labour cam shall be submitted to engineer prior to the construction. The construction shall commence only upon the written approval of the engineer The contractor shall maintain necessary living accommodation and ancillary facilities in functional and hygienic manner and as approved by the engineer. All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be planned. Adequate health care is to be provided for the work force. The layout of the construction camp and details of the facilities provided should be prepared and shall be approved by the engineer. Unskilled labour shall be recruited from local village. Development of code of conduct for camp rules, camp workers and disciplinary procedures.</p>	<p>Contractor</p>	<p>One time</p>	<p>SPU/DPU</p>

Pre-construction phase activities	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
	Separate bath and was facilities for women labours Avoid employing children's aged below 18			
Mobilization of machineries and transportation	Minimize dust generation activities Cover heavy vehicles carrying construction materials to project site Visually monitor particulate emission from diesel vehicles and carryout regular maintenance of equipment Prevent dust generation by sprinkling water	Contractor	One time	SPU/DPU
Material handling and storage	Provide necessary PPE to the workers handling construction materials such as sand, cement, brick TMT rods and other construction equipment's.	Contractor	One time	SPU/DPU
Storage sites (for large and long duration storage)	Petrol/Oil/Lubricants: Brick on edge flooring or sand flooring will be provided at the storage places of Petrol/Oil/Lubricants to avoid soil and water contamination due to spillage. Cement: Damp-proof flooring, as per IS codes	Contractor	One time	SPU/DPU
Silt disposal site	Shall be identified by Engineer during the implementation	SPU/DPU	One time	SPU/DPU
Waste disposal	The sewage from the labour camp site shall be disposed in line with the Environmental (Protection Act), 1986 in identified location. Solid waste generated from the labour site shall be disposed as per the Solid Waste Management Rules, 2016 Used oil from the project site shall be disposed as per the Hazardous And Other Wastes (Management and Transboundary Movement) Rules, 2015, Construction and demolition waste such as debris and rubble shall be disposed as per the Construction and Demolition Waste Management Rules, 2016	Contractor	One time	SPU/DPU
Tree cutting	Necessary clearance for cutting of trees should be obtained by Engineer in charge.	SPU/DPU	One time	SPU/DPU

Construction phase environmental management measures

Potential Environmental Impacts	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
Construction Sites (Applicable, If number of labour residing exceed 100)	<ul style="list-style-type: none"> • It should be kept free of water logging • Protective guards should be provided across the areas where workers may fall or could face an impalement hazard. • Store tools and materials neatly and out of the way in storage bins or lockers and keep flammable or hazardous wastes, if any, in covered, segregated waste containers • Keep form and scrap lumber away from work areas, passageways • No loose material should be allowed to leave unattended, and sites should be properly finished after completing the work 	Contractor	Once in a month	SPU/DPU
Public Safety	Warning sign boards should be provided along the construction sites in Telugu and English	Contractor	Once in a month	SPU/DPU
Occupational Health & Safety	<ul style="list-style-type: none"> • Safe access to the job sites should be provided to all workers • Passage ways, walkways, and ramps should be kept free of materials, scraps or obstructions • First Aid box should be readily available at construction sites • Contact with nearest nursing homes/clinics/primary health centre should be maintained by the Contractor to deal with any emergency at site • A vehicle should be readily available at construction site to meet emergency situation • The contractor should comply with all the precautions as required for the safety of the workmen as per Labour Laws as applicable to this project • The contractor should strictly follow the statutory child labour act • Personal Protective Equipment such as helmets, hand gloves, safety shoes, nose masks, safety goggles should be provided to the workers as per Act. 	Contractor	Once in a month	SPU/DPU
Water Pollution	SW and GW quality to be tested for any fecal contamination	Contractor	Once in a month	SPU/DPU
Solid Waste	Solid waste shall be disposed at authorized sites identified	Contractor	Once in a	SPU/DPU

Potential Environmental Impacts	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
			month	
Soil Pollution	<ul style="list-style-type: none"> Measures to prevent accidental spills of oils and other lubricants Disposal of waste and wastewater shall not be done on open land. 	Contractor	Once in a month	SPU/DPU
Noise and Vibration	Adequate measures shall be taken to control noise and vibration during operation of machineries and vehicles	Contractor	Once in a month	SPU/DPU
Air Pollution	<ul style="list-style-type: none"> Properly functioning construction equipment to minimize exhaust shall be maintained Idling of machines and equipment shall be minimized Cover stockpiled silt and trucks hauling silt, sand, and other loose materials or require trucks to maintain at least two feet of freeboard 	Contractor	Once in a month	SPU/DPU
Landscape Degradation	On completion of the works all the temporary structures may be cleared away, all rubbish disposed, excreta and disposal pits or trenches filled in and effectively sealed off and the whole site and shall be handed over to the Department in good condition.	Contractor	One time	SPU/DPU

Institutional Arrangement

The project proposes to adopt a community-based approach in tank improvement and management. Hence it is essential that right from the beginning community participation in addressing environment concerns is planned and integrated in the overall project plan.

Environmental issues and concerns identified definitely affect the performance and utility of tank system. Hence, due importance needs to be given to address these concerns in the planning and implementation process. Essentially, appropriate institutional arrangements, including adequate staffing with specialization in environmental management, need to be ensured at the different levels of project institutional structure. Accordingly, the following institutional arrangement is proposed.

Stakeholder	Role
State Level	
Project Management Unit (PMU): Environment Safeguard Expert	Ensuring implementation of Environmental Management Framework, coordinate with Dam Safety Panel for Dam Safety Plan, guide DPUs in formulation of environment component to be integrated in the Detailed Project Report (DPR), monitor implementation of environment management framework
Capacity Building and Communication Expert	Identifying stakeholders and ensuring their participation, identifying training needs of key stakeholders, ensuring timely implementation of capacity building measures of environmental management components
Agronomist	Provide CB inputs on Increase of Productivity and production to the farmers
Agri-Business Expert	Developing sector plans and overseeing implementation
Senior Fisheries Expert	Ensuring implementation of components related to fisheries in the EMP
District Level	
District Project Unit	Similar arrangement will be made at district level for supporting district level Institutional Development Unit, if required, through deputation of Government staff with specific experience and subject matter expertise, to ensure proper implementation of EMP activities at the sub-project level and coordination between the field and project management unit
Cascade Level	
SO (Support Organization) and Cascade Coordination and Management Committee (CCMC)	Terms of Reference for SO will include specific responsibilities to manage environmental management activities at cascade level. The project will develop capacities both CCMC and SO. The project will implement environmental management activities by involving Common Interest Groups, Farmer Producer Organizations and PFCSs
Tank Level	
SO (Support Organization)	TOR for SO will include specific responsibilities to manage environmental management activities. The project will develop capacities both WUA and SO through training to plan and implement environmental management activities

Participants	Training Needs	Resource Organization
Primary Stakeholders		
WUA Managing Committee Members,	<ul style="list-style-type: none"> ▪ Environmental issues and their impacts 	<ul style="list-style-type: none"> ▪ NGOs, Agriculture Research Stations, DRPs

Participants	Training Needs	Resource Organization
Tribal Members, Women's Group Leaders, GP Members, Para-workers and Progressive Farmers	<ul style="list-style-type: none"> ▪ Addressing environmental issues and mitigating measures 	<ul style="list-style-type: none"> ▪ Line Department Staff
	<ul style="list-style-type: none"> ▪ Sustainable use of natural resources ▪ Importance of soil and water conservation 	
	<ul style="list-style-type: none"> ▪ Improved farm practices, water use, crop diversification, organic farming, balanced nutrient application, IPM and INM techniques etc. 	
	<ul style="list-style-type: none"> ▪ Management, leadership and communication 	
	<ul style="list-style-type: none"> ▪ Record keeping and basic maintenance of financial accounts 	
	<ul style="list-style-type: none"> ▪ Monitoring of environmental parameters 	
Secondary Stakeholders		
Water Resource Department	<ul style="list-style-type: none"> ▪ Purpose and components of EMP for APIIATP 	<ul style="list-style-type: none"> ▪ External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> ▪ Identification of environmental and issues and mitigating measures 	<ul style="list-style-type: none"> ▪ External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> ▪ Environmental appraisal process- Screening and environmental appraisal 	<ul style="list-style-type: none"> ▪ External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> ▪ Implementation of Environmental Management Framework 	<ul style="list-style-type: none"> ▪ External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> ▪ Institutional arrangement of Environmental Management Framework 	<ul style="list-style-type: none"> ▪ External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> ▪ Key aspects for monitoring of Environmental Management Framework 	<ul style="list-style-type: none"> ▪ External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> ▪ Dam Safety Measures 	<ul style="list-style-type: none"> ▪ SDSO, Vijayawada
Agriculture Department	<ul style="list-style-type: none"> ▪ Modernization of agriculture 	<ul style="list-style-type: none"> ▪ Shall be identified based on specific requirements
	<ul style="list-style-type: none"> ▪ Eco-friendly farm practices 	<ul style="list-style-type: none"> ▪ Shall be identified based on specific requirements
	<ul style="list-style-type: none"> ▪ Impact of Climate variability on crops, importance of adaptation measures, contingency plans etc 	<ul style="list-style-type: none"> ▪ Acharya Ranga Agricultural University, AP
Agricultural Marketing Staff	<ul style="list-style-type: none"> ▪ Updating skills and knowledge on IPM and INM 	<ul style="list-style-type: none"> ▪ Agriculture Department, GoAP
	<ul style="list-style-type: none"> ▪ Organic farming practices 	<ul style="list-style-type: none"> ▪ Agriculture Department, GoAP
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	<ul style="list-style-type: none"> ▪ Management of cold storage and other infrastructures 	<ul style="list-style-type: none"> ▪ NGOs and other institutions
	<ul style="list-style-type: none"> ▪ Organic certification and Green business opportunities 	<ul style="list-style-type: none"> ▪ Seed Certification Agency, Guntur, AP
	<ul style="list-style-type: none"> ▪ Packaging and Branding 	<ul style="list-style-type: none"> ▪ Home Science College,

