DAM REHABILITATION AND IMPROVEMENT PROJECT (DRIP) PHASE II

(Funded by World Bank)

THAMBRAPARANI DAM

(PIC:TN12HH0008)

ENVIRONMENT AND SOCIAL DUE DILIGENCE REPORT

FEBRUARY 2021

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CONTENTS

List of Tables

List of Figures

List of Annexure

ABBREVIATIONS AND ACRONYMS

AIDS	:	Acquired Immunodeficiency Syndrome
CA	:	Conservation Area
COVID	:	Corona Virus Disease
CWC	:	Central Water Commission
DRIP	:	Dam Rehabilitation and Improvement Project
DSRP	:	Dam Safety Review Panel
E&S	:	Environment & Social
EAP	:	Emergency Action Plan
ESCP	:	Environmental and Social Commitment Plan
ESDD	:	Environmental and Social Due Diligence
ESF	:	Environmental and Social Framework
ESIA	:	Environmental and Social Impact Assessment
ESMF	:	Environment and Social Management Framework
ESMP	:	Environment and Social Management Plan
GBV	:	Gender Based Violence
GIS	:	Geographic Information System
GRM	:	Grievance Redressal Mechanism
HIV	:	Human Immunodeficiency Virus
IA	:	Implementing Agency
IPF	:	Investment Project Financing
MCM	:	Million Cubic Meters
OHS	:	Occupational Health & Safety
OHSP	:	Occupational Health & Safety Management Plan
PA	:	Protected Area
PAP	:	Project Affected Person
PDO	:	Project Development Objective
PPE	:	Personal Protective Equipment
PST	:	Project Screening Template
RET	:	Rare Endangered and Threatened
SC	:	Scheduled Castes
SCADA	:	Supervisory Control and Data Acquisition
SDSO	:	State Dam Safety Organisation
SEA	:	Sexual Exploitation and Abuse
SEAH	:	Sexual Exploitation Abuse and Harassment
SF	:	Screening Format
SH	:	Sexual Harassment
SPMU	:	State Project Management Unit
ST	:	Scheduled Tribes
WB	:	World Bank
WQ	:	Water Quality

EXECUTIVE SUMMARY

Thambraparani dam is constructed across Thambraparani river located in the Tirunelveli District near Ambasamudram town. This dam acts as a storage dam for the purpose of Irrigation and Power Generation. The water from this dam is diverted to Servalar dam through an Inter - connecting tunnel. The waters of Thambraparani dam are diverted to Servalar dam for power generation at Servalar Power House,and is let into the Servalar river,flowing finally into Papanasam Diversion river. It has been proposed to undertake rehabilitation measures (structural civil & hydro-mechanical and basic facilities enhancement remedial works) under the proposed Dam Rehabilitation and Improvement Project (DRIP II) with a view to increase the safety and to strengthen dam safety management.

The Environment and Social Due Diligence has been conducted for decision-making on the sub-project with a view to identify, evaluate and manage the environment and social risks and impacts in a manner consistent with the World Bank ESF. ESDD has been carried out by studying the sub-project information and proposed interventions, assessing the magnitude of E&S risk and impacts with respect to key baseline data in immediate vicinity area. Stakeholder consultations with communities living downstream/vicinity of the dam, could not be held in the current circumstances due to COVID19.However, to ensure the participation of stakeholders in ESDD preparation and record their views, limited stakeholder consultation was held at dam. More detailed interaction will be planned when the conditions are conducive for public meetings.

Activity wise environment and social screening has been carried out to identify risks and impacts to classify the sub-project based on risk level (low, moderate or substantial and high) and recommend commensurate plans/measures to meet identified risks and impacts.

As per the ESDD exercise, risk / impacts that have been identified relate to Water Quality, Physical Environment, labour and SEAH/GBV. Environment risks of air, water, noise, land use, soil and resource use for Special repairs to Approach road to dam and Road on top of demand Energy dissipation arrangement are Moderate. Similarly, environment and social risk of labour camp and disposal of debris has been identified as moderate. Risk of all other activities has been identified as Low. These risks are low to moderate and localised, short term and temporary in nature which can be managed with standard ESMP and guidelines. OHS is a substantial risk activity and is being treated separately through OHS plan in accordance with WB ESHS guidelines.

Since risks and impacts are low to moderate category, a standard ESMP customised to sub-project will be prepared in accordance with the ESMF. The customised ESMP will address the following:

- Gender Based Violence or SEA/SH related actions (ESS1)
- Labour Management Procedure (ESS2)
- Resource Efficiency and Pollution Prevention (ESS3)
- Community Health and Safety (ESS4)
- Stakeholders Engagement Plan (ESS10)

Overall, the proposed activities within this dam sub-project have low to moderate risks resulting in the overall sub-project to be categorized as Moderate risk category. These risks and impacts can be effectively mitigated with effective implementation of mitigation plans by SPMU/IA, Contractors and monitoring by EMC, SPMU and CWC.

Chapter 1 INTRODUCTION

1.1 PROJECT OVERVIEW

The Dam Rehabilitation and Improvement Project Phase II and Phase III (DRIP Phase II & Phase III) initiated by Ministry of Jal Shakti through Central Water Commission, with an objective to cover more States and more dams (after DRIP Phase I) across India to improve the safety and operational performance of these selected dams. This new Scheme will further strengthen the efforts of Government of India beyond ongoing DRIP Phase I. The project would continue to finance structural improvements along with dam safety institutional strengthening which shall break with the prevailing build-neglect-rebuild approach by giving greater emphasis to establishing innovative financing mechanism for regular O&M and dam rehabilitation, enhancing State capabilities to manage these critical assets through institutional strengthening, and introducing risk-informed dam safety management. The project development objective (PDO) is to increase the safety of selected dams and to strengthen institutional capacity for dam safety in participating States. The project components are as follows:

Component 1: *Rehabilitation and Improvement of Dams and Associated Appurtenances*, focusing on structural and non-structural measures at selected project dams. The proposed interventions will include, but not be limited to, around 35-40 kind of rehabilitation activities as done in ongoing DRIP. In addition, all important non-structural activities will also be taken up. In addition to these interventions, the project will require each rehabilitated dam to have basic instrumentation and could also support the development of additional systems to detect and respond to risks promptly, such as flood forecasting systems, early warning systems, data management and analysis software, and standardized dam safety instrumentation (i.e., Supervisory Control and Data Acquisition [SCADA]).

Component 2: *Dam Safety Institutional Strengthening,* focusing on regulatory and technical frameworks for dam safety assurance. The activities to be carried out will include, but not be limited to, targeted training nationally and internationally to all partner agencies, development of Management Information Systems (MIS) and other programs to capture and analyze data for long-term planning and guiding of dam operations; support to the further development within CWC of the Dam Health and Rehabilitation Monitoring Application (DHARMA) program, support to the revision of existing guidelines on dam safety and preparation of new guidelines, as needed; rapid risk screening of dams, stakeholders consultation meetings for dissemination of prepared emergency action plans, updation of seismic hazard mapping of country, capacity building of academic and central institutions, public outreach programs, construction supervision & quality assurance activities etc.

Component 3: *Incidental Revenue Generation for sustainable operation and maintenance of dams;* in order to ensure long term sustainability of operations & maintenance of existing dams, it is proposed to encourage the dam owners to explore the incidental

revenue generation through innovative ideas i.e. Development of tourism, fisheries, secondary sources of power generation (hydel as well as solar), water recreation activities etc. and divert some part of this generated revenue for O&M of a given dam. Few pilot dams can be selected to experiment this innovation.

Component 4: *Project Management;* the overall responsibility for project oversight and coordination will rest with the CDSO of CWC. This Organisation will act as the Central Project Management Unit (CPMU). The CPMU will be assisted by a management and engineering consulting firm. Each state and other agency will establish a Project Management Unit (SPMU) attached to the Chief Engineer's (CE) office in charge of the SDSO or any such similar arrangement in power utilities. This Unit will have direct responsibility for the coordination and management of the project at state level.

The primary beneficiaries of the project are the communities that live in dam breach flood inundation areas and the communities that depend on water, irrigation and electricity services provided by the dams that could be compromised by poor dam performance or failure. The Project will be taken up in 19 states covering 300 dams.

1.2 SUB-PROJECT DESCRIPTION – THAMBRAPARANI DAM

a. The Thambraparani Dam was constructed across Thambraparani River in Tirunelveli district during the year 1938 to 1943. This dam was constructed as storage Dam for Servalar Power House. This is a masonry gravity dam. The dam is located in Tirunelveli District of Tamilnadu State. The nearest Town is Tirunelveli, which is 55 Km away from the Dam . Nearest airport is Tuticorin, which is 89Km away from Dam and nearest Railway station is Tirunelveli, which is 55 Km from Dam. This dam is a masonry gravity dam with a height of 66 m and a length of 227 m. The tail water of this dam is let into Papanasam Diversion Weir of TANGEDCO dam.

b. Salient features of the project area are reported below:

GENERAL

Location	:	Nellai Kattabomman Dt.
Nearest Town	:	Ambasamudram
River	:	Thambraparani
Purpose	:	Storage reservoir for Papanasam P.H.
Construction Period	:	1938-1943
Cost	:	Rs.44 lakhs

RESERVOIR **DAM**

Catchment Area	: 149.03 Sq.Km	Type	: Masonry Gravity
Area at FRL	: 5.80 Sq.Km.	Height	: 66m Gross
capacity	: 155.80 M Cum.	Length	: 227m
MWL	: 264.57m	Volume	: 1352000 cum.
		FRL	: 264.57m
		MDDL	: 224.03m

SPILLWAY (Open)

Discharge capacity	: 2549 cumecs
Crest length	: 109.72m
Crest level	: 259.08m
Type of Gate	: Lift type
Size & Nos.	: 15.85 x 5.49m 1 No.

