DAM REHABILITATION AND IMPROVEMENT PROJECT (DRIP) PHASE II
(Funded by World Bank)

KADAMPARAI DAM
TN12HH0081

ENVIRONMENT AND SOCIAL DUE DILIGENCE REPORT

DECEMBER 2024

Tamil Nadu Green Energy Corporation Limited
(TNGECL)

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ABBREVIATIONS AND ACRONYMS

AIDS	:Acquired Immuno deficiency Syndrome
CA	:Conservation Area
CCA	:Cultivable Command Area
COVID	:Coronavirus Disease
CWC	:Central Water Commission
DRIP	:Dam Rehabilitation and Improvement Project
DSRP	: Dam Safety Review Panel
E&S	: Environment & Social
EAP	: Emergency Action Plan
ESDD	: Environmental and Social Due Diligence
ESF	: Environmental and Social Framework
ESIA	: Environmental and Social Impact Assessment
ESMF	: Environmental and Social Management Framework
ESMP	: Environmental and Social Management Plan
ESS	: Environmental and Social Standard
GBV	: Gender Based Violence
GIS	: Geographic Information System
GRM	: Grievance Redressal Mechanism
HIV	: Human Immunodeficiency Virus
IA	: Implementation Agency
IPF	: Investment Project Financing
MCM	: Million Cubic Meters
OHS	: Occupational Health & Safety
PA	: Protected Area
PDO	: Project Development Objective
PMF	: Probable Maximum Flood
PPE	: Personal Protective Equipment
PST	: Project Screening Template
RET	: Rare Endangered and Threatened
SC	: Scheduled Castes
SCADA	: Supervisory Control and Data Acquisition
SEA	: Sexual Exploitation and Abuse
SEAH	: Sexual Exploitation Abuse and Harassment
SEP	: Stakeholder Engagement Plan
SF	: Screening Format
SH	: Sexual Harassment
SPMU	: State Project Management Unit
ST	: Scheduled Tribes
TNGECL	:Tamil Nadu Green Energy Corporation LimitedLimited
WB	: World Bank
WQ	: Water Quality

EXECUTIVE SUMMARY

This dam was constructed as storage cum Forebay Dam for Kadamparai pumped storage Power House (4x100MW). This is masonry cum earthen gravity dam having a height of 67.50 m. The length of masonry portion of Kadamparai dam is 478 m and length of left / right flank of earthen bund are 165m / 145 m respectively. It has been proposed to undertake rehabilitation measures (remedial works and basic facility enhancement) under the proposed Dam Rehabilitation and Improvement Project (DRIP II) with a view to increase the safety and to strengthen dam safety management. Also, it is to be noted that, certain rehabilitation works have already been taken up for this dam during DRIP-I Phase.

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, was conducted on 13.08.2021.

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, protected area and SEAH/GBV. Environment risks of air, water, noise, land use, soil and resource use for special repairs to masonry portion of dam like u/s face treatment are Moderate. Similarly, environment and social risk of transportation of material, labour camp and disposal of debris has been identified as moderate.

Dam is located within Indira Gandhi (Karian Shola) National Park and bordering Anaimalai Tiger Reserve, biodiversity conservation will be a priority area during the execution of rehabilitation work. Due to limited amount of rehabilitation work proposed, which is within the dam area, risk on outside sensitive habitat due to rehabilitation work is not significant as all the activities will be carried out within the dam area on the land owned by TNGECL. Only risk identified on ecologically sensitive habitat in dam surrounding is due to transportation of material and involvement of outside labour for rehabilitation work.

Overall risks are low to moderate and localized, 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)
- Biodiversity Conservation Plan (ESS6)
- 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 low 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 proposed Dam Rehabilitation and Improvement Project (DRIP II) would complement the ongoing and pipeline operations supporting India's dam safety program. The project development objective (PDO) is to increase the safety of selected dams in participating States and to strengthen dam safety management in India. Project Components include:

Component 1: Rehabilitation and Improvement of Dams and Associated Appurtenances (US$ 577.14 million);

Component 2: Dam Safety Institutional Strengthening (US$45.74 million);

Component 3: Incidental Revenue Generation for sustainable operation and maintenance of dams (US$26.84million);

Component 4: Project Management (US$68.13 million).