Participants	Training Needs	Resource Organization
		Bapatla, AP
Horticultural Department	<ul style="list-style-type: none"> Impact of Climate variability on crops, importance of adaptation measures, contingency plan etc 	<ul style="list-style-type: none"> Acharya Ranga Agricultural University, AP
	<ul style="list-style-type: none"> Updating skills and knowledge on IPM and INM 	<ul style="list-style-type: none"> Horticulture Department, GoAP
	<ul style="list-style-type: none"> Organic farming practices 	<ul style="list-style-type: none"> Horticulture Department, GoAP
Fisheries Department	<ul style="list-style-type: none"> Fish farming in farm ponds and value addition of fishery products 	<ul style="list-style-type: none"> Fisheries Institute, Kakinada, GoAP Fisheries Department, GoAP
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All Departments, SOs Staff	<ul style="list-style-type: none"> Participatory Irrigation Management 	<ul style="list-style-type: none"> Shall be identified based on specific requirements
	<ul style="list-style-type: none"> Awareness about and environmental issues and their impacts 	<ul style="list-style-type: none"> Shall be identified based on specific requirements
	<ul style="list-style-type: none"> Impact assessment, mitigation and monitoring measures 	<ul style="list-style-type: none"> Shall be identified based on specific requirements

Monitoring and Evaluation

Monitoring and evaluation activities assume a high level of importance in light of the stress on timely achievement of project objectives and an emphasis on quality outputs and processes. The M&E system would act as a tool for measuring and assessing project activities, developing corrective measures and evaluating impact. The project stakeholders involved in implementation would have a key role to play in operationalizing and adopting the M&E system.

The designated Environment Specialists shall be responsible for overseeing compliance of the sub-projects to Bank safeguards, GoI/GoAP regulations and applicable EMP guidelines. They shall also regularly review timely implementation of environment provisions as applicable. Corrective actions shall be initiated in a planned manner as appropriate to ensure compliance to the EMP measures.

Type of Monitoring	Description	Responsibility	Frequency
Progress Monitoring	Physical progress monitoring will be carried out with a view to identify activity progress, highlight constraints and good practices	Internal: At the WUA level, as a part of participatory monitoring, the Representative of WUAs, and SO would monitor progress of implementation and report to WUA and DPU. At the District level, DPU will monitor the implementation of and Environmental Management Plan. The DPU will submit quarterly progress reports to PMU. At the state level, the PMU will monitor	Monthly/Quarterly/ Annual

Type of Monitoring	Description	Responsibility	Frequency
		implementation of EMP. Both at DPU and PMU levels the respective Environmental Units will be overall responsible for monitoring of implementation of the EMP	
Impact/Outcome Assessments (Mid-Term and Final)	These would be undertaken at critical stages of the project and would aim at assessing the extent to which project has been able to achieve targeted indicators. This would be undertaken by an external agency	The monitoring of EMP will be an integral part of the overall monitoring and learning system. The external agency will be given specific tasks for monitoring of EMP based on the indicators identified. The external agency would be responsible for impact/outcome assessment and environmental management audits	Mid Term/End Term
Environmental Management Audits	Environmental management audits would be conducted at mid-term and end-term stages and would identify significant issues and impacts associated with the interventions such as strengthening and up gradation of tanks, dam safety, improving irrigation efficiency, crop diversification, productivity enhancement through climate resilient/adaptive sustainable agriculture production, technology promotion in fisheries etc. Mid-term Environmental Management Audit shall assess to what extent the expected results have been achieved and if any mitigation measures are needed. The final environmental management audit shall assess whether expected outcomes at baseline and mid-term have been achieved and mitigation measures proposed have been implemented	The monitoring of ESMF will be an integral part of the overall monitoring and learning system. The external agency will be given specific tasks for monitoring of EMP based on the indicators identified. The external agency would be responsible for impact/outcome assessment and environmental management audits	Mid Term/End Term

Environmental Management Plan - 2

EMP FOR KURMASAGARAM TANK
Thotavada village, Burja Mandal
Srikakulam District

Andhra Pradesh Integrated Irrigation and Agriculture
Transformation Project

Introduction

The Environmental Management Plan (EMP) integrates the baseline conditions, impacts likely to occur, and the measures which need to be implemented for amelioration of adverse impacts for proposed category-B sub-projects. EMP for the proposed category-B sub-projects, includes rehabilitation of tanks and increased use of agro-chemicals. The EMP shall give particular attention to project sustainability issues such as EHS, construction camps and site office, prevention of pollution, user conflicts, etc. This detail is to be included in Bid document and to be implemented by the prospective Contractor.

About APIIATP

The Andhra Pradesh Community Based Tank Management Project (APCBTMP) was implemented during 2007 and 2016 by the Government of Andhra Pradesh with support from the World Bank with an objective of improving agricultural productivity and building capacities of Water User's Associations (WUAs) to manage tanks effectively. (ISEC, 2006) During the course of implementation of the APCBTMP there was a realization of the need for development of more holistic interventions which aimed not only to improve productivity of crops but also maximized returns by reducing gaps in the supply and demand chain. A specific need to focus on interventions that disseminated and facilitated adoption of technology by farmers, created awareness on quality standards, organized farmers and promoted collective sale and purchase of inputs and produce was identified.

The bank supported APCBTMP has made magnificent development impacts in the state by rehabilitating 2,157 tanks, which resulted in 32% increase in tank command area and contributed to increase in paddy, maize and ground nut productivity by 36%, 72% and 97% respectively. In addition tank rehabilitation resulted in 388% increase in fish productivity over baseline value.

It is in this context that the Andhra Pradesh Integrated Irrigation Agriculture Transformation Project (APIIATP) has been conceptualized by the World Bank and the Government of Andhra Pradesh (GoAP). The project adopts a holistic and synergized approach that seeks integration across relevant stakeholders of the selected minor irrigation tanks across the state under different agro climatic zones.

Project details

The proposed cascade system is situated on near of Thotavada (V), Burja (M) in Srikakulam district. The main source for getting of water to Kurmasagaram Tank is through the monsoon run off from total catchment area of 4.260 sq.km. The catchment area covered with hilly area and semi plain area. The tank is located about 39 m asl, catchment area of the tank is 0.52 sq.kms. Total storage capacity of the tank is 41.25 mcft designed to irrigate an area of 330.69 Acres. Average rainfall in the area is about 1007.6 mm. considering the overall physiography of the catchment on basis of experience it can be classified as Average Catchment according to Strange's table.

Key Issues related to Kurmasagaram Tank

f) Earth Bund:

- v. Earth Bund slopes are covered with jungle (Prosopis and other weeds).
- vi. Rain cuts of gullies formed on rear side of bund and the slopes are not up to the mark.
- vii. The existing bund is not as per Minor Irrigation standards.
- viii. There is no revetment on u/s of bund.

g) Irrigation Channel:

- i. Under Sluice- I, The irrigation channel is badly silted up and covered with bushes.
- ii. Under Sluice- II, The irrigation channel is badly silted up and covered with bushes.

h) Supply Channel:

- i. The Supply channel is not in a position to carry the adequate discharge. It is covered with jungle and silted up canal.