This dam constructed across Thambraparani river acts as a storage dam for the purpose of irrigation and power. Thambraparani reservoir is interconnected with Servalar reservoir by means of a tunnel. The waters of Thambraparani dam are diverted to Servalar dam for power generation at Servalar Power House.

View of Thambraparani Dam Reservoir

View of Downstream face of the Dam

Proposed Interventions/ Activities and intended Outcomes

Dam Safety Review Panel (DSRP) constituted by CWC, Government of India has inspected and made a review of Thambraparani Dam on 07/11/2019 and recommended measures to improve the safety and performance of dam and associated appurtenances in a sustainable manner, and also to strengthen the dam safety institutional set-up.

The objectives of the project are to be achieved through investments for physical and technological improvement activities, managerial upgrading of dam operations, management and maintenance, with accompanying institutional reforms. The project will improve the safety and operational performance of dam and mitigate risks to ensure safety of downstream population and property. The following rehabilitation proposals as described in the PST have been formulated based on DSRP recommendations and these proposals form the basis for preparation of present ESDD report.

1.	**Structural Rehabilitation Works**	
	i	Approach steps leading to drainage gallery and inter connection tunnel intake trash rack along with hand rails
	ii	PCC wall for side protection for approach roads and protection work for projected rock mass.
	iii	Chain link fencing around interconnection tunnel intake and police guard room near drainage gallery
	iv	Colour washing and miner repair works in gauge reader room and DG set room.
	v	Replacement of steel wire ropes for both the sluice gates.
	vi	Replacement of existing control panel and wiring for the scourvent and sluice gates.
	vii	Replacement / Repair of existing gate rollers, guide angle, skin plate and gate control panel for the interconnecting tunnel gate.
	viii	Tunnel intake trash rack panel replacement.
	ix	Replacements of existing water supply pipe lines.
2	**Basic Facilities Improvement**	
	i	Dam top lighting and drainage gallery lighting.
	ii	Advance lightning protection system.
	iii	Standby DG set of 82.5 kVA.
3	**Instrumentation, SCADA, Surveillance system, etc.**	
	i	Joint meter, Temperature measuring gauges, Uplift gauges, V- notches, Automatic water level indicator, Survey marker, Tilt meter, Permanent benchmark, Surveillance equipment, SCADA and Data transfer.
4	**Tourism/Fisheries/Hydropower Development**	
	i	Possibility of allowing Pisciculture in the reservoir area can be explored.
5	**Other (Investigations, Design Studies, Consultancy)**	
	i	Preparation of Emergency action of the dam.
	ii	Preparation of Operation & Maintenance manual of the dam

The above Pisciculture component is not considered as part of present DD as feasibility studies including various options and their possible impacts on environment and social are yet to be carried out. Conducting of ESDD/ESIA on these sub-components will be a pre-requisite in the Environmental and Social Commitment Plan (ESCP) before issuance of bids.

Figures provide photographs of key infrastructure proposed for rehabilitation works and also major interventions locations.

	
DAMAGED STEEL WIRE ROPE OF SLUICE GATE AND TRASH RACK PANEL	**OLD SLUICE GATE AND TRASH RACK CONTROL PANEL**
	
EXISTING OLD 10 KVA DG SET	**OLD CONTROL PANEL ARRANGEMENTS FOR 10 KVA DG SET**
	
CONTROL ROOM OF DAM	**DAMAGED APPROACH STEPS LEADING TO DRAINAGE GALLERY FROM DAM TOP**

	
DAMAGED GUIDE ROLLERS OF INTER CONNECTING TUNNEL GATE	**IMPROVEMENT WORKS IN INTER CONNECTING TUNNEL GATE SHAFT**
	
OLD CONTROL PANEL FOR INTER CONNECTION TUNNEL GATE	**DAMAGED V NOTCH INSIDE THE DRAINAGE GALLERY**
	
DAMAGED APPROACH STEPS TO TUNNEL INTAKE TRASH RACK	**SLOPE PROTECTION MEASURES NEAR POLICE GUARD ROOM**

Figure 1.2: Project Area showing major intervention locations of Thambraparani Dam

1.3 IMPLEMENTATION ARRANGEMENT AND SCHEDULE

As can be seen from the list of activities proposed under dam rehabilitation project; the activities for Thambraparani dam can be floated as one main package consisting of Civil, Mechanical and Electrical works. Works will be carried out by Contractor(s) as these are labour intensive activities and would be completed over a period of 18 months. IA will hire Contractor(s) based on national open competitive procurement using a Request for Bids (RFB) as specified in the World Bank's – Procurement Regulations for IPF Borrowers, July 2016, (Revised August 2018 Procurement Regulations), and is open to all Bidders as defined in the Procurement Regulations. Following is the overall implementation and procurement schedule:

a) Overall Phasing of Project Implementation:
Proposed Starting of implementation (MM/DD/YYYY): FEB/2021
Proposed Ending of implementation (MM/DD/YYYY): 07/2022
Implementation Duration (months) (MM): 18 months

b) Timeline phasing of implementation:

Sl. No.	Description	From (month/year)	To (month/year)
1	Main package C M E works	FEB 2021	07/2022
2	Other Packages	NIL	
3	Procurement – instrumentation, goods, inspection vehicles	NIL	

1.4 PURPOSE OF ESDD

The overall project (DRIP II) was categorized as Moderate **Risk** as per the internal Environment and Social Risk Classification of the Bank. The Environment and Social Due Diligence has been conducted to use it as a tool for decision-making on the sub-project with the following specific objectives:

i. To identify, evaluate and manage the environment and social risks and impacts of the sub-project in a manner consistent with the ESSs;
ii. To adopt a mitigation hierarchy approach to the project's E&S risks i.e. a) anticipate and avoid risks and impacts; b) minimize or reduce risks and impacts to acceptable levels, if not avoidable; c) once risks and impacts have been minimized or reduced, mitigate; and (d) where significant residual impacts remain, compensate for or offset them, where technically and financially feasible;
iii. To help identify differentiated impacts on the disadvantaged or vulnerable, if any, and to identify differentiated measures to mitigate such impacts, wherever applicable;
iv. To assess the relevance and applicability of environmental and social institutions, systems, laws, regulations and procedures in the assessment, development and implementation of projects, whenever appropriate; identify gaps, if any exist, and
v. To assess borrower's existing capacity, gaps therein, and identify areas for enhanced capacity towards management of E&S risks.

vi. Based on the categorization of Environment and Social risks and impacts of the Dam sub-project, to determine whether ESIA is to be carried out using independent third-party agency or a generic ESMP customized to mitigate E&S risks and impacts will suffice.

1.5 APPROACH AND METHODOLOGY OF ESDD

The following approach has been adopted for ESDD:

i. Study sub-project information, proposed interventions, their magnitude and locations and carry out assessment of each proposed intervention to identify the magnitude of E&S risk and impacts;
ii. Review relevance and applicability of national and state legal requirements and Bank's ESF policy, standards and directives and preliminary assessment of applicability of legal requirement and ESS framework (2-8)
iii. Conduct site visit to understand baseline environment and social settings, proposed activities under the sub-project, their location and sensitivity, if any.
iv. present key baseline data essential for impact assessment in immediate vicinity area of proposed interventions from secondary sources, such as land-use, protected areas in vicinity, ascertain presence of indigenous (schedule tribe)/vulnerable people, etc.
v. Undertake institutional assessment to identify existing capacities & relevant gaps to manage E&S risks and impacts.
vi. Conduct preliminary stakeholder consultations to help identify potential stakeholders; to provide information on the proposed interventions; to identify issues and concerns; and ascertain appropriate mechanisms for continued engagement
vii. Carry out activity wise environment and social screening and identify risks and impacts. Classify the sub-project based on risk level (low, moderate or substantial and high) and recommend commensurate plans/measures to meet identified risks and impacts.

Stakeholder consultations with communities living downstream/vicinity of the dam, have been carried out in a limited way under the current circumstances due to COVID and these shall held as soon as situation is conducive for holding such consultations.

Chapter 2 INSTITUTIONAL FRAMEWORK AND CAPACITY ASSESSMENT

2.1 POLICY AND LEGAL FRAMEWORK

India has well defined environmental and social regulatory framework. The regulation applicability depends on nature of work and location of work. Broadly legislation can be divided into four categories viz environmental, forests, wildlife conservation and social. The applicability analysis of regulations pertaining to all the above four categories was carried out. The applicability of World Bank ESF comprising, 10 ESSs (ESS1 to ESS10) to the proposed rehabilitation proposals and Standard specific requirements were analyzed. Further, a comparison of national environmental and social regulations versus World Bank's ESS has been carried out along with the gap analysis. Applicability of Indian regulations, World Bank's ESS along with comparison and gap analysis is discussed in ESMF.

Central Water Commission, Ministry of Jal Shakti, Government of India has prepared "Operational Procedures for Assessing and Managing Environmental Impacts in Existing Dam Projects" and is under publication as a guiding document for the dam owners to systematically address in advance the environmental safeguard requirements and have discussed in detail all applicable legal requirement. Reference has been drawn from this document as well, while carrying out applicability analysis.

