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ANDHRA PRADESH WATER SECTOR IMRPOVEMENT PROJECT INTEGRATED SOCIAL AND ENVIRONEMNTAL ASSESSMENT

EXECUTIVE SUMMARY

Project Context:

In support of the effective implementation of APFMIS Act and help in bringing reforms in the sector, Government of Andhra Pradesh through the Irrigation and Command Area Development Department (I&CAD) has approached the World Bank for assistance to initiate the Andhra Pradesh Water Sector Improvement Project (APWSIP), with the objective of strengthening the State's irrigation capacity for multi-sectoral planning, development and management of water resources and also to improve the irrigation service delivery, water conveyance efficiency and productivity of irrigated agriculture. This would ultimately help improve the irrigation systems in the State to boost up the water sector performance and efficiency of the system resulting in enhancing the benefits to society, particularly farmers and their families, majority of whom are still poor.

The APWSIP would focus on the entire Nagarjuna Sagar Command in the State of Andhra Pradesh to undertake Institutional Restructuring and Capacity Building of key Water Management Agencies, to improve Irrigation Water Service Delivery and Management, Increase the Knowledge Base of the Water Sector and support Project Management and Monitoring Activities.

Project Description:

The development objectives of the proposed APWSIP will be (i) to improve irrigation service delivery on a sustainable basis to increase productivity of irrigated agriculture in the Nagarjuna Sagar Scheme command, and (ii) to strengthen the state's institutional capacity for multi-sectoral planning, development and management of its water resources. The project would support the following four components

Component A: Improving Irrigation Service Delivery and Management in Nagarjuna Sagar Scheme

This component consists of and supports five sub components in the Nagarjuna Sagar Scheme (NSS) which has a command area of about 1 million hectare in AP:

(i) Participatory rehabilitation and modernization of irrigation systems,
(ii) Dam safety works
(iii) Fostering and capacity building of WUAs at all levels of the scheme
(iv) Improved water management practices, including bench marking, administration of water entitlements, and bulk supply of water to users, and
(v) An environmental and social management plan.

Component B: Agriculture Component

This component consists of and supports two sub components:

(i) Agricultural intensification and diversification,
(ii) Market facilitation.

Component C: Water Sector Institutional Restructuring and Capacity Building

This component consists of and supports seven sub components:

(i) Establishment, fostering and operationalization of Andhra Pradesh Water Resources Regulatory Authority
(ii) Restructuring and capacity building of Irrigation and Command Area Development Department (I&CADD)
(iii) Strengthening and capacity building of Water and Land Management Training Institute (WALMTRI),
(iv) Establishment of an integrated computerized information system
(v) Piloting users centered aquifer level ground water management, and
(vi) Piloting conjunctive use of surface and ground water/micro-irrigation system in Nagarjuna Sagar Scheme.

Component D: Project Management:

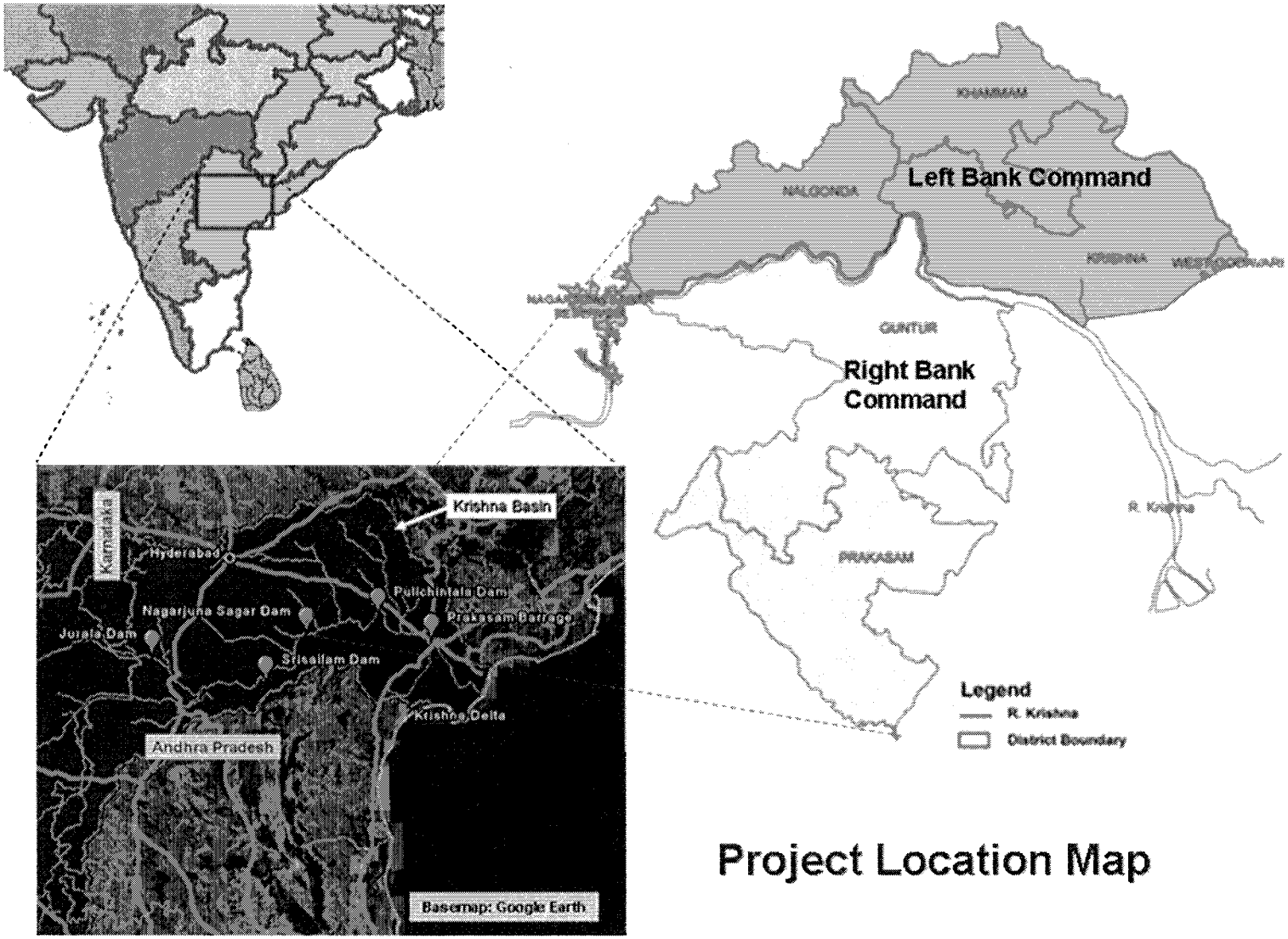
This component consists of and supports three sub components:

(i) Establishment of a state level project preparation and management unit (PPMU)
(ii) Project monitoring and evaluation (M&E), and
(iii) Information, education, and communication program (IEC).

Project Location and Baseline:

Andhra Pradesh is the fifth largest state in India in terms of both its area and population. While it has an area of about 27.68 million hectares, its population as per 2001 census is of 7,57,27,541. Of the total geographical area of the state, 13.2 million hectares come under gross cropped area where as 11.5 million hectares are identified as net cropped area. About 70 percent of the population in the state still depends on agriculture and the major crop they produce is paddy. In addition to this, other crops like cotton, chillies, sugar cane, maize, oil seeds and pulses are also cultivated depending upon various factors like rainfall, soil type and its fertility and irrigation facilities.

Andhra Pradesh is endowed with very rich water resources and is appropriately called a river state. Waters flow in the large rivers Krishna, Godavari, and Pennar and in several minor rivers. The state is broadly divided into three major agro-climatic zones: the Telangana area, comprising the northern part of the State; the Coastal Region, covering the coast along the Bay of Bengal; and the Rayalseema Region covering the southern part of the state.



Project Location Map

Scope of Integrated Social and Environmental Assessment

The study is to provide inputs into the design of APWSIP in accordance with the World Bank Operational Guidelines through identification of key environmental and social issues arising out of the proposed Project activities and mainstream the social and environmental management measures in all stages of the project cycle. To respond to these issues, the study developed a Social and Environmental Management Framework (SEMF) with an aim to ensure that:

1. Environmental and social considerations and opportunities are fully mainstreamed in project planning, implementation and monitoring; and
2. The potential adverse impacts are adequately mitigated and potential benefits of the project are further enhanced to improve the effectiveness and sustainability of the project.

Accordingly, the scope of the study has encompassed the following activities:

1. Compilation of the existing knowledge base of social and environmental issues in the irrigation sub-sector for use in planning, implementation, monitoring and information dissemination for APWSIP.
2. Identification of key stakeholders in the water resources sector in order to assess the social and environmental issues through a consultative process.
3. Analysis of policy, regulatory and institutional framework to recommend enabling measures as well as to improve capacity to implement environmental and social safeguard measures.
4. Development of a resettlement and entitlement (R&R) framework for the people likely to be affected due to the proposed rehabilitation and modernization activities under the project.
5. Development of a consultation strategy to involve stakeholders in planning, implementation, operation and maintenance and monitoring of project related activities;
6. Development of a tribal specific and gender-specific strategies and plans to increase participation of these vulnerable sections in the project
7. Development of a strategy for promotion and effective sue of participatory irrigation management and sustainability of Water User Associations (WUA), and
8. Development of an institutional arrangement to address social and environmental concerns of APWSIP and strengthening of Irrigation Department.

The ISEA also describes the Policy and Institutional Setting in detail, as well as includes a detailed Baseline of the State, Project Districts, and Project Area, including Project Infrastructure. An Analysis of Alternatives has also been undertaken. The following sections provide a summary of other elements of the ISEA and Social and Environmental Management Framework (SEMF) development. A framework has been

considered appropriate for the project given that the activities are dispersed over a large area and will be starting at different points of time. The physical rehabilitation packages will be sectioned according to parts of the canal system (e.g. main canal, branches, distributaries, etc.) which would benefit from a framework approach.