Proposed Sub-project for tank improvement

- f. Strengthening of the tank bund
 - Removal of thick jungle and strengthening of the tank bund
 - Providing and laying Hariyala or other approved quality turfing sods for the slopes of earthen embankments
 - Providing revetment with dry rubble stone pitching on the u/s of the bund
- g. Repairing of Surplus weir
- h. Improvement of Irrigation Channels
- i. Improvement of Supply Channel

Engineering details, designs and cost estimates of the proposed activities are provided in the detailed project report (DPR)

Environmental Management Plan

The potential impacts on the environment during the construction and operation of the project and the environmental management plan including the mitigation measures and monitoring programs necessary to minimize potential adverse impacts on the environment is presented.

The plan covers pre-construction and construction phases of the project. The EMP includes the organizational structure, specific mitigation actions and monitoring program.

At this stage of project development and information available, a detailed EMP has been provided in the following table.

Pre-construction environmental management measures

Pre-construction phase activities	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
<p>Site preparation Clearing of bushes from the bund, irrigation channel and feeder channel Waste handling and transportation Soil compaction</p>	<ul style="list-style-type: none"> • Isolate the construction area with flexible enclosure/curtains so that the air emissions will not spread in the surroundings. • Sprinkling of water in the construction area and unpaved roads • Proper maintenance of vehicle shall be done • Minimize dust generating activities • Cover heavy vehicles moving offsite • Restrict vehicle speed on construction site ensure vehicles use only dedicated construction roads. • Visually monitor particulate 	Contractor	One time	SPU/DPU
<p>Labour deployment and camp setting Construction of labour sheds to accommodate labour, supply of drinking water, supply of fuel/energy, waste handling and disposal, sewage disposal.</p>	<ul style="list-style-type: none"> • Follow all relevant provision of the Factory Act, 1948 and the Building and the other construction workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp. • The location, layout and basic facility provision of labour cam shall be submitted to engineer prior to the construction. • The construction shall commence only upon the written approval of the engineer • The contractor shall maintain necessary living accommodation and ancillary facilities in functional and hygienic manner and as approved by the engineer. 	Contractor	One time	SPU/DPU

Pre-construction phase activities	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
	<ul style="list-style-type: none"> • All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be planned. Adequate health care is to be provided for the work force. The layout of the construction camp and details of the facilities provided should be prepared and shall be approved by the engineer. • Unskilled labour shall be recruited from local village. • Development of code of conduct for camp rules, camp workers and disciplinary procedures. • Separate bath and was facilities for women labours • Avoid employing children’s aged below 18 			
Mobilization of machineries and transportation	<ul style="list-style-type: none"> • Minimize dust generation activities • Cover heavy vehicles carrying construction materials to project site • Visually monitor particulate emission from diesel vehicles and carryout regular maintenance of equipment • Prevent dust generation by sprinkling water 	Contractor	One time	SPU/DPU
Material handling and storage	<ul style="list-style-type: none"> • Provide necessary PPE to the workers handling construction materials such as sand, cement, brick TMT rods and other construction equipment’s. 	Contractor	One time	SPU/DPU
Storage sites (for large and long duration storage)	<ul style="list-style-type: none"> • Petrol/Oil/Lubricants: Brick on edge flooring or sand flooring will be provided at the storage places of 	Contractor	One time	SPU/DPU

Pre-construction phase activities	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
	<p>Petrol/Oil/Lubricants to avoid soil and water contamination due to spillage.</p> <ul style="list-style-type: none"> • Cement: Damp-proof flooring, as per IS codes 			
Silt disposal site	<ul style="list-style-type: none"> • Shall be identified by Engineer during the implementation 	SPU/DPU	One time	SPU/DPU
Waste disposal	<ul style="list-style-type: none"> • The sewage from the labour camp site shall be disposed in line with the Environmental (Protection Act), 1986 in identified location. • Solid waste generated from the labour site shall be disposed as per the Solid Waste Management Rules, 2016 • Used oil from the project site shall be disposed as per the Hazardous And Other Wastes (Management and Transboundary Movement) Rules, 2015, • Construction and demolition waste such as debris and rubble shall be disposed as per the Construction and Demolition Waste Management Rules, • 2016 	Contractor	One time	SPU/DPU
Tree cutting	<ul style="list-style-type: none"> • Necessary clearance for cutting of trees should be obtained by Engineer in charge. 	SPU/DPU	One time	SPU/DPU

Construction phase environmental management measures

Potential Environmental Impacts	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility

Potential Environmental Impacts	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
Construction Sites (Applicable, If number of labour residing exceed 100)	<ul style="list-style-type: none"> It should be kept free of water logging Protective guards should be provided across the areas where workers may fall or could face an impalement hazard. Store tools and materials neatly and out of the way in storage bins or lockers and keep flammable or hazardous wastes, if any, in covered, segregated waste containers Keep form and scrap lumber away from work areas, passageways No loose material should be allowed to leave unattended, and sites should be properly finished after completing the work 	Contractor	Once in a month	SPU/DPU
Public Safety	Warning sign boards should be provided along the construction sites in Telugu and English	Contractor	Once in a month	SPU/DPU
Occupational Health & Safety	<ul style="list-style-type: none"> Safe access to the job sites should be provided to all workers Passage ways, walkways, and ramps should be kept free of materials, scraps or obstructions First Aid box should be readily available at construction sites Contact with nearest nursing homes/clinics/primary health centre should be maintained by the Contractor to deal with any emergency at site A vehicle should be readily available at construction site to meet emergency situation The contractor should comply with all the precautions as required for the safety of the workmen as per Labour Laws as applicable to this project The contractor should strictly follow the statutory child labour act Personal Protective Equipment such as helmets, hand gloves, safety shoes, nose masks, safety goggles should be provided to the workers as per Act. 	Contractor	Once in a month	SPU/DPU
Water Pollution	<ul style="list-style-type: none"> SW and GW quality to be tested for any fecal contamination 	Contractor	Once in a month	SPU/DPU
Solid Waste	<ul style="list-style-type: none"> Solid waste shall be disposed at authorized sites identified - 	Contractor	Once in a month	SPU/DPU
Soil Pollution	<ul style="list-style-type: none"> Measures to prevent accidental spills of oils and other lubricants 	Contractor	Once in a month	SPU/DPU

Potential Environmental Impacts	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
	<ul style="list-style-type: none"> Disposal of waste and wastewater shall not be done on open land. 		month	
Noise and Vibration	<ul style="list-style-type: none"> Adequate measures shall be taken to control noise and vibration during operation of machineries and vehicles 	Contractor	Once in a month	SPU/DPU
Air Pollution	<ul style="list-style-type: none"> Properly functioning construction equipment to minimize exhaust shall be maintained Idling of machines and equipment shall be minimized Cover stockpiled silt and trucks hauling silt, sand, and other loose materials or require trucks to maintain at least two feet of freeboard 	Contractor	Once in a month	SPU/DPU
Landscape Degradation	<ul style="list-style-type: none"> On completion of the works all the temporary structures may be cleared away, all rubbish disposed, excreta and disposal pits or trenches filled in and effectively sealed off and the whole site and shall be handed over to the Department in good condition. 	Contractor	One time	SPU/DPU

Applicable World Bank Safeguard Policies

c) Natural Habitat Plan

The proposed restoration activities shall have temporary and acute impacts on Aquatic animals, avifauna and other native vegetation. To minimize the associated impacts, a Natural Habitat Plan (NHP) has been prepared.

d) Pest Management Plan

The proposed project shall improve the water availability for irrigation resulting in diversification of crops and intensification of agricultural production. Due to this the consumption of Pesticide, fertilizer and other agro-chemical consumption might increase. To minimize the associated impacts, a Pest Management Plan (PMP) has been prepared that includes an Integrated Pest Management and Integrated Nutrient Management strategy.

Institutional Arrangement

The project proposes to adopt a community-based approach in tank improvement and management. Hence it is essential that right from the beginning community participation in addressing environment concerns is planned and integrated in the overall project plan.

Environmental issues and concerns identified definitely affect the performance and utility of tank system. Hence, due importance needs to be given to address these concerns in the planning and implementation process. Essentially, appropriate institutional arrangements, including adequate staffing with specialization in environmental management, need to be ensured at the different levels of project institutional structure. Accordingly, the following institutional arrangement is proposed.