Indian environmental regulation require environment clearance for new dam projects specifically for the purpose of hydropower generation and/or irrigation projects and vary with generation capacity for hydropower projects and cultivable command area served by irrigation projects. Forest related clearances become applicable, if new or any modification in any existing project requires diversion of forest land for non-forestry purposes. Wildlife Clearance process gets triggered if the project is in proximity to protected area or activities are proposed within protected or conservation areas.

Therefore, for the proposed dam rehabilitation activities at Thambraparani dam, works do not trigger the regulatory provisions and hence clearances are not required.

2.2 DESCRIPTION OF INSTITUTIONAL FRAMEWORK

The sub-project will be implemented by Tamil Nadu Generation and Distribution Corporation, Government of Tamil Nadu. TANGEDCO being responsible for power generation, transmission and distribution; have a well-established customer complaint system for power consumer; where they can register their complaints 24x7 on dedicated line (1912). It also has a 24x7 Chairman's complaint cell with phone number and whatsapp numbers. In addition, it has established a Consumer Grievance Redressal Forum, where consumers can register complaints online/manually, directly or through a representative to be resolved within a period of 60 days; with a provision of filing appeal in next 30 days if the complainant is not satisfied with the redressal.

Tamil Nadu Generation and Distribution Corporationdo not have in-house expertise to address E&S issues. As per the suggestions of CPMU/CWC, it is proposed to outsource consultancy services of Environmental and Social experts to assist TANGEDCO in resolving E& S issues.

Assessment of physical, ecological and socio-economic conditions at dam site and immediate surrounding has been carried out based on secondary information and site observations; as discussed below.

3.1 PHYSICAL ENVIRONMENT

Land Use/ Land Cover

The project surrounding area land use and environmental sensitivity was analysed using GIS techniques. Land use/ Land cover map within 5 km radius of dam is presented at **Figure 3.1**. As can be seen from the map, evergreen/semi-evergreen forest, deciduous forest, and agriculture/fallow land dominates the landuse in project surrounding area. In addition, there are small patches of scrub forest and crop land; small and scattered settlement and water body (reservoir). However, the project activities will be confined to dam body only and no structural interventions are proposed beyond existing dam boundaries. Fourmajor villages are identified in dam surrounding (within 5 km) viz. Chinnamailar, and Agasthiyar nagar.

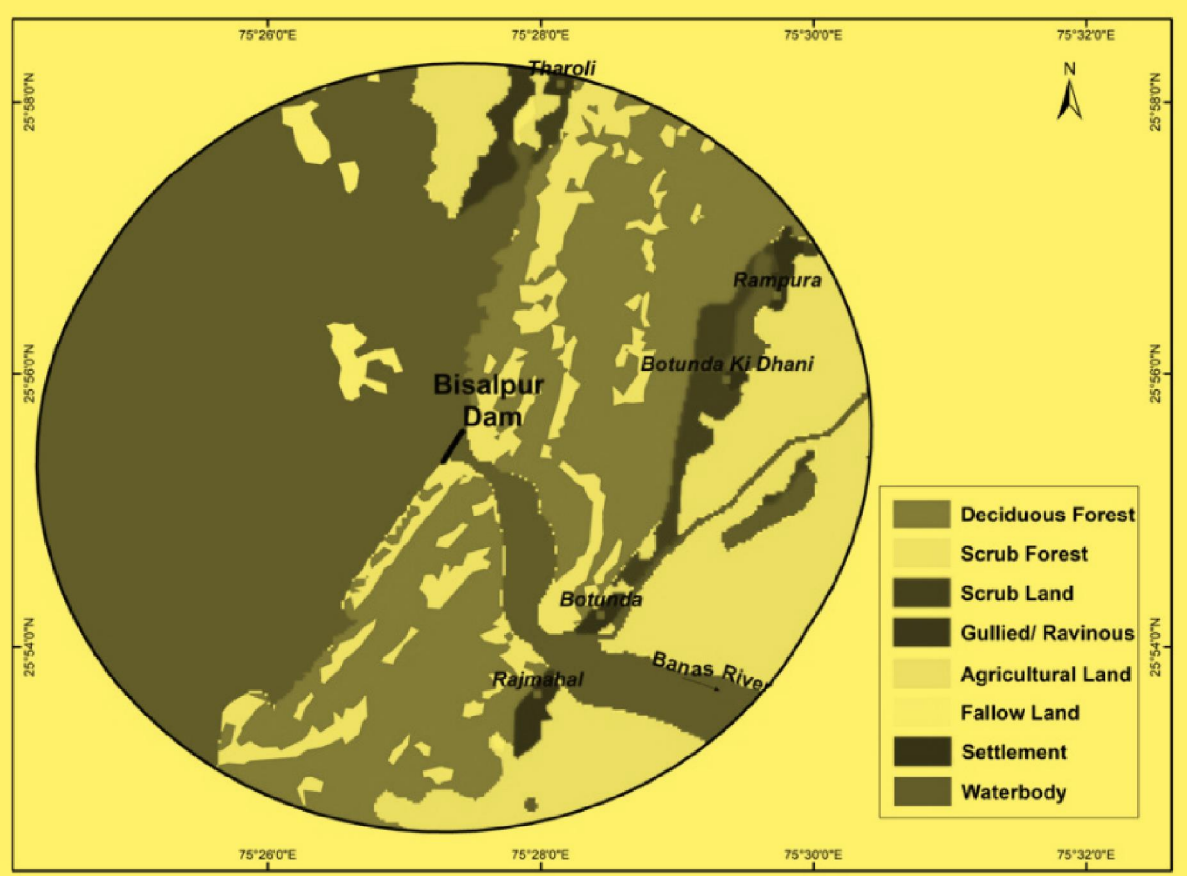

Figure 3.1: Land Use and Land Cover Map of 5 Km radius around Thambraparani Dam site (the above picture has to be changed with the help of CPMU)

Natural Hazards

Project is designed for a design flood value of 2549 cumec, revised design flood has been worked as 2457 cumec by CWC i.e. 3.61% decrease.

Project falls in earthquake zone II, there is no revision and dam design has taken care of this aspect as well. *Bureau of Indian Standards [IS 1893 (Part I):2002], has grouped the country into four seismic zones, viz. Zone II, III, IV and V. Zone II is the least active and Zone V is the most active.*

3.2 PROTECTED AREA

Thambraparani dam is situated inside the Kalakad Mundunthurai Tiger Reserve. Tiger Reserve has 895 square kilometres as Core or Critical Tiger Habitat. In addition, lately an Eco-sensitive Zone (ESZ) has also been notified for the protection of tiger reserve. Buffer Zone (including notified ESZ) is about 10 Km radius from the forest check post at Papanasam. No rehabilitation work is proposed beyond the dam boundary, which can directly or indirectly impact the protected area; there ESS 6 will not be triggered.

The proposed rehabilitation works are inside the Thambraparani dam boundary. All the materials movement, etc., are through reserved forest only. Since ESS6 is not triggered.

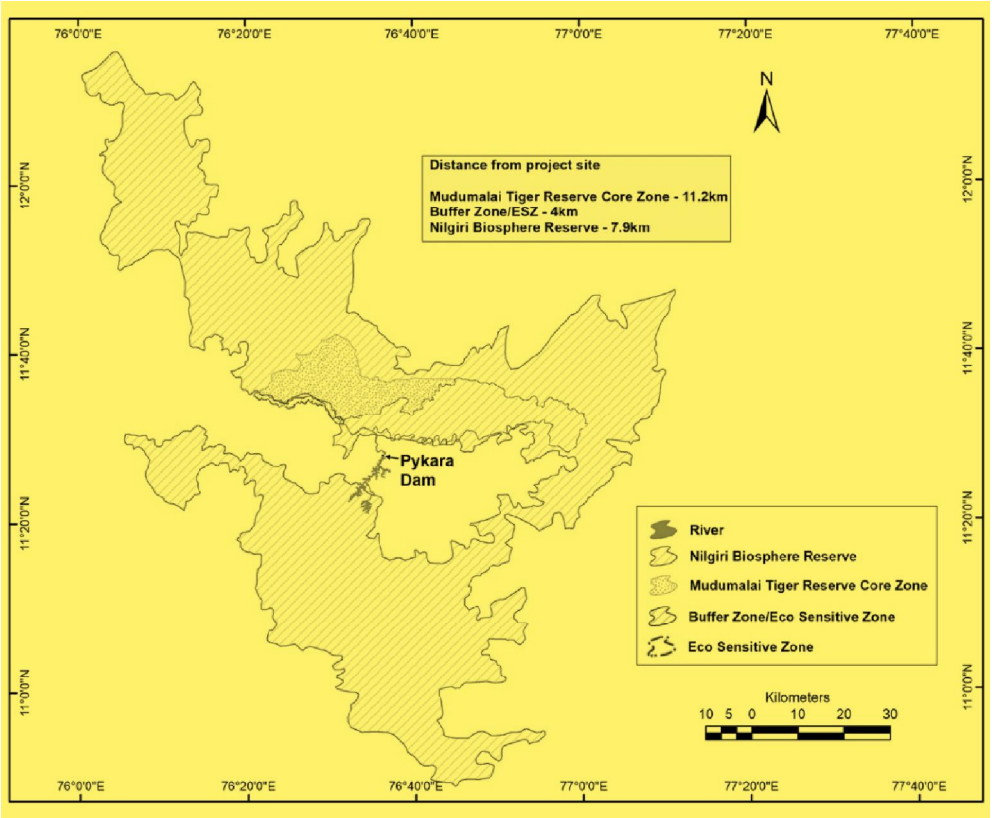

Figure 3.2: Protected Areas around Dam Site

3.3 SOCIAL ENVIRONMENT

The dam is located in Tirunelveli district. Three villages namely Chinnamailar, Mailar, and Agasthiyar nagar have been identified as falling in 5 Km area on downstream side of dam. The project area does not fall within the Schedule V[1] areas of Tamilnadu.