Component 5: Contingency Emergency Response Component (US$0 million).

The project is likely to be implemented for 300 dam in 18 states across the country. 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. In addition to saving lives, improved dam safety will avoid potential flood damage to houses, farm areas, infrastructure (roads, bridges, and other public and private infrastructure) and industrial and commercial facilities. Improved dam safety will also reduce the likelihood of service interruptions due to dam failure as well as potentially improving dam service provision, overall efficiency and storage capacity, including during drought periods.

1.2 SUB-PROJECT DESCRIPTION – KADAMPARAI

Kadamparai Dam was constructed across the Kadamparai stream in Coimbatore district during the period from 1979 to 1984. This dam was constructed as storage cum Forebay Dam for Kadamparai Pumped storage Power House (4x100MW). This is masonry gravity dam with earthen flanks having a height of 67.50 m. The length of masonry portion of Kadamparai dam is 478 m and length of left / right flank of earthen bund are 165m / 145 m respectively.

The dam was constructed to serve as "Storage cum Forebay"for power generation at Kadamparai Underground Power house. The tail water from Kadamparai PH flows into Upper Aliyar reservoir. From Upper Aliyar, it goes to Aliyar reservoir of TNWRD through a tunnel after generating 60 MW of power at Aliyar Power house.

Salient features of the project area are reported below:

Project Name	Kadamparai Dam
River Basin	Aliyar
River/Stream	Kadamparai - tributary of Aliyar river
District	Coimbatore
Latitude/Longitude	10° 23' 53''N / 77° 02' 41''E
Type of Project	Underground pumped storage Hydro Power Project
Gross Command Area (GCA)	NA
Cultivable Command Area (CCA)	NA
Hydro Power Installed Capacity	4 x 100 MW
Average Annual Energy Generation (MU):	160.00 MU
Domestic/Municipal/Industrial Water Supply (Annual)	NA
Dam	
Type	Masonry Gravity Dam with Earthen bunds at both flanks
Total length of the Main dam	788.00 m
Length of Embankment dam Left/ Right flanks	165/ 145 m
Length of Masonry/Concrete dam	478.00 m
Top width of Embankment Dam	4.50 m
Top width of Masonry/Concrete Dam	4.50 m
Elevation of top of Embankment Dam	+ 1150.50 m
Elevation of top of Masonry/Concrete Dam	+ 1150.50 m
Elevation of top of Upstream Solid Parapet Wall	+ 1151.50 m
Height of Embankment Dam above Lowest River Bed Level	+ 1087.00 m
Height of Masonry/Concrete Dam above deepest foundation level	67.50 m
Lowest River Bed Elevation	+ 1087.00 m
Deepest Foundation Elevation	+ 1083.00m
Saddle Dam	NA
Spillway	
Type of Spillway	Ogee
Length of Spillway	31.50m
Location of Spillway	Ch.372.00 m
Spillway Crest Level	+ 1143.00 m
Number of bays	3
Total Discharging Capacity at MWL	Original : 517.80 Cumecs. Revised : 777.94 Cumecs.
Spillway Gate	Radial type; 3 Nos. 8.50 m width & 6.0m height
Type of Hoist for Spillway Gates	Rope Drum Hoist Mechanism
Scour vent	
Sill Level (m) & No. of gates	+ 1093.00 m ; one service gate & one emergency gate.
Size of gates	Service gate of 1.525 m width, 2.125 height and emergency gate of 1.525 width & 2.805m height
Reservoir	
Catchment Area at Dam site	22.79 sq km

Maximum Water Level	+1149.00 m	
Full Reservoir Level	+1149.00 m	
Minimum Draw Down Level	+1112.00 m	
Gross Storage Capacity at FRL	30.85 MCM	
Live Storage Capacity	26.75 MCM	
Reservoir Spread Area at FRL	1.17 sq km	
Date of Starting the Construction	1979	
Date of Completion	1984	
Date of first full impoundment	1984	
Original Inflow Design Peak Flood	----------	
Maximum observed flood peak and date	…….	
Revised Inflow Design Peak Flood	632 cumec	

Proposed Interventions/Activities and Intended Outcomes

The Dam Safety Review Panel (DSRP), constituted for the purpose of inspection of the TNGECL dams to undertake repair, rehabilitation and modernization works under World Bank aided DRIP-II & III schemes, made a visit to Kadamaparai Dam on 20/01/2021. It 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.