Stakeholder	Role
State Level	
Project Management Unit (PMU): Environment Safeguard Expert	Ensuring implementation of Environmental Management Framework, coordinate with Dam Safety Panel for Dam Safety Plan, guide DPUs in formulation of environment component to be integrated in the Detailed Project Report (DPR), monitor implementation of environment management framework
Capacity Building and Communication Expert	Identifying stakeholders and ensuring their participation, identifying training needs of key stakeholders, ensuring timely implementation of capacity building measures of environmental management components
Agronomist	Provide CB inputs on Increase of Productivity and production to the farmers
Agri-Business Expert	Developing sector plans and overseeing implementation
Senior Fisheries Expert	Ensuring implementation of components related to fisheries in the EMP
District Level	
District Project Unit	Similar arrangement will be made at district level for supporting district level Institutional Development Unit, if required, through deputation of

Stakeholder	Role
	Government staff with specific experience and subject matter expertise, to ensure proper implementation of EMP activities at the sub-project level and coordination between the field and project management unit
Cascade Level	
SO (Support Organization) and Cascade Coordination and Management Committee (CCMC)	Terms of Reference for SO will include specific responsibilities to manage environmental management activities at cascade level. The project will develop capacities both CCMC and SO. The project will implement environmental management activities by involving Common Interest Groups, Farmer Producer Organizations and PFCSS
Tank Level	
SO (Support Organization)	TOR for SO will include specific responsibilities to manage environmental management activities. The project will develop capacities both WUA and SO through training to plan and implement environmental management activities

Participants	Training Needs	Resource Organization
Primary Stakeholders		
WUA Managing Committee Members, Tribal Members, Women's Group Leaders, GP Members, Para-workers and Progressive Farmers	<ul style="list-style-type: none"> Environmental issues and their impacts 	<ul style="list-style-type: none"> NGOs, Agriculture Research Stations, DRPs
	<ul style="list-style-type: none"> Addressing environmental issues and mitigating measures 	<ul style="list-style-type: none"> Line Department Staff
	<ul style="list-style-type: none"> Sustainable use of natural resources Importance of soil and water conservation 	
	<ul style="list-style-type: none"> Improved farm practices, water use, crop diversification, organic farming, balanced nutrient application, IPM and INM techniques etc. 	
	<ul style="list-style-type: none"> Management, leadership and communication 	
	<ul style="list-style-type: none"> Record keeping and basic maintenance of financial accounts 	
<ul style="list-style-type: none"> Monitoring of environmental parameters 		
Secondary Stakeholders		
Water Resource Department	<ul style="list-style-type: none"> Purpose and components of EMP for APIIATP 	<ul style="list-style-type: none"> External Institutions and Agencies/ Line Department Staff
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Agriculture Department	<ul style="list-style-type: none"> Modernization of agriculture 	<ul style="list-style-type: none"> Shall be identified based on specific requirements
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The designated Environment Specialists shall be responsible for overseeing compliance of the sub-projects to Bank safeguards, GoI/GoAP regulations and applicable EMP guidelines. They shall also regularly review timely implementation of environment provisions as applicable. Corrective actions shall be initiated in a planned manner as appropriate to ensure compliance to the EMP measures.

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Impact/Outcome Assessments (Mid-Term and Final)	These would be undertaken at critical stages of the project and would aim at assessing the extent to which project has been able to achieve targeted indicators. This would be undertaken by an external agency	The monitoring of EMP will be an integral part of the overall monitoring and learning system. The external agency will be given specific tasks for monitoring of EMP based on the indicators identified. The external agency would be responsible for impact/outcome assessment and environmental	Mid Term/End Term Mid Term/End Term

Type of Monitoring	Description	Responsibility	Frequency
Environmental Management Audits	<p>Environmental management audits would be conducted at mid-term and end-term stages and would identify significant issues and impacts associated with the interventions such as strengthening and up gradation of tanks, dam safety, improving irrigation efficiency, crop diversification, productivity enhancement through climate resilient/adaptive sustainable agriculture production, technology promotion in fisheries etc. Mid-term Environmental Management Audit shall assess to what extent the expected results have been achieved and if any mitigation measures are needed. The final environmental management audit shall assess whether expected outcomes at baseline and mid-term have been achieved and mitigation measures proposed have been implemented</p>	<p>management audits</p> <p>The monitoring of ESMF will be an integral part of the overall monitoring and learning system. The external agency will be given specific tasks for monitoring of EMP based on the indicators identified. The external agency would be responsible for impact/outcome assessment and environmental management audits</p>	

Environmental Management Plan -3

**EMP FOR Dattappa Tank,
Peddipalem village, Ananthapuram Mandal
Visakhapatnam District**

Andhra Pradesh Integrated Irrigation and Agriculture
Transformation Project

Introduction

The Environmental Management Plan (EMP) integrates the baseline conditions, impacts likely to occur, and the measures which need to be implemented for amelioration of adverse impacts for proposed category-B sub-projects. EMP for the proposed category-B sub-projects, includes rehabilitation of tanks and increased use of agro-chemicals. The EMP shall give particular attention to project sustainability issues such as EHS, construction camps and site office, prevention of pollution, user conflicts, etc. This detail is to be included in Bid document and to be implemented by the prospective Contractor.

About APIIATP

The Andhra Pradesh Community Based Tank Management Project (APCBTMP) was implemented during 2007 and 2016 by the Government of Andhra Pradesh with support from the World Bank with an objective of improving agricultural productivity and building capacities of Water User's Associations (WUAs) to manage tanks effectively. (ISEC, 2006) During the course of implementation of the APCBTMP there was a realization of the need for development of more holistic interventions which aimed not only to improve productivity of crops but also maximized returns by reducing gaps in the supply and demand chain. A specific need to focus on interventions that disseminated and facilitated adoption of technology by farmers, created awareness on quality standards, organized farmers and promoted collective sale and purchase of inputs and produce was identified.

The bank supported APCBTMP has made magnificent development impacts in the state by rehabilitating 2,157 tanks, which resulted in 32% increase in tank command area and contributed to increase in paddy, maize and ground nut productivity by 36%, 72% and 97% respectively. In addition tank rehabilitation resulted in 388% increase in fish productivity over baseline value.

It is in this context that the Andhra Pradesh Integrated Irrigation Agriculture Transformation Project (APIIATP) has been conceptualized by the World Bank and the Government of Andhra Pradesh (GoAP). The project adopts a holistic and synergized approach that seeks integration across relevant stakeholders of the selected minor irrigation tanks across the state under different agro climatic zones.

Project details

This project is proposed for improvement of Dattappa Independent tank. The tank is covered in Anandapuram Mandal of Visakhapatnam district and situated on West of Peddipalem Village. The Total ayacut covered in Peddipalem village. The tank is located about 16 m asl, catchment area of the tank is 3.24 sq.kms Total storage capacity of the tank is 31.81 mcft designed to irrigate an area of 98.8 Ha.

Key Issues related to Dattappa Tank

i) Earth Bund:

- ix. **Earth Bund slopes are covered with jungle (Prosopis, Parthenium and other weeds).**
- x. Rain cuts of gullies formed on rear side of bund and the slopes are not up to the mark.
- xi. The existing bund is not as per Minor Irrigation standards.
- xii. There is no revetment on u/s of bund.

j) Sluice and surplus course

- i. Headwalls damaged for sluices -I,II andIII
- ii. Unlined Surplus course

k) Irrigation Channel:

- iii. The Main Irrigation channels under Sluice – I and II are unlined.
- iv. The Irrigation channels under Sluice – III and IV are unlined.

l) Supply Channel:

- ii. The Supply channels from Jaggannabanda and Gudilova are not in a position to carry the adequate discharge. It is covered with jungle and silted up canal.

Proposed Sub-project for tank improvement

- j. Strengthening of the tank bund
 - Removal of thick jungle and strengthening of the tank bund
 - Providing and laying Hariyala or other approved quality turfing sods for the slopes of earthen embankments
 - Providing revetment with dry rubble stone pitching on the u/s of the bund
- k. Repairing of sluice headwalls
- l. Protection wall for surplus course
- m. Improvement of Irrigation Channels under Sluices I, II, III and IV.
- n. Improvement of Supply Channels from Jaggannabanda and Gudilova tanks.

Engineering details, designs and cost estimates of the proposed activities are provided in the detailed project report (DPR)

Environmental Management Plan

The potential impacts on the environment during the construction and operation of the project and the environmental management plan including the mitigation measures and monitoring programs necessary to minimize potential adverse impacts on the environment is presented.

The plan covers pre-construction and construction phases of the project. The EMP includes the organizational structure, specific mitigation actions and monitoring program.

At this stage of project development and information available, a detailed EMP has been provided in the following table.