The district has seven sub-divisions i.e. seven Tehsil Headquarters. The brief demographic characteristic of the district is given in the table below:

No. of Households	**8,13,866**	**Household Size**	
Total Population	**3077233**	**Population (0-6 age)**	**3,21,687**
Male	15,20,912	Boys (0-6 age)	1,64,157
Female	15,56,321	Girls (0-6 age)	1,57,530
Sex Ratio	1023	Sex Ratio (0-6)	960
Population (SC)	**5,69,714**	**Population (ST)**	**10270**
Male	2,79,570	Male	5,109

[1] **Scheduled Areas** are **areas** in India with a preponderance of tribal population subject to a special governance mechanism wherein the central government plays a direct role in safeguarding cultural and economic interests of **scheduled** tribes in the **area**.

Female	2,90,144	Female	5,161
Literates	**2,273,457**	**Literacy Rate**	**82.50**
Male	12,10,710	Male	89.24
Female	10,62,747	Female	75.98
No. of Workers	**14,36,454**	**Cultivators**	115715(8.06%)
Male	8,76,175	**Agricultural Labours**	379763(26.44%)
Female	5,60,279	**Household Industrial Workers**	239664(16.68%)
No. of Main Workers	**12,71,407**	**Other Workers**	701312(48.82%)
No. of Marginal Workers	**1,65,047**		
Source: Census of India, 2011 (District Handbook)			

The project area does not fall within the Schedule V areas of the state. Though there are Scheduled Tribe households in the downstream areas, there are no physical interventions planned in the downstream areas. The ST households are mainstreamed in the area and do not possess any characteristics as outlined in ESS7.

These areas and the ST households will be taken into account during the preparation of Emergency Action Plan for Thambraparani Dam.

Figure 3.3: Location of Conservation Reserve with respect to Thambraparani Dam

3.4 CULTURAL ENVIRONMENT

As per list of National Monuments in Tamil Nadu and list of State Protected monuments in Tamil Nadu; there are no protected monuments in and around dam site i.e. within 10 km radius of dam site.

4.1 SUB-PROJECT SCREENING

The sub-project screening was undertaken following a set methodology. Process of risk /impacts identification was done using two step Screening process. Step I identifies the applicable sub-project activities, preconstruction and construction stage's major auxiliary or interventions related risks and impacts within the impact zone. Step II conducts an analysis of extent of risk viz. low, moderate, substantial and high associated with various sub activities related to each activity that was identified through Step I. All these were then summarized to arrive at overall dam sub-project risk category. Description of each step of screening as per formats, and the outcome of each step is given below.

Step I Screening (using Form SF-1): Sub-Project Component, Construction Support Preparatory Intervention related vs Nature of risk/impact

Scoping exercise was carried out to select the applicability of each activity based on the interventions proposed in the sub-project PST. Applicable interventions were further classified based on the location i.e. within dam area or outside the dam area and for each applicable intervention likely nature of risks and impacts has been listed.

Screening indicated that all project components related activities are limited to within the dam area/premises. Due to nature of these activities, likely impacts will be on physical environment in terms of air pollution, noise pollution and waste generation. None of the proposed structural interventions involve acquisition of private land and/or private assets. These activities in no way cause restriction on access to land or use of resources by local communities and there is no economic displacement envisaged due to the sub-project. Activities interfacing with water bodies – river/reservoir may have risk of spillage of chemicals, construction material, and debris leading to water pollution and impacts on fishes.

Pre-construction and construction stage major auxiliary or preparatory intervention are within dam area as well as beyond dam area. Deployment and haulage of heavy machinery, setting up of workshop, operation of concrete mixture and pumps will be within dam area. Other activities such as labour camp and debris disposal will be beyond dam area. Activities involving machinery and equipment will have OHS risks and impacts on physical environment. Transportation of material, debris/silt disposal and labour camp are likely to generate pollution and impact on physical environment.

Project will involve project managers and supervisors, contracted workers – these would also include migrant workers as all the required labour will not be fully supplied locally for a number of reasons, such as worker unavailability and lack of technical skills and capacity. Construction contractors are expected to stay at/near dam, set up construction equipment and machinery near work location at pre-determined/approved sites. Influx of skilled migrant labour, albeit few in numbers, for construction works is likely. The labour will stay outside the dam premises, hence risk of SEA/SH is likely.

Emergency Action Plan, Early Warning System and Flood Forecasting System, etc. would be required to be prepared. In that case, project will reach out to the disadvantaged and vulnerable persons and groups and involve them mainly during implementation. During preparation of EAP, dam break scenario will be simulated and inundation map prepared to delineate the potential risk area in case of an emergency situation. Similarly, during flood release scenario, area inundated will be delineated by simulation. Population in vulnerable areas under different release scenario will be identified and contacted through public consultation meetings. Communities will be made aware about the warning systems and do's and dont's during such scenarios.

Output of this screenings enclosed as **Annexure I**.[

Step II Screening (using Form SF-2): All applicable activities identified as having potential risks/impacts that were identified through Step I screening, are further screened for associated sub-activity and evaluated for the extent of risk. Sub-activity's Risk/Impact intensity is further categorised as Low (L), Moderate (M), Substantial (S) or High (H) based on following criteria:

Low : Localized, temporary and negligible
Moderate : Temporary, or short term and reversible under control
Substantial : Medium term, covering larger impact zone, partially reversible
High : Significant, non- reversible, long term and can only be contained/compensated

Occupational Health and safety is treated as substantial by default as its risk effect can be managed by adopting defined guidelines.

All other activities are categorised as low risk activities. None of the activities for this sub-project is having substantial or high risk. The outcome of Screening is enclosed as **Annexure II**. In case of GBV/SEAH, this site was assessed as Low risk. Based on consideration of all the above, summary of Risk/Impact (as per outcome of SF-2 3) is summarised for major sub-project activities under **Table 4.1below.**

Table 4.1: Summary of Identified Risks/Impacts inForm SF ~~3~~2

Project Activity	Environment Risks						Social Risks					
	Air, water, noise, land use, Soil, Resource use	Pollution downstream and upstream	General Ecology	Protected Area (Wild Life Sanctuaries, National Park and other natural habitat even if not protected)	Other RET species (flora and fauna) outside protected areas	Fish and Aquatic life within dam water body	Land	Tribal	Labour	Cultural heritage	GBV/ SEAH	OH and Safety to Labour/ Community
Civil (within Dam Boundary)	M	M	L	None	L	L	L	L	M	L	L	S
Hydro Mechanical/Electrical	L	L	L	None	L	L	L	L	L	L	L	S
Instrumental SCADA, surveillance	L	L	L	None	L	L	L	L	L	L	L	L
Road work	M	L	L	None	L	L	L	L	M	L	L	L
Major debris disposal	L	L	L	None	L	L	L	L	L	L	L	L
Labour camp	L	L	L	None	L	L	L	L	L	L	L	L

Criteria for Risk Evaluation:
Low: Localized, temporary and Negligible
Moderate: temporary, or short term and reversible under control
Substantial: medium term, covering larger impact zone, partially reversible
High: significant, non- reversible, long term and can only be contained/compensated
Occupational Health and safety: it will be treated as Substantial by default as OHS effect can be kept controlled and with negligible effect with adoption of defined guidelines,

4.2 STAKEHOLDERS CONSULTATION

In light of the COVID 19 pandemic, Government of India has announced a country wide lockdown between March 23 till date , that constrained holding of consultation meetings. However, to ensure the participation of stakeholders in ESDD preparation and record their views, Stakeholder consultation was made at Thambraparani dam on 23/07/2020. Two sets of questions are prepared, one for each category of stakeholders – direct workers and community and the responses are given below. Direct workers included Engineers/staff working at dam (present or working from home) – full time or contracted and community stakeholders included local tribal people from locations Chinnamylar, Agasthiyar nagar and Non- Tribal people of Karaiyar dam at Papanasam Tirunelveli district.

Stakeholder consultation was conducted as part of environmental and social impact assessments, with a purpose to:

a. Provide initial information to the communities on the proposed project interventions and particularly the non-structural interventions.
b. Help identify potential stakeholders who are involved at this stage and will be involved a later stage.
c. assess their responses in understanding the potential risks and prepare mitigation plan to address their concerns

Stakeholder consultation was made at Thambraparani dam on 23/07/2020. List of participants is enclosed as **Annexure III**. Inputs were taken from workers from nearby village.

Following is the outcome of the stakeholder consultation exercise:

Stakeholder consultation was made as part of environmental and social impact assessments. The purpose was to:

a. Provide initial information to the communities on the proposed project interventions and particularly the non-structural interventions.
b. Help identify potential stakeholders who are involved at this stage and will be involved a later stage.
c. Ascertain if, there are any legacy issues relating to displacement, resettlement, etc.
d. Elicit their responses in relation to key non-structural interventions such as early warning systems, emergency action plans, etc.
e. Identify mechanisms that would be deployed to engage with different stakeholders and particularly communities living downstream.