Methodology

The present ISEA study has two main components. The first component is to identify, develop, and incorporate social and environmental measures into project planning, preparation, implementation, and monitoring as a means of capturing direct and indirect social and environmental outcomes derived from all aspects of project execution covering first year packages of the project. In doing so, the social and environmental review was made followed by the development of a suitable social and environmental management framework. All this was done within the applicable policy and regulatory framework at the national and state levels.

The second component of the study covers formulation of package specific social and environmental management plans (SEMP). This involved an assessment of the benefits and the losses that would be experienced by the project population in the studied area covering the defined first year packages of the project. In other words, an attempt has been made in quantifying the socio-economic, environmental and health impacts of the proposed project activities under the first year packages and prepares individual SEMP including measures to mitigate the sufferings of the local people and other potential social and environmental negative impacts based on the detailed social and environmental assessment of these packages.

The methodology in brief is given below:

(1) The baseline primary data was generated through field surveys,

(2) The primary data was supplemented with secondary data/information collected from different sources

(3) The collected data was analyzed and existing as well as the likely social and environmental issues associated with the operation of the project were assessed

(4) A consultation approach was adopted in understanding and assessing the knowledge, awareness, perceptions, and attitudes of various stakeholders towards the identified issues

(5) SEMF including needed training and capacity building measures was developed based on the impacts of the project

The methodological approaches followed by the study team in selecting the study area were organizing field work, collecting data, conducting focus group discussions, village and stakeholder meetings, discussion with project staff and other line departments. This also takes into account the approach in the analysis of primary data

collected and triangulation of the secondary data and qualitative information collected during the field visits.

Key Environmental and Social Issues

The Andhra Pradesh Waster Sector Improvement Project has a number of environmental and social issues associated with the key proposed components and activities as summarized below:

Table 8.2: Key Project-related Environmental and Social Issues

Component	Key Proposed Activities	Social Issues	Environmental Issues
A. Improving Irrigation Service Delivery and Management	• Participatory rehabilitation and modernization of Nagarjuna Sagar Schemes having a CCA of about 1 million ha • Dam safety works & Environmental & Social Mgmt Plan • Fostering and capacity building of water users organizations • Improved water management practices, including bench marking, administration of water entitlements, and bulk water supply to users	• Effective Participation of WUAs • Inclusion of and Benefits to the poor, tribals, women, and other vulnerable groups • Land acquisition and economic rehabilitation	• Dam safety • Effective silt and debris disposal • Borrow area rehabilitation • Weed management • Sustainable fisheries (exotic species, etc.) • Cultural property
B. Agriculture Component	• Agriculture intensification and diversification • Market facilitation	• Improving farmer incomes • Improving access to knowledge (e.g. agricultural technology, market prices, weather information, etc.) • Resilience to climate stress, disease, and market fluctuations	• Induced agro-chemical use and misuse • Environmentally-friendly agricultural and irrigation practices (bio-fertilizers, bio-pesticides, organic cultivation, residue composting, water conservation, etc.)
C. Water Sector Institutional Restructuring and Capacity building	• Establishment, operationalization and fostering of Andhra Pradesh Water Resources Regulatory Authority (APWRRA) • Restructuring and capacity building of Irrigation Department	• Appropriate consideration of environmental issues into water regulation • Clarity on water entitlements and service reliability	• Appropriate consideration of social issues and stakeholder inputs into water regulation • Effective multi-sectoral planning

	• Strengthening and capacity building of Water and Land management and Training Institute (WALAMTARI) • Integrated computerized info. system • Piloting user-centered aquifer level ground water management • Piloting conjunctive use of surface and ground water/ micro – irrigation systems in NSS	• Capacity-building of WUAs • Social knowledge base and analytical skills • Mainstreaming of social issues into decision support systems • Choice of beneficiaries for pilots	and regulation of water resource base • Environmental knowledge base and analytical skills • Mainstreaming of environmental issues into decision support systems • Learning from and adoption of pilots
D. Project Management	• Establishment of a state level Project Preparation and Management Unit (PPMU) • Monitoring and Evaluation (M&E) • Information , Education and Communication (IEC) program	• Appropriate use of ESMF and preparation and implementation of environmental and social management plans for all packages • Adequate monitoring of appropriate environmental and social indicators for adaptive project management • Social and environmental awareness • Appropriate training to improve environmental and social management skills	

Applicability of World Bank Safeguard Policies

The World Bank has a number of Operational Policies (OPs) to effectively management social and environmental issues[1] - the relevant ones are described below:

Applicability of World Bank OP/BP to APWSIP

Safeguard Policies	Summary	Application to the project
4.01 OP / BP - Environmental Assessment Policy	This is an umbrella process to ensure compliance with all other Bank safeguard policies. It provides a framework for analyzing the present conditions and predicting the likely impacts of the development projects. The environmental consequences of the project are taken in to consideration during the project cycle and are taken into account in selection, siting, planning, and designing of projects. It emphasizes upon the mitigative measures so as to reduce the adverse environmental consequences.	This project belongs to category A. Following this Operational Policy (OP), ISEA study analyzes the environmental and social impacts and suggests alternative measures. Issues originating from the stakeholder consultations have been analyzed through SEMF. Hence, the OP is applicable to the project.
4.04 OP/BP -	This policy emphasizes upon the	This OP is not applicable to

[1] See http://www.worldbank.org/safeguards

Natural Habitats	conservation of the natural habitats like land, water, etc. It focuses upon the natural resource management so as to ensure environmentally sustainable development. It aims to support the protection maintenance and rehabilitation of the natural habitats and critical and semi-critical ecosystems.	APWSIP.
4.09 OP-Pest Management	This is a Policy to support biological or environmental control methods in managing pests that affect either agriculture or public health and reduce use of chemical pesticides.	Trainings and awareness programs would be prepared. This OP is applicable to the project.
4.120 OP-Indigenous Peoples	This Policy asserts that the adverse impacts of the development projects on the indigenous people should be mitigated or avoided and the benefits of the project should be accrued to them.	The tribal populations are one of the stakeholders in the project. A tribal development strategy will be prepared so as to benefit from the project. This OP is applicable to the project.
4.12 OP Involuntary Resettlement	The policy aims at avoiding, if not minimizing adverse impacts on the local population due to project and where unavoidable it ensures that those affected improve or at least restore their livelihood.	This OP is applicable to the project.
4.37 OP Safety of Dams	This policy is concerned with the safety of new and existing dams on which Bank financed projects are directly dependent. The policy distinguishes between construction of new dams and existing dams/ dams under construction.	This OP is applicable to the project
4.11 OP Cultural Property	The policy aims to assist and prevention of cultural property and to avoid its elimination.	This OP is applicable to APWSIP. Even though no known sites with cultural property significance are covered under the scope of the APWSIP, this OP is triggered from the perspective of the chance finds of objects or sites of cultural/ archaeological importance, during the course of the physical works rehabilitation/ modernization. In case of such finds, proper steps will be taken to ensure that objects are not destroyed, that relevant authorities are informed, and that a Cultural Property Plan is prepared.

In addition, the World Bank disclosure policy also applies, requiring appropriate disclosure of project related information and documents (including this ESA and the SEMF), including in the project area.

Summary of Consultations

The Consultation with relevant stakeholders had been an important aspect in this ISEA exercise to obtain the perceptions and views of the stakeholders on social and environmental concerns pertaining to the local areas both during this assessment and this will continue during implementation too. The objective of stakeholder consultation is to minimize the negative impacts in the area and to make them feel that they are the ultimate beneficiaries of the project. The views held by the stakeholders are analyzed and presented in this chapter. The primary goal of such consultation was to understand and exchange views among the participants on key social issues, concerns, impacts and to develop a framework to meet responses.

The methodology followed in these consultation workshops is as follows:

- Inviting the key stakeholders to the workshops
- Circulation of review objectives and goals of these workshops among the participants
- Motivation and encouraging interactions and deliberations on pertinent issues
- Eliciting feedback and responses from the participants and recording them
- Identification of ways and means to resolve conflicts, if any, between stakeholder groups
- Developing ultimately a participatory framework and consultation strategy for planning and designing the scheme contemplated.

The stakeholder consultations accordingly did provide us an overview of the above issues and their relative importance. They have also provided insights into the complexity and diversity of interests, which were taken into account while planning for an effective ESMF. The issues raised during the consultation process were documented and include the following issues that have been further analyzed in the ISEA:

- Water pollution, water-borne diseases
- Entry of Sewage water into the canals
- Industrial pollution
- Solid waste management
- Ground water depletion and quality
- Fluoride and nitrate concentration in ground water