Pre-construction environmental management measures

Pre-construction phase activities	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
<p>Site preparation Clearing of bushes from the bund, irrigation channel and feeder channel Waste handling and transportation Soil compaction</p>	<p>Isolate the construction area with flexible enclosure/curtains so that the air emissions will not spread in the surroundings. Sprinkling of water in the construction area and unpaved roads Proper maintenance of vehicle shall be done Minimize dust generating activities Cover heavy vehicles moving offsite Restrict vehicle speed on construction site ensure vehicles use only dedicated construction roads. Visually monitor particulate</p>	<p>Contractor</p>	<p>One time</p>	<p>SPU/DPU</p>
<p>Labour deployment and camp setting Construction of labour sheds to accommodate labour, supply of drinking water, supply of fuel/energy, waste handling and disposal, sewage disposal.</p>	<p>Follow all relevant provision of the Factory Act, 1948 and the Building and the other construction workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp. The location, layout and basic facility provision of labour cam shall be submitted to engineer prior to the construction. The construction shall commence only upon the written approval of the engineer The contractor shall maintain necessary living accommodation and ancillary facilities in functional and hygienic manner and as approved by the engineer. All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be planned. Adequate health care</p>	<p>Contractor</p>	<p>One time</p>	<p>SPU/DPU</p>

Pre-construction phase activities	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
	<p>is to be provided for the work force. The layout of the construction camp and details of the facilities provided should be prepared and shall be approved by the engineer.</p> <p>Unskilled labour shall be recruited from local village.</p> <p>Development of code of conduct for camp rules, camp workers and disciplinary procedures.</p> <p>Separate bath and was facilities for women labours</p> <p>Avoid employing children's aged below 18</p>			
Mobilization of machineries and transportation	<p>Minimize dust generation activities</p> <p>Cover heavy vehicles carrying construction materials to project site</p> <p>Visually monitor particulate emission from diesel vehicles and carryout regular maintenance of equipment</p> <p>Prevent dust generation by sprinkling water</p>	Contractor	One time	SPU/DPU
Material handling and storage	<p>Provide necessary PPE to the workers handling construction materials such as sand, cement, brick TMT rods and other construction equipment's.</p>	Contractor	One time	SPU/DPU
Storage sites (for large and long duration storage)	<p>Petrol/Oil/Lubricants: Brick on edge flooring or sand flooring will be provided at the storage places of Petrol/Oil/Lubricants to avoid soil and water contamination due to spillage.</p> <p>Cement: Damp-proof flooring, as per IS codes</p>	Contractor	One time	SPU/DPU
Silt disposal site	<p>Shall be identified by Engineer during the implementation</p>	SPU/DPU	One time	SPU/DPU
Waste disposal	<p>The sewage from the labour camp site shall be disposed in line with the Environmental (Protection Act), 1986 in identified location.</p>	Contractor	One time	SPU/DPU

Pre-construction phase activities	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
	Solid waste generated from the labour site shall be disposed as per the Solid Waste Management Rules, 2016 Used oil from the project site shall be disposed as per the Hazardous And Other Wastes(Management and Transboundary Movement) Rules, 2015, Construction and demolition waste such as debris and rubble shall be disposed as per the Construction and Demolition Waste Management Rules, 2016			
Tree cutting	Necessary clearance for cutting of trees should be obtained by Engineer in charge.	SPU/DPU	One time	SPU/DPU

Construction phase environmental management measures

Potential Environmental Impacts	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
Construction Sites (Applicable, If number of labour residing exceed 100)	<ul style="list-style-type: none"> • It should be kept free of water logging • Protective guards should be provided across the areas where workers may fall or could face an impalement hazard. • Store tools and materials neatly and out of the way in storage bins or lockers and keep flammable or hazardous wastes, if any, in covered, segregated waste containers • Keep form and scrap lumber away from work areas, passageways • No loose material should be allowed to leave unattended, and sites should be properly finished after completing the work 	Contractor	Once in a month	SPU/DPU
Public Safety	Warning sign boards should be provided along the construction sites in Telugu and English	Contractor	Once in a month	SPU/DPU

Potential Environmental Impacts	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
Occupational Health & Safety	<ul style="list-style-type: none"> • Safe access to the job sites should be provided to all workers • Passage ways, walkways, and ramps should be kept free of materials, scraps or obstructions • First Aid box should be readily available at construction sites • Contact with nearest nursing homes/clinics/primary health centre should be maintained by the Contractor to deal with any emergency at site • A vehicle should be readily available at construction site to meet emergency situation • The contractor should comply with all the precautions as required for the safety of the workmen as per Labour Laws as applicable to this project • The contractor should strictly follow the statutory child labour act • Personal Protective Equipment such as helmets, hand gloves, safety shoes, nose masks, safety goggles should be provided to the workers as per Act. 	Contractor	Once in a month	SPU/DPU
Water Pollution	SW and GW quality to be tested for any fecal contamination	Contractor	Once in a month	SPU/DPU
Solid Waste	Solid waste shall be disposed at authorized sites identified	Contractor	Once in a month	SPU/DPU
Soil Pollution	<ul style="list-style-type: none"> • Measures to prevent accidental spills of oils and other lubricants • Disposal of waste and wastewater shall not be done on open land. 	Contractor	Once in a month	SPU/DPU
Noise and Vibration	Adequate measures shall be taken to control noise and vibration during operation of machineries and vehicles	Contractor	Once in a month	SPU/DPU
Air Pollution	<ul style="list-style-type: none"> • Properly functioning construction equipment to minimize exhaust shall be maintained • Idling of machines and equipment shall be minimized • Cover stockpiled silt and trucks hauling silt, sand, and other 	Contractor	Once in a month	SPU/DPU

Potential Environmental Impacts	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
	loose materials or require trucks to maintain at least two feet of freeboard			
Landscape Degradation	On completion of the works all the temporary structures may be cleared away, all rubbish disposed, excreta and disposal pits or trenches filled in and effectively sealed off and the whole site and shall be handed over to the Department in good condition.	Contractor	One time	SPU/DPU

Applicable World Bank Safeguard Policies

a) Natural Habitat Plan

The proposed restoration activities shall have temporary and acute impacts on Aquatic animals, avifauna and other native vegetation. To minimize the associated impacts, a Natural Habitat Plan (NHP) has been prepared.

b) Pest Management Plan

The proposed project shall improve the water availability for irrigation resulting in diversification of crops and intensification of agricultural production. Due to this the consumption of Pesticide, fertilizer and other agro-chemical consumption might increase. To minimize the associated impacts, a Pest Management Plan (PMP) has been prepared that includes an Integrated Pest Management and Integrated Nutrient Management strategy.

Institutional Arrangement

The project proposes to adopt a community-based approach in tank improvement and management. Hence it is essential that right from the beginning community participation in addressing environment concerns is planned and integrated in the overall project plan.

Environmental issues and concerns identified definitely affect the performance and utility of tank system. Hence, due importance needs to be given to address these concerns in the planning and implementation process. Essentially, appropriate institutional arrangements, including adequate staffing with specialization in environmental management, need to be ensured at the different levels of project institutional structure. Accordingly, the following institutional arrangement is proposed.

Stakeholder	Role
State Level	
Project Management Unit (PMU): Environment Safeguard Expert	Ensuring implementation of Environmental Management Framework, coordinate with Dam Safety Panel for Dam Safety Plan, guide DPUs in formulation of environment component to be integrated in the Detailed Project Report (DPR), monitor implementation of environment management framework
Capacity Building and Communication Expert	Identifying stakeholders and ensuring their participation, identifying training needs of key stakeholders, ensuring timely implementation of capacity building measures of environmental management components
Agronomist	Provide CB inputs on Increase of Productivity and production to the farmers
Agri-Business Expert	Developing sector plans and overseeing implementation
Senior Fisheries Expert	Ensuring implementation of components related to fisheries in the EMP
District Level	
District Project Unit	Similar arrangement will be made at district level for supporting district level Institutional Development Unit, if required, through deputation of

Stakeholder	Role
	Government staff with specific experience and subject matter expertise, to ensure proper implementation of EMP activities at the sub-project level and coordination between the field and project management unit
Cascade Level	
SO (Support Organization) and Cascade Coordination and Management Committee (CCMC)	Terms of Reference for SO will include specific responsibilities to manage environmental management activities at cascade level. The project will develop capacities both CCMC and SO. The project will implement environmental management activities by involving Common Interest Groups, Farmer Producer Organizations and PFCSS
Tank Level	
SO (Support Organization)	TOR for SO will include specific responsibilities to manage environmental management activities. The project will develop capacities both WUA and SO through training to plan and implement environmental management activities

Participants	Training Needs	Resource Organization
Primary Stakeholders		
WUA Managing Committee Members, Tribal Members, Women’s Group Leaders, GP Members, Para-workers and Progressive Farmers	<ul style="list-style-type: none"> Environmental issues and their impacts 	<ul style="list-style-type: none"> NGOs, Agriculture Research Stations, DRPs
	<ul style="list-style-type: none"> Addressing environmental issues and mitigating measures 	<ul style="list-style-type: none"> Line Department Staff
	<ul style="list-style-type: none"> Sustainable use of natural resources Importance of soil and water conservation 	
	<ul style="list-style-type: none"> Improved farm practices, water use, crop diversification, organic farming, balanced nutrient application, IPM and INM techniques etc. 	
	<ul style="list-style-type: none"> Management, leadership and communication 	
	<ul style="list-style-type: none"> Record keeping and basic maintenance of financial accounts 	
<ul style="list-style-type: none"> Monitoring of environmental parameters 		
Secondary Stakeholders		
Water Resource Department	<ul style="list-style-type: none"> Purpose and components of EMP for APIIATP 	<ul style="list-style-type: none"> External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> Identification of environmental and issues and mitigating measures 	<ul style="list-style-type: none"> External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> Environmental appraisal process- Screening and environmental appraisal 	<ul style="list-style-type: none"> External Institutions and Agencies/ Line Department Staff