Following is the outcome of the stakeholder consultation exercise. List of participants is enclosed as **Annexure III**.

A. Interaction with Dam Engineers/Staff

Questions	Responses provided / Observations
1. Please confirm whether all proposed structural rehabilitation activities for this dam are limited to dam compound only or any activities are proposed beyond dam complex like catchment area treatment plan, stabilization of reservoir rim area, slope stabilization, de-silting etc.? Please specify if any possibility of local community interference exist during the implementation of rehabilitation measures; including stakeholders consultation meetings planned for dissemination of emergency action plans which is a non-structural measure.	The proposed structural Rehabilitation activities are within the dam site only. Neither slope stabilization nor desilting work is proposed in this dam. Dam is located in the Wildlife Sanctuary and there is no possibility of community interference during the implementation of Rehabilitation work and EAP stakeholders' consultation meeting.
2. Is there any unsettled issues (legacy) related to displacement or resettlement, pending since time of dam construction? If yes, please give a brief detail.	The dam is located in Wildlife Sanctuary. There are no resettlement issues pending from the time of construction of dam.
3. Any unauthorized encroachers or squatters living within the dam premise? If yes, are these not a threat for dam security and dam premise, any official action taken in the past, does the state government have legalized these squatters and these have full right in the property of dam authorities.	There is no encroacher (or) squatter within the dam premises as on date.

4. What is the proposed institutional arrangement to deal the Environment and Social activities within the scheme i.e. in-house team of experts/hired agency or individual experts?	Dealing of Environmental and social activity by CWC environmental experts.
5. Who will be in charge of E&S related activities at dam site and at SPMU level?	Dam site: Executive Engineer/Civil/DRIP/ Madurai SPMU : Executive Engineer/Civil/ Dam safety/Chennai
6. How do communities contact dam officials? Is there any existing mechanism known to communities to contact dam officials (through telephone/mobile/e-mail/official website?	Through telephone and mobile.
7. What is existing mechanism to communicate with downstream communities/ public on unregulated releases of water during high flood time siren/ written communication to district authorities/ telephone/ mobile/ text messages or any other mode of communication?	i. By siren. ii. Written Communication to the District Collector. iii. Advance intimation to the public/ downstream communities through mobile.
8. How do you ensure that downstream community is fully aware of the above existing mechanism?	The downstream community had already been educated by the Department officials.
9. Are there women employees at the dam site?	Nil
10. Is there any existing Grievance Redressal Mechanism (GRM) within the department to address any kind of grievance/complaints by general public?	Yes. Executive Engineer/ Civil/ Dam Safety I/ Chennai @ SPMU Level Executive Engineer/ Civil/ DRIP/ Madurai @ Field
11. Details of any grievances received lately related to this new Scheme?	NIL
12. Is dam premise a restricted area or has open access to general public?	Access to Dam area is fully restricted.
13. Are there tribals living in the surrounding area of dam complex? Which tribes are these? Please give brief detail.	Kani tribals are living in the surrounding dam area.
14. Does the dam have any tourism/ water recreation facilities? If yes, how many approximate tourist visits annually, annual revenue generated, whether any portion of this generated revenue is diverted to regular O&M of this dam.	NIL.

15. Do you engage any local labours for routine dam maintenance work? If yes, what is the process of engaging these locals for work at dam, whether through Government approved contractor or hired individually?	Routine Dam maintenance works are being done by Department staff only. Cleaning works are done through registered Contractors.

B. Interaction with Local Community

Questions	Responses provided / Observations
1. How many villages are in immediate downstream vicinity?	Three villages, namely Chinna mylar, Karaiyar and Agasthiyar nagar at the downstream side of this dam.
2. Are they dependent on dam in any way for their livelihood?	No, they are not dependent on the dam. All the basic amenities required are fulfilled by the respective Vickramasingapuram village.
3. Does any of these villages were displaced and rehabilitated during the construction of Thambraparani Dam ? Is there any pending compensation issues?	Dam area is fully covered in Wildlife Sanctuary. There is no R & R issue.
4. Is there any R&R affected person known to you who is currently working with the dam authorities? If so, in what capacity (employee/direct worker/contractor)	No.
5. Are you aware of any fishing communities living immediately downstream of dam whose livelihood are directly linked with the fishing activities of this dam?	No fishing activity.
6. Are you aware of fishing working seasons, revenue earning, any access to general public for fishing, any suggestion, etc.	Not applicable.
7. Are you aware of local women affected in any way by dam operations?	Not affected.
8. Are you aware of any early flood warning system for this dam, or any other system wherein downstream communities getting regular update during flood season for any uncontrolled release of water?	Yes, warning siren is already provided in the dam. When the spillway gate is opened to discharge the surplus water, siren is blown.
9. Are you aware of any dam related incident happened in the past wherein some loss of life encountered? If yes, brief summary may be given	No loss of life reported
10. If you have to contact the dam authorities; how will you contact, through telephone/mobile/e mail/personally?	There is no communication facility.
11. In the past, on any occasion, did you contact dam authorities for any specific reason affecting public in general? If so, how did you contact and how was the response of dam	

authority?	
12. Give your views about Thambraparani, how this dam is helping Country, State, district or local communities in meeting its objectives, any specific concern can also be given?	1. Water conservation 2. Power generation 3. Transport facilities 4. Fruits and spices plantations.
13. (a) Are you aware of any document named Emergency Action Plan (EAP) of the dam? (b) If yes, do dam authorities conduct any annual mock drill or consultation meeting on dam site and invite all stakeholders to inform about various protocols in place and consequences in case dam fails? (c) In future, during stakeholder's consultation meeting, would you like to be a part of these consultation and mock drill activities to be conducted by dam authorities? (d) If yes, how to contact you, please give the corresponding address along with all details to receive the official communication.	No. Not yet. Consultation meeting to be conducted. Yes. Through Mobile. Address and mobile Nos. are given in Annexure III.
14. Are you a regular follower of official website of dam authorities as a general public, in case you are a contractor, do you follow various tenders notices being invited for various maintenance of this dam?	No.
15. Any suggestion to improve overall system by dam authorities in any way, please give in brief?	1. There is no objection to DRIP works. 2. Request to carry out DRIP works early. 3. Request for employment opportunities (daily wages) while executing DRIP works.

Following is the summary outcome of the stakeholder consultation:

1. Agriculture is still the main occupation of people around the dam.
2. All the participants welcomed the proposed interventions relating to dam safety and ensured that our DRIP work will not affect the villages during execution.
3. There are no pending issues regarding dam construction related resettlement.
4. The participants explicitly mentioned that the dam is their lifeline and strengthening works will help their long term livelihood and therefore welcomed such information.
5. Participants have expressed that they do not have any grievances and as such no grievances were ever reported from their communities/neighbourhoods.

4.3 DESCRIPTIVE SUMMARY OF RISKS AND IMPACTS BASED ON SCREENING

Based on the above screening analysis, potential impacts and risks from the sub-project are summarised below:

Environmental Impacts and Risks

1. Environment risks and impacts, as assessed above, for various project activities under this sub-project are categorised as Low and Moderate due to localised nature of proposed activities i.e. activities remain limited to dam area except for labour camp and muck/debris disposal.
2. Execution of civil and hydro-mechanical work within dam body will generate localised impacts on physical environment and resource use; pose risk of exposure of workers requiring personal protective equipment (PPE) use.
3. Civil work could not interface with water body; hence risk of water pollution and impact on fish fauna is neglected.
4. Construction and demolition waste and muck require careful disposal at pre-identified and approved site to minimise the risk of pollution on this count.
5. No impact on general ecology is envisaged.

Social Risk and impacts

1. As the interventions are within the dam premises and on the dam structure, there shall be no adverse impacts on land and assets due to any sub-component or sub-activities
2. The dam is not located in the Schedule V area. Though are Scheduled Tribes households in the vicinity, these are mainstreamed into the overall society and do not meet the characteristics outlined in ESS 7. There will be no physical interventions.
3. Influx of migrant labour will be low as these works require only few but very skilled labour Also these workers will mostly operate from labour camps within the dam premises/proximity and hence there would be minimal interface with communities and therefore significantly lower SEAH/GBV risks.
4. Waste generation from labour colony can pollute drinking water sources of community; risk is low and can be mitigated by providing adequate sanitation facilities.
5. No impacts are envisaged on cultural heritage as works shall not be undertaken in their vicinity or result in any impact.
6. Labour related risk would include:
   - Safety issues while at work like injuries/accidents/ fatalities leading to even death, while at work; Occupational health and safety risks due to exposure of workers to unsafe conditions while working at heights, working using lifts, handling of equipment and machinery, exposure to air and noise pollution etc. will be addressed through OHS guidelines.
   - Short terms effects due to exposure to dust and noise levels, while at work
   - Long term effects on life due to exposure to chemical /hazardous wastes
   - Inadequate accommodation facilities at work force camp, including inadequate sanitation and health facilities
   - Sexual harassment at work
   - Absence or inadequate or inaccessible emergency response system for rescue of labour/workforce in situations of natural calamities.
   - Health risks of labour relating to HIV/AIDS and other sexually transmitted diseases

- Non-payment of wages
- Discrimination in Employment (e.g. abrupt termination of the employment, working conditions, wages or benefits etc.)
- Unclear terms and conditions of employment
- Discrimination and denial of equal opportunity in hiring and promotions/incentives/training opportunities
- Denial for workers' rights to form worker's organizations, etc.
- Absence of a grievance mechanism for labour to seek redressal of their grievances/issues.