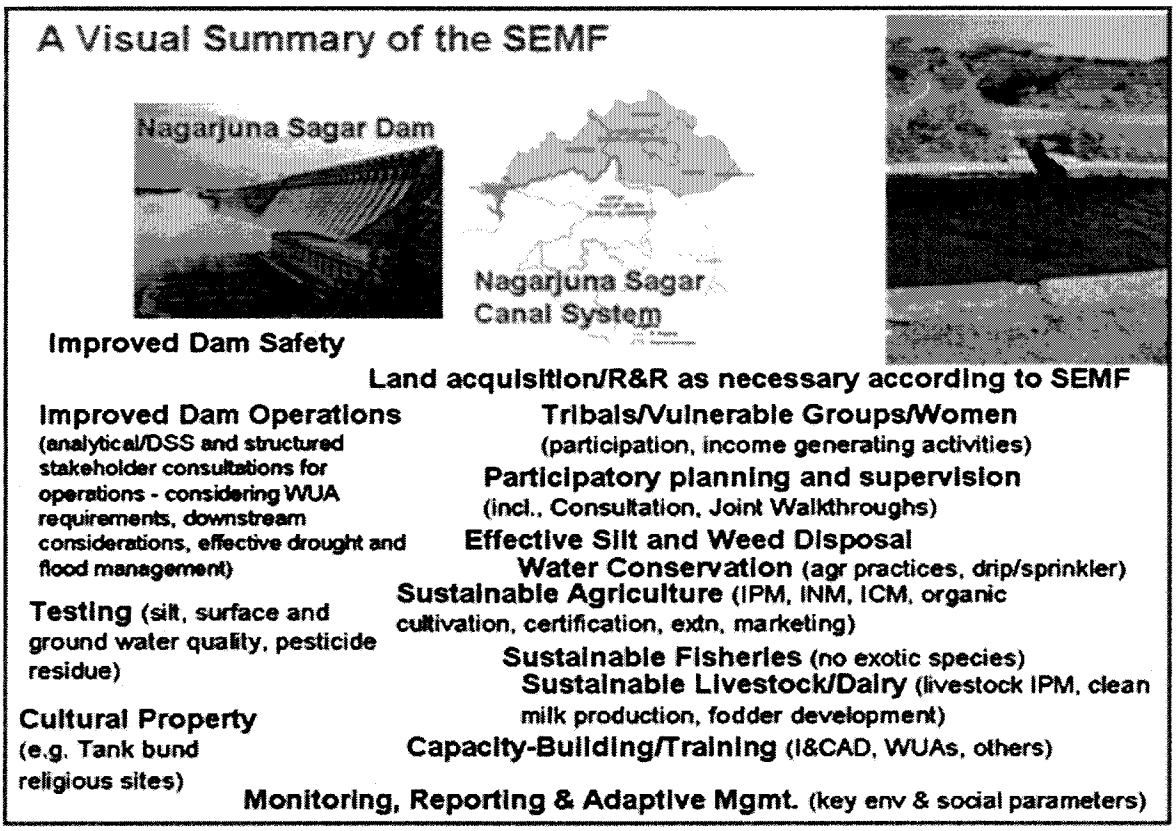
- Surface water pollution due to untreated industrial effluents
- Sea water intrusion
- Sand mining
- Soil erosion
- Drinking water supply
- Irrigation facilities
- Local social problems – Occupational problems, indiscrimination, economic status etc
- Literacy levels
- Employment
- Status of Livestock
- Child labour
- Vocational training programmes for adolescent girls
- Rural health and sanitation
- Migration
- Tribal issues
- Gender issues
- Marketing Facilities, Value addition and post harvesting technologies
- Extension of modern agricultural implements
- Small-scale industry
- Coordination between line departments in attending the works

Social and Environmental Management Framework

Proposed Outcomes of SEMF

The overall outcome of the SEMF is to ensure that social and environmental opportunities are enhanced and adverse impacts are minimized and fully mitigated. In particular, the SEMF for this project seeks to ensure the achievement of the following outcomes:

Social	Environmental	Overall Institutional
• Improved incomes for NSP command farmers • Increased awareness of water entitlements for WUAs/farmers • Land acquisition/R&R issues addressed adequately (project affected families livelihood restored/improved) • Meaningful consultation with and involvement of WUAs/farmers during project planning, modernization, and evaluation • Cultural property, wherever affected, are restored in consultation with the stakeholders • Special issues relating to tribals and other vulnerable groups (including women) effectively addressed and they have access to project benefits • Tribal/women and other vulnerable groups are actively involved in WUA activities • Increase in awareness and knowledge levels on HIV/AIDS and child labour	• The NSP system has improved O&M • Dam safety concerns in NSP addressed effectively (e.g. NSP dam safety panel formed and operational, NSP dam safety measures/instrumentation completed) • Sustainable agriculture (incl. fisheries and livestock) practices effectively promoted in NSP command (e.g. awareness building, IPM, INM, organic farming, water conservation, conjunctive use, etc.) • Silt and weeds in NSP modernization effectively managed • Borrow areas rehabilitated effectively	• Improved environmental and social knowledge base and information systems developed and used • Institutional capacity improved in NSP, I&CAD and WUAs to effectively manage environmental and social issues



The project ESMF has been articulated in a number of different ways in the IESA – by project cycle, project component/activity, and environmental and social issue. One of these (by component) is presented below for illustration.

In addition, the following special areas have been covered in the ISEA:

A. Rehabilitation and Resettlement
B. Tribal Development
C. Gender Development
D. Dam Safety
E. Sustainable Agriculture
   - Integrated Pest Management
   - Integrated Nutrient Management
   - Banned/hazardous pesticides
   - Erosion management
   - Rainwater harvesting/groundwater recharge
F. Other (Cultural property)
G. Communication and Training Strategy
H. Monitoring & Evaluation Strategy

The ISEA also outlines the activities to be undertaken to effectively operationalize the ISEA, including issues of institutional strengthening (structure, staffing, implementation support), training/awareness-building, institutional processes (including checklists to be completed for every stage of every package), and documentation and reporting. In addition, ways to improve mainstreaming into the project and ESMF budget have been outlined.