Participants	Training Needs	Resource Organization
	<ul style="list-style-type: none"> Implementation of Environmental Management Framework 	<ul style="list-style-type: none"> External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> Institutional arrangement of Environmental Management Framework 	<ul style="list-style-type: none"> External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> Key aspects for monitoring of Environmental Management Framework 	<ul style="list-style-type: none"> External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> Dam Safety Measures 	<ul style="list-style-type: none"> SDSO, Vijayawada
Agriculture Department	<ul style="list-style-type: none"> Modernization of agriculture 	<ul style="list-style-type: none"> Shall be identified based on specific requirements
	<ul style="list-style-type: none"> Eco-friendly farm practices 	<ul style="list-style-type: none"> Shall be identified based on specific requirements
	<ul style="list-style-type: none"> Impact of Climate variability on crops, importance of adaptation measures, contingency plans etc 	<ul style="list-style-type: none"> Acharya Ranga Agricultural University, AP
Agricultural Marketing Staff	<ul style="list-style-type: none"> Updating skills and knowledge on IPM and INM 	<ul style="list-style-type: none"> Agriculture Department, GoAP
	<ul style="list-style-type: none"> Organic farming practices 	<ul style="list-style-type: none"> Agriculture Department, GoAP
	<ul style="list-style-type: none"> Direct marketing and Farmers Producer Organizations 	<ul style="list-style-type: none"> Agriculture Department, GoAP
	<ul style="list-style-type: none"> Management of cold storage and other infrastructures 	<ul style="list-style-type: none"> NGOs and other institutions
	<ul style="list-style-type: none"> Organic certification and Green business opportunities 	<ul style="list-style-type: none"> Seed Certification Agency, Guntur, AP
	<ul style="list-style-type: none"> Packaging and Branding 	<ul style="list-style-type: none"> Home Science College, Bapatla, AP
Horticultural Department	<ul style="list-style-type: none"> Impact of Climate variability on crops, importance of adaptation measures, contingency plan etc 	<ul style="list-style-type: none"> Acharya Ranga Agricultural University, AP
	<ul style="list-style-type: none"> Updating skills and knowledge on IPM and INM 	<ul style="list-style-type: none"> Horticulture Department, GoAP
	<ul style="list-style-type: none"> Organic farming practices 	<ul style="list-style-type: none"> Horticulture Department, GoAP
Fisheries Department	<ul style="list-style-type: none"> Fish farming in farm ponds and value addition of fishery products 	<ul style="list-style-type: none"> Fisheries Institute, Kakinada, GoAP Fisheries Department, GoAP
	<ul style="list-style-type: none"> Fish farming in farm ponds and value addition of fishery products 	<ul style="list-style-type: none"> Fisheries Institute, Kakinada, GoAP Fisheries Department, GoAP
All Departments, SOs Staff	<ul style="list-style-type: none"> Participatory Irrigation Management 	<ul style="list-style-type: none"> Shall be identified based on specific requirements
	<ul style="list-style-type: none"> Awareness about and environmental issues and their impacts 	<ul style="list-style-type: none"> Shall be identified based on specific requirements
	<ul style="list-style-type: none"> Impact assessment, mitigation and monitoring measures 	<ul style="list-style-type: none"> Shall be identified based on specific requirements

Monitoring and Evaluation

Monitoring and evaluation activities assume a high level of importance in light of the stress on timely achievement of project objectives and an emphasis on quality outputs and processes. The M&E system would act as a tool for measuring and assessing project activities, developing corrective measures and evaluating impact. The project stakeholders involved in implementation would have a key role to play in operationalizing and adopting the M&E system.

The designated Environment Specialists shall be responsible for overseeing compliance of the sub-projects to Bank safeguards, GoI/GoAP regulations and applicable EMP guidelines. They shall also regularly review timely implementation of environment provisions as applicable. Corrective actions shall be initiated in a planned manner as appropriate to ensure compliance to the EMP measures.

Type of Monitoring	Description	Responsibility	Frequency
Progress Monitoring	Physical progress monitoring will be carried out with a view to identify activity progress, highlight constraints and good practices	Internal: At the WUA level, as a part of participatory monitoring, the Representative of WUAs, and SO would monitor progress of implementation and report to WUA and DPU. At the District level, DPU will monitor the implementation of and Environmental Management Plan. The DPU will submit quarterly progress reports to PMU. At the state level, the PMU will monitor implementation of EMP. Both at DPU and PMU levels the respective Environmental Units will be overall responsible for monitoring of implementation of the EMP	Monthly/Quarterly/Annual
Impact/Outcome Assessments (Mid-Term and Final)	These would be undertaken at critical stages of the project and would aim at assessing the extent to which project has been able to achieve targeted indicators. This would be undertaken by an external agency	The monitoring of EMP will be an integral part of the overall monitoring and learning system. The external agency will be given specific tasks for monitoring of EMP based on the indicators identified. The external agency would be responsible for impact/outcome assessment	Mid Term/End Term Mid Term/End

Type of Monitoring	Description	Responsibility	Frequency
Environmental Management Audits	<p>Environmental management audits would be conducted at mid-term and end-term stages and would identify significant issues and impacts associated with the interventions such as strengthening and up gradation of tanks, dam safety, improving irrigation efficiency, crop diversification, productivity enhancement through climate resilient/adaptive sustainable agriculture production, technology promotion in fisheries etc. Mid-term Environmental Management Audit shall assess to what extent the expected results have been achieved and if any mitigation measures are needed. The final environmental management audit shall assess whether expected outcomes at baseline and mid-term have been achieved and mitigation measures proposed have been implemented</p>	<p>and environmental management audits</p> <p>The monitoring of ESMF will be an integral part of the overall monitoring and learning system. The external agency will be given specific tasks for monitoring of EMP based on the indicators identified. The external agency would be responsible for impact/outcome assessment and environmental management audits</p>	Term

Environmental Management Plan - 4

**EMP FOR Gollavani Tank,
Thirumalapalem village,
Dwarka Tirumala Mandal
West Godavari District**

Andhra Pradesh Integrated Irrigation and Agriculture
Transformation Project

Introduction

The Environmental Management Plan (EMP) integrates the baseline conditions, impacts likely to occur, and the measures which need to be implemented for amelioration of adverse impacts for proposed category-B sub-projects. EMP for the proposed category-B sub-projects, includes rehabilitation of tanks and increased use of agro-chemicals. The EMP shall give particular attention to project sustainability issues such as EHS, construction camps and site office, prevention of pollution, user conflicts, etc. This detail is to be included in Bid document and to be implemented by the prospective Contractor.

About APIIATP

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The bank supported APCBTMP has made magnificent development impacts in the state by rehabilitating 2,157 tanks, which resulted in 32% increase in tank command area and contributed to increase in paddy, maize and ground nut productivity by 36%, 72% and 97% respectively. In addition tank rehabilitating resulted in 388% increase in fish productivity over baseline value.

It is in this context that the Andhra Pradesh Integrated Irrigation Agriculture Transformation Project (APIIATP) has been conceptualized by the World Bank and the Government of Andhra Pradesh (GoAP). The project adopts a holistic and synergized approach that seeks integration across relevant stakeholders of the selected minor irrigation tanks across the state under different agro climatic zones.

Project details

This project is proposed for improvement of Gollavani tank. The tank is located in Thirumalapalem village, Dwarka Tirumala Mandal of West Godavari district. The tank is located about 40 m asl, catchment area of the tank is 1.27sq.kms Total storage capacity at full tank level is 6.9mcft designed to irrigate an area of 137.98 Acres. Presently there is 2 irrigation sluices at km 0.187 and km 0.505 on earthen bund are in good condition.

Key Issues related to Gollavani Tank

a) Earth Bund:

- xiii. Earth Bund slopes are covered with jungle (Prosopis, Parthenium and other weeds).
- xiv. Rain cuts of gullies formed on rear side of bund and the slopes are not up to the mark.
- xv. The existing bund is not as per Minor Irrigation standards.
- xvi. There is no revetment on u/s of bund.

b) Surplus weir

- iii. Surplus weir is not in good condition.

c) Irrigation Channel:

- v. The Irrigation channel under Sluice –I and II are unlined.

d) Supply Channel:

- iii. The Supply channels from Pattiya tank is not in a position to carry the adequate discharge. It is covered with jungle and silted up.