Chapter 5 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

5.1.1 Risk Classification

As per the ESDD exercise, risk/impacts that have been identified relate to Water Quality, Occupational Health, Physical Environment, labour and SEAH/GBV. The summarised environmental and social risks of identified activities with level of risk are presented in previous chapter. These risks are low to moderate and localised, short term and temporary in nature which can be managed with standard ESMP and guidelines. Environment risks of air, water, noise, land use, soil and resource use for some of the activities as well as social risks of labour and OHS to labour/community is substantial. Environment risks of pollution downstream and upstream are categorised as Moderate due to interface with water bodies. Environmental risk relating to Labour camp has been flagged as Moderate on environment.

Hence the overall risk of this sub-project Dam is categorized as Moderate

5.1.2 National Legislation and WB ESS Applicability Screening

The applicability analysis of GoI legal and regulatory framework indicates that while, there are various legislations which will have to be followed by the contractor for the protection of environment, occupational health and safety of workers and protection of workers and employment terms. None of Indian legislation is applicable warranting obtaining clearance prior to start of construction/improvement work.

Five ESS standards are found relevant to this sub-project as per reasons given in **Table 5.1** below:

Table 5.1: WB ESF Standards applicable to the sub-project

Relevant ESS	Reasons for Applicability of the standard
ESS1 :Gender Based Violence or SEA/SH related actions	Leading to SEA/SH GBV risk
ESS2: Labour and Working Conditions	Direct workers, Contracted workers(for civil and hydro-mechanical works) and Community workers (likely to be engaged for EAP and other non-structural interventions)
ESS3: Resource Efficiency, Pollution Prevention and Management	Civil and hydro-mechanical/electrical work including resource consumption requiring protection of physical environment and conservation of resources
ESS 4: Community Health and Safety	Transportation of material, labour camp near habitation; and accidental risk during repair /improvement work and also leading to SEA/SH GBV risk; Community involvement during EAP preparation
ESS 10: Stakeholder Engagement Plan	For engagement of stakeholders in all interventions

5.2 RECOMMENDATIONS

5.2.1 Mitigation and Management of Risks and Impacts

Since risks and impacts are low to moderate category, standard guidance in accordance with the ESMF shall be followed. It shall cover the following aspects:

a. IA shall customise the standard Environmental and Social Management plan (ESMP) that has been provided in the Environmental and Social Management Framework (ESMF) and make it part of bid document for effective adherence by contractors.

b. It is recommended that ESMP provides due measures for protection of environment quality and resource conservation (during handling of resources) in line with ESF standard ESS3 requirements. Similarly, any impacts identified have to be conserved. Likewise, due attention has to be given to Occupational Health and Safety of workers and community in line with the requirements of ESS4 and World Bank Group guidelines on Occupational Health and Safety (OHS). Hence SPMU/IA shall prepare a standard ESMP in line with outline provided in the ESMF and ensure its adherence by contractor. The standard ESMP will address the following:

- Gender Based Violence or SEA/SH related actions (ESS1)
- Labour Management Procedure (ESS2)
- Resource Efficiency and Pollution Prevention (ESS3)
- Community Health and Safety (ESS4)
- Stakeholders Engagement Plan (ESS10)

c. Contractor shall submit BOQ as per ESMP of the sub project and will also include environmental and social budget as part of bid submission.

Mitigation plans to meet requirements for relevant Standards with responsibility and stages are given in **Table 5.2** below:

Table 5.2: List of Mitigation Plans with responsibility and timelines

WB-ESS Triggered	Mitigation Instrument	Responsibility	Timelines
ESS2: Labour and Working Conditions	• LMP	SPMU/IA EAP, CHSMP	Before mobilization by Contractor
ESS 4: Community Health and Safety	• OHS MP • GBV/SEAH Risk management	SPMU for GBV/SEAH	GBV/SEAH by appraisal
ESS3: Resource Efficiency, Pollution Prevention and Management	• ESMP • Muck Management Plan • Resource	SPMU/IA ,EAP, CHSMP	Before mobilization by Contractor

WB-ESS Triggered	Mitigation Instrument	Responsibility	Timelines
	Conservation Plan		
ESS 10: Stakeholder Engagement Plan	• SEP in accordance with project SEF	SPMU/IA	By negotiation

IA shall disclose the finalised ESDD, ESMP, ESCP and other related plans on its website after formal approval from CPMU. Executive summary of proposed ESMF and SEF based on ESDD shall be translated and disclosed in local language.

5.2.2 Institutional Management, Monitoring and Reporting

ESMP will be developed by SPMU/IA and will be part of the bid document of the sub project and shall be shared with CWC by SPMU for their review/ endorsement and approval. SPMU/IA shall designate a Nodal Officer to coordinate and supervise E&S activities. The SPMU will hire the qualified staffs to support management of E&S risks including Environmental Expert, Social Expert for ensuring compliance with the Bank's ESF and ESS's and ensures that these activities shall be implemented as per the procedures. Specifically, as included in the ESCP, every SPMU shall be strengthened from environmental and social risk perspective during implementation of the sub-projects. A dedicated Environmental and Social staff with requisite skill shall be placed in the SPMU and will be utilized to enable (a) development/review of ESDD of each sub project either through an agency or in house, (b) E and S staff will coordinate to hire consultants where ESDDs suggest a high risk for undertaking detailed ESIA, (c) preparation of environmental and social management plans (ESMPs) based on type of risks as well subsequent implementation of mitigation measures during implementation. SPMU/IA will hire experts from outside department with relevant experience. These E&S experts will work in coordination with Project Management Consultancy (PMC) contracted by CPMU – CWC.

SPMU/IA shall advise contractors about applicable legislative requirements and ensure that contractors fully comply with applicable requirements and submit compliance reports to SPMU/IA on quarterly basis. SPMUs will share regular implementation status of ESMPs to CWC and The World Bank in line with Environmental Social Commitment Plan (ESCP) on quarterly basis.

SPMU/IA hasestablished a GrievanceRedressalMechanism to receive and facilitate resolution of complaints and grievances, from the communities and other stakeholders including implementation partners. Grievance redress mechanism will address concerns and complaints promptly and transparently with no impacts (for any complaints made by project affected people (PAPs). GRM will work within existing legal and cultural frameworks and shall comprise project level and respective State level redress mechanisms.

PMC for the project will have sufficient staff with skills on Environment and Social aspects. Awareness raising and capacity building on the new Environmental and Social Framework (ESF) hasbeen preparedfor the environment and social staff engaged and this will be an

area of continued focus, with a view to generate awareness at dam level.

Project Management Consultancy (PMC) shall coordinate with CWC for approval, documentation, disclosure and implementation of these ESMPs in line with project ESMF and ESCP.

Overall, the proposed activities within this Dam sub-project have low to moderate risks resulting in the overall sub-project to be categorized as Moderate risk category. These risks and impacts can be effectively mitigated with effective implementation of mitigation plans by SPMU/IA, Contractors and monitoring by PMC, SPMU and CWC.

Annexure - I: Form SF1

Sl. No	Project Component	Applicable (A), Not Applicable (NA)	Environment and Social Risk Associated within dam area (DI), Beyond Dam Area (DE)	Likely Nature of Risk/Impact Water Quality (WQ), Fisheries(F), Conservation area(CA), Protected Area (PA), Ecological (E), Occupational Health (OH), Physical Environment (PE), Cultural (C), Tribal presence (T), impact on private land/assets/encroachers/squatters (LA), Labour (L), GBV risks (G), (Write whichever is applicable)
1	**2**	**3**	**4**	**5**
A	**Nature of Project Component Related**			
1	Reservoir Desiltation	**NA**		
2	Major structural changes – Spillway construction (Improving ability to withstand higher floods including additional flood handling facilities as needed.)	**NA**		
3	Structural strengthening of dams to withstand higher earthquake loads	**NA**		
4	Structural Improvement/Repair work-upstream of Dam site (interfacing dam reservoir) (like Repairs to revetment/rip-rap in u/s face)	**A**	**DI**	**WQ, F, OH, PE, L, G**
5	Structural Improvement/Repair work -Downstream of Dam site (with no interfacing with dam reservoir) (like energy dissipating arrangement etc.)	**A**	**DI**	**WQ, OH, PE, L, G**
6	Remodelling earth dams to safe, stable cross sections	**NA**		
7	Hydro-mechanical/electrical activities with interface with dam reservoir	**A**	**DI**	**OH, WQ, L, G**
8	Hydro-mechanical/ electrical activities Downstream of Dam site (with no interfacing with dam reservoir)	**NA**		
9	Instrumentation, General lighting and SCADA systems	**A**	**DI**	**OH, L**
10	Basic Facilities (like access road improvement, renovation of office, etc)	**A**	**DI**	**OH, PE, L, G**
11	Utility installation like standby generator, or setting up solar power systems	**NA**		
12	Painting Work	**A**	**DI**	**WQ, OH, L**
13	Water recreation activities	**NA**		
14	Tourism Development	**NA**		
15	Solar power/floating solar	**NA**		
16	List any other component not listed above			
i	Jungle clearance	**A**	**DI**	**E, L, G**