The Environment and Social Cell at the PPMU will be the over all coordinating agency for planning and implementing package level social and environmental plans (RAP/TDP/EMP/GDP). The package level unit will plan and implement these plans with the assistance of the NGOs as required. WUAs and Gram Panchayats will also participate in the entire cycle of social and environmental management. The Environmental and Social Cell will be strengthened by the inclusion of support consultants.

In addition, the SEMF recommendations have been factored into key consultancies such as Baseline, Monitoring and Evaluation (to monitor the ESMF monitoring parameters), Quality Management (to check safe and proper silt and debris disposal and rehabilitation of borrow areas, etc.), and Information Management System (to include environmental and social parameters in the asset inventory and decision support systems being developed).

SEMF Summary by Project Component and Activity

Component	Key Activities	Summary of Management Measures	
		Environmental	**Social**
Component A **Improving irrigation service delivery and management in Nagarjuna Sagar Scheme**	Participatory Rehabilitation & Modernization of Irrigation Systems	• Silt disposal plan(e.g. from desilting canals and branch canals) • Reducing seepage loss/bank erosion protection/removal of weeds • Control of industrial effluents • Guidelines and procedures for sustainable material procurement (e.g. sand)	• Ensuring adequate WUA inputs into proposed activities • WUA participation in work execution/monitoring
	Dam Safety	• Dam safety activities • Operational Decision Support System development for NSP system • Soil erosion management/Green belt development • Sustainable pisiculture development	• Submergence issues • R&R issues • Employment generation • Tourism development
	Capacity-building of WUAs	Improve awareness/capacity-building on • Water management • Ground water and conjunctive use • Weed control and bank protection • Water conservation • Sustainable agricultural practices • Solid waste management	Improve awareness/capacity-building on • PIM/Mobilization of WUA • Conflict resolution within and across WUAs • Interaction with Dept. officials (e.g. on water demands/ canal rostering, etc.) • Collection of water charges/ability to pay
	Improved Water Management	• Regular water monitoring (quantity wise) • Regular water quality monitoring • Provision/replacement of gauges on canals • Information of canal water flows	• Clarify NSP Command Area boundaries • Clarify water allocation/ entitlements and procedures for each WUA and federation • Administrative control over canal water distribution • Enhancing WUA participation • Manage illegal water diversion/pumping
	Environmental and Social Plan	• As in SEMF	• As in SEMF

Component B Agriculture Component	Agricultural Intensification & Diversification	• IPM (demonstrations, awareness on safe chemical pesticide management/banned pesticides to WUAs/ shopkeepers) • INM/Organic farming • Water Conservation (drip/ sprinkler irrigation methods) • Crop choices (to reduce water consumption and improve incomes) • Promotion of Eco-friendly practices (e.g. solar chilli dryers, etc.)	• Crop choices led by marketing • Participatory Selection of Farmers for Demonstration
	Market Facilitation	• Incorporation of environmental material (e.g. on IPM/INM, water management etc.) into marketing kiosks, marketing information (e.g. lists of organic buyers/sellers, etc.) • Promotion of certification/ labelling through appropriate linkups (e.g. organic, phytosanitary standards etc.)	• Timely provision of market information to farmers • Improve farmer access to markets/agro-processing
Component C Water Sector Institutional Restructuring and Capacity Building	Establishment, operationalization, & fostering of the AP Water Resources Regulator	• Consider environmental implications of proposed regulatory decisions • Conduct special studies as required	• Adequate consultation to be undertaken before major regulatory decisions • Ensure consideration of impacts of proposed decisions to different stakeholders • Conduct special studies as required
	Capacity-building of I&CADD	• Awareness on various environmental issues relating to water resources and irrigated agriculture • Training on silt disposal methods, weed removal, canal structure maintenance etc • Training on regular monitoring of water quality, water conservation methods, sustainable agriculture practices etc and reporting on environmental issues in the department	• Awareness on various social issues like R&R, Tribal, vulnerable group issues and WUA related issues etc • Training on regular monitoring and reporting on various social issues • Improve complaint/grievance management system

	Capacity-building of WALMTRI	• Training on various environmental issues relating to water resources and irrigated agriculture • Promote inter-disciplinary water research • Promote applied research on irrigation • Promote partnerships with other institutions on water management	• Training on various social issues like R&R, Tribal, vulnerable groups and WUA related issues etc • Promote applied research on social parameters
	Integrated Computerized Information System	• Capture, monitor, and use appropriate environmental parameters • Development of Asset Management System • Use of modern instrumentation and techniques for improved water and system management (e.g. survey, reservoir bathymetric mapping) • Optimal use of water through appropriate information management and analysis (e.g. computerized Decision Support System for Nagarjuna Sagar operation)	• Capture, monitor, and use appropriate social parameters • Monitor and assess performance WUAs and their federations through appropriate indicators
	Demonstrative Pilots	• Develop pilots where learning on environmental issues can be improved (e.g. groundwater management, conjunctive use of surface and ground water etc.)	• Pilot management associations and assist their functioning as part of the pilot activities
Component D Project management	Support for Project Unit	• Project Unit should have an Environmental Cell with appropriate environmental staff	• Project Unit should have an Social Cell with appropriate social staff
	Project Monitoring & Evaluation	• Ensure that ESMF environmental monitoring indicators are covered as part of overall project monitoring and evaluation • Input into project website and documentation	• Ensure that ESMF social monitoring indicators are covered as part of overall project monitoring and evaluation
	Information, Education and Communicatio n Program	• Include key environmental issues like silt disposal , weed growth, canal structure management, sustainable agriculture practices, water management and conjunctive use of surface and ground water etc as part of the IEC programs	• Include key social topics (e.g. equity, gender, WUAs, resettlement, tribal development, wage, child labour, migration, conflicts etc.) as part of the IEC programs