Proposed Sub-project for tank improvement

- a. Strengthening of the tank bund
 - Removal of thick jungle and strengthening of the tank bund
 - Providing and laying Hariyala or other approved quality turfing sods for the slopes of earthen embankments
 - Providing revetment with dry rubble stone pitching on the u/s of the bund
- b. Repairing of surplus weir
- c. Improvement of Irrigation Channels under Sluice I and II.
- d. Improvement of Supply Channels from Pattiya tank.

Engineering details, designs and cost estimates of the proposed activities are provided in the detailed project report (DPR)

Environmental Management Plan

The potential impacts on the environment during the construction and operation of the project and the environmental management plan including the mitigation measures and monitoring programs necessary to minimize potential adverse impacts on the environment is presented.

The plan covers pre-construction and construction phases of the project. The EMP includes the organizational structure, specific mitigation actions and monitoring program.

At this stage of project development and information available, a detailed EMP has been provided in the following table.

Pre-construction environmental management measures

Pre-construction phase activities	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
<p>Site preparation Clearing of bushes from the bund, irrigation channel and feeder channel Waste handling and transportation Soil compaction</p>	<p>Isolate the construction area with flexible enclosure/curtains so that the air emissions will not spread in the surroundings. Sprinkling of water in the construction area and unpaved roads Proper maintenance of vehicle shall be done Minimize dust generating activities Cover heavy vehicles moving offsite Restrict vehicle speed on construction site ensure vehicles use only dedicated construction roads. Visually monitor particulate</p>	<p>Contractor</p>	<p>One time</p>	<p>SPU/DPU</p>
<p>Labour deployment and camp setting Construction of labour sheds to accommodate labour, supply of drinking water, supply of fuel/energy, waste handling and disposal, sewage disposal.</p>	<p>Follow all relevant provision of the Factory Act, 1948 and the Building and the other construction workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp. The location, layout and basic facility provision of labour camp shall be submitted to engineer prior to the construction. The construction shall commence only upon the written approval of the engineer The contractor shall maintain necessary living accommodation and ancillary facilities in functional and hygienic manner and as approved by the engineer. All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be planned. Adequate health care is to be provided for the work force. The layout of the</p>	<p>Contractor</p>	<p>One time</p>	<p>SPU/DPU</p>

Pre-construction phase activities	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
	<p>construction camp and details of the facilities provided should be prepared and shall be approved by the engineer.</p> <p>Unskilled labour shall be recruited from local village.</p> <p>Development of code of conduct for camp rules, camp workers and disciplinary procedures.</p> <p>Separate bath and was facilities for women labours</p> <p>Avoid employing children's aged below 18</p>			
Mobilization of machineries and transportation	<p>Minimize dust generation activities</p> <p>Cover heavy vehicles carrying construction materials to project site</p> <p>Visually monitor particulate emission from diesel vehicles and carryout regular maintenance of equipment</p> <p>Prevent dust generation by sprinkling water</p>	Contractor	One time	SPU/DPU
Material handling and storage	<p>Provide necessary PPE to the workers handling construction materials such as sand, cement, brick TMT rods and other construction equipment's.</p>	Contractor	One time	SPU/DPU
Storage sites (for large and long duration storage)	<p>Petrol/Oil/Lubricants: Brick on edge flooring or sand flooring will be provided at the storage places of Petrol/Oil/Lubricants to avoid soil and water contamination due to spillage.</p> <p>Cement: Damp-proof flooring, as per IS codes</p>	Contractor	One time	SPU/DPU
Silt disposal site	<p>Shall be identified by Engineer during the implementation</p>	SPU/DPU	One time	SPU/DPU
Waste disposal	<p>The sewage from the labour camp site shall be disposed in line with the Environmental (Protection Act), 1986 in identified location.</p> <p>Solid waste generated from the labour site shall be disposed as per the Solid Waste Management Rules, 2016</p> <p>Used oil from the project site shall be disposed as per the Hazardous And Other Wastes(Management and</p>	Contractor	One time	SPU/DPU

Pre-construction phase activities	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
	Transboundary Movement) Rules, 2015, Construction and demolition waste such as debris and rubble shall be disposed as per the Construction and Demolition Waste Management Rules, 2016			
Tree cutting	Necessary clearance for cutting of trees should be obtained by Engineer in charge.	SPU/DPU	One time	SPU/DPU

Construction phase environmental management measures

Potential Environmental Impacts	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
Construction Sites (Applicable, If number of labour residing exceed 100)	<ul style="list-style-type: none"> • It should be kept free of water logging • Protective guards should be provided across the areas where workers may fall or could face an impalement hazard. • Store tools and materials neatly and out of the way in storage bins or lockers and keep flammable or hazardous wastes, if any, in covered, segregated waste containers • Keep form and scrap lumber away from work areas, passageways • No loose material should be allowed to leave unattended, and sites should be properly finished after completing the work 	Contractor	Once in a month	SPU/DPU
Public Safety	Warning sign boards should be provided along the construction sites in Telugu and English	Contractor	Once in a month	SPU/DPU
Occupational Health & Safety	<ul style="list-style-type: none"> • Safe access to the job sites should be provided to all workers • Passage ways, walkways, and ramps should be kept free of materials, scraps or obstructions • First Aid box should be readily available at construction sites 	Contractor	Once in a month	SPU/DPU

Potential Environmental Impacts	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
	<ul style="list-style-type: none"> Contact with nearest nursing homes/clinics/primary health centre should be maintained by the Contractor to deal with any emergency at site A vehicle should be readily available at construction site to meet emergency situation The contractor should comply with all the precautions as required for the safety of the workmen as per Labour Laws as applicable to this project The contractor should strictly follow the statutory child labour act Personal Protective Equipment such as helmets, hand gloves, safety shoes, nose masks, safety goggles should be provided to the workers as per Act. 			
Water Pollution	SW and GW quality to be tested for any fecal contamination	Contractor	Once in a month	SPU/DPU
Solid Waste	Solid waste shall be disposed at authorized sites identified	Contractor	Once in a month	SPU/DPU
Soil Pollution	<ul style="list-style-type: none"> Measures to prevent accidental spills of oils and other lubricants Disposal of waste and wastewater shall not be done on open land. 	Contractor	Once in a month	SPU/DPU
Noise and Vibration	Adequate measures shall be taken to control noise and vibration during operation of machineries and vehicles	Contractor	Once in a month	SPU/DPU
Air Pollution	<ul style="list-style-type: none"> Properly functioning construction equipment to minimize exhaust shall be maintained Idling of machines and equipment shall be minimized Cover stockpiled silt and trucks hauling silt, sand, and other loose materials or require trucks to maintain at least two feet of freeboard 	Contractor	Once in a month	SPU/DPU
Landscape Degradation	On completion of the works all the temporary structures may be cleared away, all rubbish disposed, excreta and disposal pits or	Contractor	One time	SPU/DPU

Potential Environmental Impacts	Mitigation measures	Implementation Responsibilities	Monitoring Frequency	Monitoring Responsibility
	trenches filled in and effectively sealed off and the whole site and shall be handed over to the Department in good condition.			

Applicable World Bank Safeguard Policies

a) Natural Habitat Plan

The proposed restoration activities shall have temporary and acute impacts on Aquatic animals, avifauna and other native vegetation. To minimize the associated impacts, a Natural Habitat Plan (NHP) has been prepared.

b) Pest Management Plan

The proposed project shall improve the water availability for irrigation resulting in diversification of crops and intensification of agricultural production. Due to this the consumption of Pesticide, fertilizer and other agro-chemical consumption might increase. To minimize the associated impacts, a Pest Management Plan (PMP) has been prepared that includes an Integrated Pest Management and Integrated Nutrient Management strategy.

Institutional Arrangement

The project proposes to adopt a community-based approach in tank improvement and management. Hence it is essential that right from the beginning community participation in addressing environment concerns is planned and integrated in the overall project plan.

Environmental issues and concerns identified definitely affect the performance and utility of tank system. Hence, due importance needs to be given to address these concerns in the planning and implementation process. Essentially, appropriate institutional arrangements, including adequate staffing with specialization in environmental management, need to be ensured at the different levels of project institutional structure. Accordingly, the following institutional arrangement is proposed.