Sl. No	Project Component	Applicable (A), Not Applicable (NA)	Environment and Social Risk Associated within dam area (DI), Beyond Dam Area (DE)	Likely Nature of Risk/Impact Water Quality (WQ), Fisheries(F), Conservation area(CA), Protected Area (PA), Ecological (E), Occupational Health (OH), Physical Environment (PE), Cultural (C), Tribal presence (T), impact on private land/assets/encroachers/squatters (LA), Labour (L), GBV risks (G), (Write whichever is applicable)
1	**2**	**3**	**4**	**5**
B	**Pre-construction and construction stage major auxiliary or preparatory intervention**			
1	Acquisition of forest land involved	**NA**		
2	Taking of private land (including physical or economic displacement, impact on livelihood; temporary loss of business)	**NA**		
3	Major Borrow materials requirement involved	**NA**		
4	Major Quarry materials requirement involved	**NA**		
5	Blasting involved	**NA**		
6	Resettlement and Rehabilitation	**NA**		
7	Types of project workers (Direct, Contracted, Community Workers (or Volunteers i.e. for EAP implementation)	**A**	**DE**	**L, G**
8	Labour Camp involved (location within dam premises or outside)	**A**	**DE**	**WQ, PE, L, G**
9	Migrant labour likely to be involved	**A**	**DE**	**L, G**
10	Heavy machinery to be deployed and related maintenance workshop set up involved	**A**	**DI**	**OH, PE, L, G**
11	Hot mix plant Requirement	**NA**		
12	Concrete mixture and heavy pumps to be deployed	**A**	**DI**	**OH, PE, L, G**
13	Temporary land acquisition involved	**NA**		
14	Temporary disruption to access, livelihoods	**NA**		
15	Tree felling/ vegetation clearance involved	**NA**		
16	Haulage of machinery involved	**A**	**DI**	**OH, PE, L, G**
17	Major Debris Disposal involved	**A**	**DE**	**PE, L, G**
18	Major Transport of materials involved	**A**	**DE**	**PE, L, G**
19	Utility shifting involved	**NA**		
20	Discharge of reservoir water (lowering of reservoir water involved)	**NA**		
21	**List any other not listed above**			

Annexure – II: Form SF2 Annexure - I: Form SF1

Sl. No.	Project Component	Applicable (A) , Not Applicable (NA)	Environment and Social Risk Associated within dam area (DI), Beyond Dam Area (DE)	Likely Nature of Risk/ Impact Water Quality (WQ), Fisheries (F), Conservation area (CA), Protected Area (PA), Ecological (E), Occupational Health (OH), Physical Environment (PE), Cultural (C), Tribal presence (T), impact on private land/ assets/ encroachers/ squatters (LA), Labour (L), GBV risks (G) (Write whichever is applicable)
1	**2**	**3**	**4**	**5**
A	**Nature of Project Component Related**			
1	Reservoir Desiltation	**NA**		
2	Major structural changes – Spill way construction (Improving ability to withstand higher floods including additional flood handling facilities as needed.)	**NA**		
3	Structural strengthening of dams to withstand higher earthquake loads	**NA**		
4	Structural Improvement/ Repair work – Treatment of weak masonry joints on upstream of Dam site (interfacing dam reservoir) (like resetting of Rip-Rap, repair of training walls, treatment of Honey combed etc.)	**NA**		
5	Structural Improvement/ Repair work - Downstream of Dam site (with no interfacing with dam reservoir) (like repair of parapet walls, damage spillway crest, ~~downstream training walls,~~ etc.)	**NA**		
6	Remodeling earth dams to safe, stable cross sections	**NA**		
7	Electro-mechanical activities with interface with dam reservoir	**A**	**DI**	**CA, OH, PE, L,**
8	Electro-mechanical activities ~~Downstream of Dam site~~ (with no interfacing with dam reservoir)	**A**	**DI**	**CA, OH, PE, L, G**
9	General lighting	**A**	**DI**	**CA, OH, PE, L, G**

Sl. No.	Project Component	Applicable (A) , Not Applicable (NA)	Environment and Social Risk Associated within dam area (DI), Beyond Dam Area (DE)	Likely Nature of Risk/ Impact Water Quality (WQ), Fisheries (F), Conservation area (CA), Protected Area (PA), Ecological (E), Occupational Health (OH), Physical Environment (PE), Cultural (C), Tribal presence (T), impact on private land/ assets/ encroachers/ squatters (LA), Labour (L), GBV risks (G) (Write whichever is applicable)
1	**2**	**3**	**4**	**5**
10	Basic Facilities (like access road improvement, renovation of office and police guard room, etc.)	**A**	**DI**	**CA, OH, PE, L, G**
11	Utility installation like standby generator	**A**	**DI**	**CA, OH, PE, L**
12	Painting Work	**A**	**DI**	**CA, OH, PE, L**
13	Water recreation activities	**NA**		
14	Tourism Development	**NA**		
15	Solar power/floating solar	**NA**		
16	List any other component not listed above			
i	Cleaning/Reaming of Drainage shafts (In Dam Body and foundation)	**A**	**DI**	**CA, OH, PE, L, G**
ii	Construction of RCC Retaining wall in downstream L/S and R/S to improve flow condition	**NA**		
B	**Pre-construction and construction stage major auxiliary or preparatory intervention**			
1	Acquisition of forest land involved	**NA**		
2	Taking of private land (including physical or economic displacement, impact on livelihood; temporary loss of business)	**NA**		
3	Major Borrow materials requirement involved	**NA**		
4	Major Quarry materials requirement involved	**NA**		
5	Blasting involved	**NA**		
6	Resettlement and Rehabilitation	**NA**		

Sl. No.	Project Component	Applicable (A) , Not Applicable (NA)	Environment and Social Risk Associated within dam area (DI), Beyond Dam Area (DE)	Likely Nature of Risk/ Impact Water Quality (WQ), Fisheries (F), Conservation area (CA), Protected Area (PA), Ecological (E), Occupational Health (OH), Physical Environment (PE), Cultural (C), Tribal presence (T), impact on private land/ assets/ encroachers/ squatters (LA), Labour (L), GBV risks (G) (Write whichever is applicable)
1	**2**	**3**	**4**	**5**
7	Types of project workers (Direct, Contracted, Community Workers (or Volunteers i.e. for EAP implementation)	**A**	**DE**	**CA, L, G**
8	Labour Camps involved (location within dam premises or outside)	**A**	**DE**	**WQ, CA, PE, G, CA, E**
9	Migrant labour likely to be involved	**A**	**DE**	**L, G**
10	Heavy machinery to be deployed and related maintenance workshop set up involved	**A**	**DI**	**CA, OH, PE, L, G**
11	Hot mix plant Requirement	**NA**		
12	Concrete mixture and heavy pumps to be deployed	**A**	**DI**	**CA, OH, PE, L, G**
13	Temporary land acquisition involved	**NA**		
14	Temporary disruption to access, livelihoods	**NA**		
15	Tree felling/ vegetation clearance involved	**NA**		
16	Haulage of machinery involved	**A**	**DI**	**OH, PE, L, G**
17	Major Debris Disposal involved	**A**	**DE**	**PE, L, G**
18	Major Transport of materials involved	**A**	**DE**	**PE, L, G**
19	Utility shifting involved	**NA**		
20	Discharge of reservoir water (lowering of reservoir water involved)	**A**	**DI**	**OH, PE, L, G**
21	**List any other not listed above**			

Annexure – II: Form SF2

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity (As per SF-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment/ social	Risk/ Impact intensity for each type of risk/ impact Low (L) , Moderate (M), Substantial(S), High (H)
1	**2**	**3**	**4**	**5**
A	**Project Component Related**			
1.	**Structural Strengthening/ Improvement/ Repair work - upstream of Dam site**			
a	Colour washing and miner repair works in gauge reader room and DG set room.	**WQ, F, OH, PE, L, G**	Air pollution, noise pollution, risk of spillage of wastewater, risk of reservoir water contamination and impact on fishes, generation of construction debris, Occupational health and safety risk due to working on upstream face of dam, Labour and GBV risk	**M**
2.	**Structural Improvement/ Repair work - Downstream of Dam site (with no interfacing with dam reservoir) (like repair of parapet walls, damage spillway crest, downstream training walls, etc.)**			
a	Approach steps leading to	**WQ, CA, F, OH, PE, L, G**	Air pollution, noise pollution, risk of spillage of	**M**

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity (As per SF-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment/ social	Risk/ Impact intensity for each type of risk/ impact Low (L) , Moderate (M), Substantial(S), High (H)
1	2	3	4	5
	drainage gallery and inter connection tunnel intake trash rack along with hand rails.		wastewater to river, risk of river water contamination and impact on fishes, construction debris, Occupational health and safety risk, Labour and GBV risk	
b	PCC wall for side protection for approach roads and protection work for projected rock mass.	**WQ, F, OH, PE, L, G**	Air pollution, noise pollution, risk of spillage of wastewater to river, risk of river water contamination and impact on fishes, construction debris, muck from excavation, Occupational health and safety risk, Labour and GBV risk	**M**
c	Chain link fencing around interconnection tunnel intake and police guard room near drainage gallery.	**WQ, CA, F, OH, PE, L, G**	Air pollution, noise pollution, risk of spillage of wastewater to river, risk of river water contamination and impact on fishes, construction debris and muck generation from excavation work for wall foundation, Occupational health and safety risk, Labour and GB risk	**M**