Monitoring and Evaluation

Monitoring and Evaluation Indicators

	Desired Environmental and Social Outcome	Indicator (Units)	Responsible Agency	Suggested Reporting Frequency
Social	NSP command farmers improve incomes	• Increase in incomes for command area farmers (% increase based on stratified survey – on-farm and off-farm)	External Agency	Mid-term and Final stages
	WUAs/farmers are aware of water entitlements	• Farmers aware of water entitlements (% of survey respondents)	External Agency	Annually
	Land acquisition/R&R issues addressed adequately (Project affected families livelihood restored/improved)	• No. of families affected (No.) • Average estimated income increase (Rs/yr) • Interview feedback	External Agency I&CAD Revenue Department	Every 6 months
	Meaningful consultation with and involvement of WUAs/farmers during project planning, modernization, and evaluation	• No. of structured stakeholder consultations – e.g. with WUAs (No.) • Joint walkthrough maps & photos/videos indicating key project-related (incl. env/social) issues and potential options both from stakeholder and analytical perspectives • WUA sign-off on scheme plans/ OK cards (%)	External Agency I&CAD WUAs	Every 6 months
	Cultural property, wherever affected, are restored in consultation with the stakeholders	• Cultural property restored (number) • Complaints on cultural property adversely impacted by project (number)	External Agency/Quality Management Consultant/I&CAD	Every 6 months
	Special issues relating to tribals and other vulnerable groups (including women) effectively addressed and they have access to project benefits Tribal/women and other vulnerable groups are actively involved in WUA activities	• No. of tribals in income generating activities • Benefits to tribal groups (Rs.) • Benefits to landless (Rs.) • Benefits to women-headed households (Rs.) • Representation of women in WUA executive committee (%) • WUAs headed by women (%)	External Agency I&CAD Social Welfare/ Tribal Welfare Department WUAs	Every 6 months

	Increase in awareness and knowledge levels on HIV/AIDS and child labor	• No. of labor force participating in training on HIV/AIDS and child labor (No.)	External Agency I&CAD/ WALMTARI	Annually
Environmental	Dam safety concerns in NSP addressed effectively (e.g. NSP dam safety panel formed and operational, NSP dam safety measures/ instrumentation completed)	• NSP dam safety panel setup and operational • NSP dam safety budget (Rs/yr) • NSP dam safety activities completed (% completion by activity)	External Agency I&CAD	Annually
	Sustainable agriculture (incl. fisheries and livestock) practices effectively promoted in NSP command (e.g. awareness building, IPM, INM, organic farming, water conservation, conjunctive use, etc.)	• Farmers trained on sustainable agriculture techniques (No.) • Area under IPM (ha.) and Area under INM (ha.) • Area under Organic Cultivation (ha.) • Pesticide residue for common pesticides (in representative IPM/other areas) by crop (levels and comparison with standards/guidelines) • Area under drip/sprinkler (ha.) • NSP land productivity estimate (Rs/ha) • NSP water productivity estimate (Rs/cubic meter) • Stall-fed livestock (%) • Sustainable fishery value (Rs/yr) • Problems with exotic species introduction (No.)	External Agency Agriculture Department Horticulture Department Fisheries Department Animal Husbandry/ Livestock Dept. I&CAD WUAs	Every 6 months
	Silt and weeds in NSP modernization effectively managed	• Silt disposal plan developed with appropriate silt quality testing for each package/reach (% of packages/reaches) • Silt safely disposed (tons and % of total silt excavated) • Weeds safely disposed (tons)	External Agency/Quality Management Consultant I&CAD	Every 6 months
	Borrow areas rehabilitated effectively	• Borrow areas fully rehabilitated (ha and %)	External Agency/Quality Management Consultant/I&CAD	Every 6 months