Stakeholder	Role
State Level	
Project Management Unit (PMU): Environment Safeguard Expert	Ensuring implementation of Environmental Management Framework, coordinate with Dam Safety Panel for Dam Safety Plan, guide DPUs in formulation of environment component to be integrated in the Detailed Project Report (DPR), monitor implementation of environment management framework
Capacity Building and Communication Expert	Identifying stakeholders and ensuring their participation, identifying training needs of key stakeholders, ensuring timely implementation of capacity building measures of environmental management components
Agronomist	Provide CB inputs on Increase of Productivity and production to the farmers
Agri-Business Expert	Developing sector plans and overseeing implementation
Senior Fisheries Expert	Ensuring implementation of components related to fisheries in the EMP
District Level	
District Project Unit	Similar arrangement will be made at district level for supporting district level

Stakeholder	Role
	Institutional Development Unit, if required, through deputation of Government staff with specific experience and subject matter expertise, to ensure proper implementation of EMP activities at the sub-project level and coordination between the field and project management unit
Cascade Level	
SO (Support Organization) and Cascade Coordination and Management Committee (CCMC)	Terms of Reference for SO will include specific responsibilities to manage environmental management activities at cascade level. The project will develop capacities both CCMC and SO. The project will implement environmental management activities by involving Common Interest Groups, Farmer Producer Organizations and PFCSS
Tank Level	
SO (Support Organization)	TOR for SO will include specific responsibilities to manage environmental management activities. The project will develop capacities both WUA and SO through training to plan and implement environmental management activities

Participants	Training Needs	Resource Organization
Primary Stakeholders		
WUA Managing Committee Members, Tribal Members, Women's Group Leaders, GP Members, Para-workers and Progressive Farmers	<ul style="list-style-type: none"> ▪ Environmental issues and their impacts 	<ul style="list-style-type: none"> ▪ NGOs, Agriculture Research Stations, DRPs
	<ul style="list-style-type: none"> ▪ Addressing environmental issues and mitigating measures 	<ul style="list-style-type: none"> ▪ Line Department Staff
	<ul style="list-style-type: none"> ▪ Sustainable use of natural resources ▪ Importance of soil and water conservation 	
	<ul style="list-style-type: none"> ▪ Improved farm practices, water use, crop diversification, organic farming, balanced nutrient application, IPM and INM techniques etc. 	
	<ul style="list-style-type: none"> ▪ Management, leadership and communication 	
	<ul style="list-style-type: none"> ▪ Record keeping and basic maintenance of financial accounts 	
<ul style="list-style-type: none"> ▪ Monitoring of environmental parameters 		
Secondary Stakeholders		
Water Resource Department	<ul style="list-style-type: none"> ▪ Purpose and components of EMP for APIIATP 	<ul style="list-style-type: none"> ▪ External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> ▪ Identification of environmental issues and mitigating measures 	<ul style="list-style-type: none"> ▪ External Institutions and Agencies/ Line Department Staff

Participants	Training Needs	Resource Organization
	<ul style="list-style-type: none"> Environmental appraisal process- Screening and environmental appraisal 	<ul style="list-style-type: none"> External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> Implementation of Environmental Management Framework 	<ul style="list-style-type: none"> External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> Institutional arrangement of Environmental Management Framework 	<ul style="list-style-type: none"> External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> Key aspects for monitoring of Environmental Management Framework 	<ul style="list-style-type: none"> External Institutions and Agencies/ Line Department Staff
	<ul style="list-style-type: none"> Dam Safety Measures 	<ul style="list-style-type: none"> SDSO, Vijayawada
Agriculture Department	<ul style="list-style-type: none"> Modernization of agriculture 	<ul style="list-style-type: none"> Shall be identified based on specific requirements
	<ul style="list-style-type: none"> Eco-friendly farm practices 	<ul style="list-style-type: none"> Shall be identified based on specific requirements
	<ul style="list-style-type: none"> Impact of Climate variability on crops, importance of adaptation measures, contingency plans etc 	<ul style="list-style-type: none"> Acharya Ranga Agricultural University, AP
Agricultural Marketing Staff	<ul style="list-style-type: none"> Updating skills and knowledge on IPM and INM 	<ul style="list-style-type: none"> Agriculture Department, GoAP
	<ul style="list-style-type: none"> Organic farming practices 	<ul style="list-style-type: none"> Agriculture Department, GoAP
	<ul style="list-style-type: none"> Direct marketing and Farmers Producer Organizations 	<ul style="list-style-type: none"> Agriculture Department, GoAP
	<ul style="list-style-type: none"> Management of cold storage and other infrastructures 	<ul style="list-style-type: none"> NGOs and other institutions
	<ul style="list-style-type: none"> Organic certification and Green business opportunities 	<ul style="list-style-type: none"> Seed Certification Agency, Guntur, AP
	<ul style="list-style-type: none"> Packaging and Branding 	<ul style="list-style-type: none"> Home Science College, Bapatla, AP
Horticultural Department	<ul style="list-style-type: none"> Impact of Climate variability on crops, importance of adaptation measures, contingency plan etc 	<ul style="list-style-type: none"> Acharya Ranga Agricultural University, AP
	<ul style="list-style-type: none"> Updating skills and knowledge on IPM and INM 	<ul style="list-style-type: none"> Horticulture Department, GoAP
	<ul style="list-style-type: none"> Organic farming practices 	<ul style="list-style-type: none"> Horticulture Department, GoAP
Fisheries Department	<ul style="list-style-type: none"> Fish farming in farm ponds and value addition of fishery products 	<ul style="list-style-type: none"> Fisheries Institute, Kakinada, GoAP Fisheries Department, GoAP
	<ul style="list-style-type: none"> Fish farming in farm ponds and value addition of fishery products 	<ul style="list-style-type: none"> Fisheries Institute, Kakinada, GoAP Fisheries Department, GoAP
All Departments, SOs	<ul style="list-style-type: none"> Participatory Irrigation 	<ul style="list-style-type: none"> Shall be identified based on

Participants	Training Needs	Resource Organization
Staff	Management	specific requirements
	<ul style="list-style-type: none"> Awareness about and environmental issues and their impacts 	<ul style="list-style-type: none"> Shall be identified based on specific requirements
	<ul style="list-style-type: none"> Impact assessment, mitigation and monitoring measures 	<ul style="list-style-type: none"> Shall be identified based on specific requirements

Monitoring and Evaluation

Monitoring and evaluation activities assume a high level of importance in light of the stress on timely achievement of project objectives and an emphasis on quality outputs and processes. The M&E system would act as a tool for measuring and assessing project activities, developing corrective measures and evaluating impact. The project stakeholders involved in implementation would have a key role to play in operationalizing and adopting the M&E system.

The designated Environment Specialists shall be responsible for overseeing compliance of the sub-projects to Bank safeguards, GoI/GoAP regulations and applicable EMP guidelines. They shall also regularly review timely implementation of environment provisions as applicable. Corrective actions shall be initiated in a planned manner as appropriate to ensure compliance to the EMP measures.

Type of Monitoring	Description	Responsibility	Frequency
Progress Monitoring	Physical progress monitoring will be carried out with a view to identify activity progress, highlight constraints and good practices	Internal: At the WUA level, as a part of participatory monitoring, the Representative of WUAs, and SO would monitor progress of implementation and report to WUA and DPU. At the District level, DPU will monitor the implementation of and Environmental Management Plan. The DPU will submit quarterly progress reports to PMU. At the state level, the PMU will monitor implementation of EMP. Both at DPU and PMU levels the respective Environmental Units will be overall responsible for monitoring of implementation of the EMP	Monthly/Quarterly /Annual

Type of Monitoring	Description	Responsibility	Frequency
Impact/Outcome Assessments (Mid-Term and Final)	These would be undertaken at critical stages of the project and would aim at assessing the extent to which project has been able to achieve targeted indicators. This would be undertaken by an external agency	The monitoring of EMP will be an integral part of the overall monitoring and learning system. The external agency will be given specific tasks for monitoring of EMP based on the indicators identified. The external agency would be responsible for impact/outcome assessment and environmental management audits	
Environmental Management Audits	Environmental management audits would be conducted at mid-term and end-term stages and would identify significant issues and impacts associated with the interventions such as strengthening and up gradation of tanks, dam safety, improving irrigation efficiency, crop diversification, productivity enhancement through climate resilient/adaptive sustainable agriculture production, technology promotion in fisheries etc. Mid-term Environmental Management Audit shall assess to what extent the expected results have been achieved and if any mitigation measures are needed. The final environmental management audit shall assess whether expected outcomes at baseline and mid-term have been achieved and mitigation measures proposed have	The monitoring of ESMF will be an integral part of the overall monitoring and learning system. The external agency will be given specific tasks for monitoring of EMP based on the indicators identified. The external agency would be responsible for impact/outcome assessment and environmental management audits	Mid Term/End Term Mid Term/End Term

Type of Monitoring	Description	Responsibility	Frequency
	been implemented		