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity (As per SF-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment/ social	Risk/ Impact intensity for each type of risk/ impact Low (L) , Moderate (M), Substantial(S), High (H)
1	2	3	4	5
3.	**Electro-mechanical activities Downstream of Dam site (with no interfacing with dam reservoir)**			
a	Replacement of steel wire ropes for both the sluice gates.	**CA, OH, PE, L**	Air pollution, noise pollution, Occupational health and safety risk due to working at heights and exposure to paints, waste generation from removed parts and empty paint containers, Labour risk	**M**
b	Replacement of existing control panel and wiring for the scourvent and sluice gates.	**CA, OH, PE, L**	Air pollution, noise pollution, Occupational health and safety risk due to working at heights and exposure to paints, waste generation from removed parts and empty paint containers, Labour risk	**M**
c	Replacement / Repair of existing gate rollers, guide angle, skin plate and gate control panel for the interconnecting	**CA, OH, PE, L**	Air pollution, noise pollution, Occupational health and safety risk due to working at heights and exposure to paints, waste generation from removed parts	**M**

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity (As per SF-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment/ social	Risk/ Impact intensity for each type of risk/ impact Low (L) , Moderate (M), Substantial(S), High (H)
1	2	3	4	5
	tunnel gate.		and empty paint containers, Labour risk	
d	Tunnel intake trashrack panel replacement is proposed	**CA, OH, PE, L**	Air pollution, noise pollution, Occupational health and safety risk due to working at heights and exposure to paints, waste generation from removed parts and empty paint containers, Labour risk	**M**
b	General Maintenance and upkeeping of spillway gate, scour vent gates, power tunnel gates and Hoist Bridge	**CA, OH, PE, L, G**	Air pollution, noise pollution, Occupational health and safety risk due to working at heights and exposure to paints, waste generation from removed parts and empty paint containers, Labour and GBV risk	**M**
4.	**Instrumentation, General lighting and SCADA systems**			
a	Providing and installing 80 KVA generator	**CA, OH, PE, G**	Occupational health and safety risk due to electrical work, waste generation from removed parts and packing material, labour risk	**L**

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity (As per SF-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment/ social	Risk/ Impact intensity for each type of risk/ impact Low (L) , Moderate (M), Substantial(S), High (H)
1	2	3	4	5
b	Providing lighting over Dam and surrounding areas.	**CA, OH, PE, G**	Occupational health and safety risk due to electrical work, waste generation from removed parts and packing material, labour risk	**L**
c	Providing Lightening arrester at Dam	**CA, OH, PE, G**	Occupational health and safety risk due to electrical work, waste generation from removed parts and packing material, labour risk	**L**
d	Providing lightening in Drainage Gallery	**CA, OH, PE, G**	Occupational health and safety risk due to electrical work, waste generation from removed parts and packing material, labour risk	**L**
e	Dam Instrumentation (Geo-technical, hydro-meteorological, Seismic, Geodetic, data collection, storage, data transfer, analysis, retrieval, Operation & Maintenance etc.).	**OH, PE, G**	Occupational health and safety risk due to electrical work, waste generation from removed parts and packing material, labour risk	**NA**
B.	**Pre-construction and construction stage major auxiliary or preparatory**			

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity (As per SF-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment/ social	Risk/ Impact intensity for each type of risk/ impact Low (L) , Moderate (M), Substantial(S), High (H)
1	2	3	4	5
	intervention			
1	Types of project workers (Direct, Contracted, Community Workers (or Volunteers i.e. for EAP implementation)	**G**	GBV risk due to involvement of workers, volunteers and local population	**L**
2	Labour Camps involved (location within dam premises or outside)	**WQ, CA, PE, G, E, CA**	Wastewater generation from domestic activities, waste generation, risk of tree cutting and hunting of wild animals, GBV risk within labour and involving community. Labour camp will be in close proximity to the Conservation reserve and there is a risk of interference with conservation area	**M**
3	Migrant labour likely to be involved	**L, G**	Migrant labour having low degree of interface with community	**L**
4	Likely interface of Workers with communities	**L, G**	Risk of GBV due to labour interaction with community	**L**
5	Heavy machinery to be deployed and related maintenance workshop set up involved	**CA, OH, PE, L, G**	Heavy machinery will be deployed for repair and maintenance of gates and hoists and for other activities - OH risk due to machine handling, waste, wastewater and	**L**

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity (As per SF-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment/ social	Risk/ Impact intensity for each type of risk/ impact Low (L) , Moderate (M), Substantial(S), High (H)
1	2	3	4	5
			air emissions from machines operations, hazardous waste generation from oil waste,	
6	Concrete mixture and heavy pumps to be deployed	**CA, OH, PE, L, G**	Concrete mixture and pumps will be deployed for road repair and other civil works and dewatering - OH risk due to machine handling, waste generation, air emissions from operations, hazardous waste generation from oil waste, Labour	**L**
7	Haulage of machinery involved	**CA, OH, PE, L, G**	Machines will be hauled from different location and brought to site; OHS risk during loading/unloading and air and noise pollution during transportation, labour and GBV risk	**L**
8	Major Debris Disposal involved	**CA, OH, PE, L, G**	Debris will be generated from various repair activities such as repair of roads, rip-rap replacement, training walls, etc. - OH risk during debris handling, air and noise emissions from debris handling and transportation,	**M**

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity (As per SF-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment/ social	Risk/ Impact intensity for each type of risk/ impact Low (L) , Moderate (M), Substantial(S), High (H)
1	**2**	**3**	**4**	**5**
			water pollution risk due to debris finding its way to water body, and GBV risk due to labour involvement	
9	Major Transport of materials involved	**CA, OH, PE, L, G**	Material will be transported from various vendors and suppliers to site for civil, electromechanical work and instrumentation - OH risk during material handling, loading and unloading, air and noise emissions from transportation, Labour and GBV risk due to labour involvement	**L**

Criteria for Risk Evaluation :		
Low	:	Localized, temporary and Negligible
Moderate	:	Temporary, or short term and reversible under control
Substantial	:	Medium term , covering larger impact zone, partially reversible
High	:	Significant , non- reversible, long term and can only be contained/compensated
Occupational Health and safety	:	Moderate by default as OHS effect can be kept controlled and with negligible effect with adoption of defined guidelines

Annexure III: Stakeholder's consultation: List of Participants

Sl. No.	Name	Relation with Dam – Staff, contractor, worker, full time/part time, local, NGO….	Mobile Number	Address (at least village name)
01	Mr. P.Rameshwari	Executive Enginner/Civil/DRIP/Madurai	94454-42372	Madurai
02	Mr. C. Natarajan	Assistant Enginner/Civil/ DRIP /Papanasam	94425-70802	Papanasam
03	Thiru P Velusamy	Public from Thalaivettan parai	Nill	Mylar kani Kudiyerupu, Upper dam (Post) Ambasamuthram (Taluk), Thirunalveli District
04	M. Ganesamoorthy	Public from Thalaivettan parai	Nill	Mylar kani Kudiyerupu, Upper dam (Post) Ambasamuthram (Taluk), Thirunalveli District
05	M. Kalian	Public from Thalaivettan parai	Nill	Mylar kani Kudiyerupu, Upper dam (Post) Ambasamuthram (Taluk), Thirunalveli District
06	S.Senthurpandiyan	Public from Mylar kani Kudiyerupu	Nill	Mylar kani Kudiyerupu, Upper dam (Post) Ambasamuthram (Taluk), Thirunalveli District
07	R.Jeeva nantham	Public from Mylar kani Kudiyerupu	Nill	Mylar kani Kudiyerupu, Upper dam (Post) Ambasamuthram (Taluk), Thirunalveli District
08	R.Seetha	Public from Mylar kani Kudiyerupu	Nill	Mylar kani Kudiyerupu, Upper dam (Post) Ambasamuthram (Taluk), Thirunalveli District
09	R.Meenakshi,	Public from Mylar kani Kudiyerupu	Nill	Mylar kani Kudiyerupu, Upper dam (Post) Ambasamuthram (Taluk), Thirunalveli District

10	V.Seeja	Public from Mylar kani Kudiyerupu	Nill	Mylar kani Kudiyerupu, Upper dam (Post) Ambasamuthram (Taluk), Thirunalveli District
11	P.Vijaya	Public from Mylar kani Kudiyerupu	Nill	Mylar kani Kudiyerupu, Upper dam (Post) Ambasamuthram (Taluk), Thirunalveli District
12	C.Kalarani	Public from Agestheya nagar, Kani Kudiyerupu	Nill	Agestheya nagar, Kani Kudiyerupu 37A, Ambasamudram taluk, Thirunelveli District
13	B. Nesammal	Public from Agestheya nagar, Kani Kudiyerupu	Nill	Agestheya nagar, Kani Kudiyerupu 37A, Ambasamudram taluk, Thirunelveli District
14	R. Balasubramaniyan	Public from Agestheya nagar, Kani Kudiyerupu	94439-03438	Agestheya nagar, Kani Kudiyerupu 37A, Ambasamudram taluk, Thirunelveli District
15	V. Ajith Kumar	Public from Agestheya nagar, Kani Kudiyerupu	Nill	Agestheya nagar, Kani Kudiyerupu 37A, Ambasamudram taluk, Thirunelveli District
16	Amalapushpam	Public from Karayar	Nill	Karayar, Upper Camp, Ambasamuthram Taluk
17	A. Parvathi	Public from Karayar	Nill	Karayar, Upper Camp, Ambasamuthram Taluk
18	S. Mary	Public from Karayar	Nill	Karayar, Upper Camp, Ambasamuthram Taluk
19	Sariva	Public from Karayar	Nill	Karayar, Upper Camp, Ambasamuthram Taluk