Related Institutional	Improved environmental and social knowledge base and information systems developed and used	• Environmental and social knowledge base developed for NSP area (yes/no) • Decision support system developed and used for NSP operation (yes/no) • Water quality in critical canal and river reaches (pollutant levels) • Land quality (organic matter %)	External Agency I&CAD (including Hydrology project cell) AP Water Resources Regulatory Authority/ APPCB/Dept. of Env.	Mid-term and Final
	Institutional capacity improved in NSP, I&CAD and WUAs to effectively manage environmental and social issues	• Screening forms I to VI prepared fully for all packages (% of packages by number and value) • Procurement packages screened and cleared on Environmental and Social grounds (with appropriate social and environmental plans prepared, budgeted and implemented) as per this ESMF (% of number and % of Value at each stage) • Updated guidelines developed to mainstream E&S issues into I&CAD work (yes/no) • Staff and consultants engaged to specifically help manage environmental and social issues (No.) • No. of staff trained on E&S issues – courses (No.) • No. of staff trained on E&S issues – study tours (No.) • No. of WUAs/Farmers trained on E&S issues (No.)	External Agency I&CAD (with inputs from all other implementing agencies)	Every 6 months
	The NSP system has improved O&M	• I&CAD Budget devoted to O&M (Rs/yr) • Money collected by WUA for O&M (Rs/yr) • Money used for O&M work (Rs/yr) • Farmers aware of system O&M plans (% of survey respondents) • Disputes settled by WUA (No.)	External Agency I&CAD (incl. NSP O&M circles) WUAs	Every 6 months

Application for 1st Year Packages

The SEMF developed has been applied to the fourteen civil works packages scheduled for implementation initiation in the first year of the project. Detailed reports on the social and environmental plans prepared for these 14 packages have been annexed. Based on the lessons learnt during the first year of the project, the SEMF would need to be revisited for refinement in subsequent years. The survey revealed that in these two main canals (proposed to be covered under 14 packages), the proposed civil works do not involve any land acquisition. However, some of the canal lands are found to be in use for different purposes by local people. The survey results estimate that in the two main canals, the total encroached land is around 233.6 acres - 225.6 acres under agriculture use, 7.78 acres for residential purposes and the remaining 0.22 acres for other purposes.

The appropriation of this land for the proposed project activities is likely to result in adversely impacting 618 families of whom 134 families might lose house/commercial places and thus get physically displaced. In the case of 481 families, the loss will be in terms of loss of land being used for agriculture purposes. It was observed that the displacement is mostly local in nature and limited to particular sections of the canal. The survey also revealed that in these two main canals, most of the households encroaching NSP land for residential purposes are mainly agricultural labour and marginal farmer families and any displacement would result in homelessness. In addition, the project would impact 4 community properties including 2 temples and 2 graveyards.

In addition, the silt disposal required for each package has been estimated and appropriate plans for disposal being developed. The agricultural and horticultural activities will include a focus on Integrated Pest Management, Integrated Nutrient Management, and promotion of organic farming, in addition to training on soil and water management, water conservation, and sustainable agricultural practices.

Appropriate plans have been designed for the first year to implement the provisions of the SEMF.

The ISEA Report

The ISEA report includes the following main chapters, in addition to several detailed annexes.

Chapter	Description
1.Introduction	This chapter highlights the need for modernization works and provides a broad overview about the project details and focuses upon the objective of the study and the methodology employed to carry out the ISEA study
2.Policy and Institutional Framework	This chapter deals with all the relevant Policies and Acts which would improve the socio-economic and environmental situation in the entire basin and also highlights the importance of institutional structures and values for determining policy outcomes and giving a brief note on Water Resource Organization, Institutions, Dam safety Directorate and

	Agriculture – Institutions. It would provide a broad overview about the existing structure and would suggest measures in the subsequent chapter.
3. Project Description	This chapter deals with the context of the project its components, description about Nagarjunasagar and its irrigation systems and the key environmental and social sustainability issues in the project
4. Baseline Environmental and Social Information	This chapter deals with the baseline environmental and social status of the State, Project area districts as well as the command area in detail.
5. Project Environmental and Social Impacts	This chapter emphasizes upon the anticipated positive and negative impacts as a result of the rehabilitation and modernization works of the proposed Nagarjunasagar project.
6. Analysis of Alternatives	This chapter deals with the alternative approaches in the project and the analysis for the various alternatives considered t the planning and implementation level of the modernization project.
7. Stakeholder Consultations	This chapter presents the process of consultations held in the command area with all the stakeholders. The issues discussed, the perceptions of the stakeholders, and the implications for project design are presented.
8. Social and Environmental Management Framework	This chapter is intended to inform and guide the Project Implementing Agency or departments at a strategic decision-making level. The frame work produces a mechanism to identify the key environmental and social impacts and to screen projects on the basis of the risks. The objective is to minimize risks and mitigate them to the extent possible. This framework will also act as a guideline for specific environmental and social impact assessment to be prepared at the project formulation stage. The SEMF also contains Action Plans for various key issues like Dam Safety, Pest Management, Cultural Property Management, Rehabilitation & Resettlement, Tribal Issues, Gender Issues and Community Sensitization that need to be addressed through the project. This chapter will cover the analysis of existing training institutions, training need analysis for different stakeholder segments i.e., WUA's, Irrigation department officials, line department officials, Farmers, SHGs, etc.