REMEDIAL WORKS

Works proposed in earthen dam portion

- Strengthening of earthen bund.
- Interlocking pavement blocks to the d/s slopes of earthen flanks.
- Refilling the construction joint with asphalt.
- Reaming the drainage shafts.
- Polyurethane grouting on the downstream face weak portions.

Special repairs to masonry portion of dam

- U/s face treatment.
- Hydro washing of downstream face of dam.
- Stilling basin repair works.
- Permanent shed for housing control panels.
- Repairs to shutters including replacement of seals.
- Repair/renewal of hoisting arrangements platform.
- Security gates at both ends of dam.

- Dam top lighting.
- Standby DG set of 40 kVA capacity.
- Communication facility with 7 Km range walkie-talkie.
- Advanced lightning protection system.
- Instrumentation and Surveillance system.

Basic Facilities

- Geo physical scanning of dam.
- Guard room building renovation including toilet facilities.
- Repair works to staff quarters at KPH camp.

Figures 1.1 and **1.2** provide photographs of key infrastructure proposed for rehabilitation works and also major interventions locations.

Inspection by DSRP Members

View of top of Dam

Settlement at Right flank Masonry and Earthen bund junction portion

Settlement at the top portion of Dam at Right flank

Settlement to CR Masonry Rip Rap at left flank on U/S side of DAM

Water Leakage at the right Flank D/S Dam Toe

Turfing Area at Right flank D/S

Turfing Area at Left flank D/S

Seepage / Leaching at D/S Left flank

Seepage / Leaching at D/S Right flank

Heavy Seepage in Vertical Shaft No.7

Chocked Vertical Shaft No.14 (View inside Drainage Gallery)

Earth Sludge coming out through Vertical shafts in Blocks 11 & 12

Formation of Calcination inside DG Vertical Shaft

Reinforcement protruding from Spillway piers

Vertical shaft without cover slab at Dam top

Corroded Chequered plates of Spillway Gates Hoisting Arrangement Platform.

Dried Cardium wire Rope of Scour Vent Lifting Gate

Corroded Scour Vent Hoisting Arrangements

Corroded Scour Vent Structure

Dried Cardium Compound in Steel Rope of Head Race Tunnel Gate mechanism

Corroded Chequered Plate and Steel Boxes of Head Race Tunnel Gate mechanism


Reaming and Grouting the choked vertical shafts
Strengthen the settlement at masonry earthenbund junction at Right Flank
Srengthen the settlement at masonry earthenbund junction at Left Flank
Overhauling the gate hoisting mechanism and repacing the corroded parts
Kadamparai Dam
Turfing the vegetation at DVS of left flank
Hydro washing of downstream face of dam
Stilling basin repair works

1.3 IMPLEMENTATION ARRANGEMENT AND SCHEDULE

As can be seen from the list of activities proposed under dam rehabilitation project; these activities can be divided into civil works main package, other package and instrumentation. Civil work will be carried out by contractor(s) as these are labour intensive activities and would be completed over a period of 18 months. Dam Authority 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) : 04/2022
Proposed Ending of implementation (MM/DD/YYYY) : 09/2023
Implementation Duration (months) (MM) : 18 months

b) Timeline phasing of implementation:

Sl. No.	Description	From (month/year)	To (month/year)	Status of Procurement Process
1	Main package C M E works	04/2022	09/2023	Procurement process will be initiated after obtaining approval of the PST from World Bank.
2	Other Packages – Geophysical scanning	02/2022	06/2022	Procurement process will be initiated after obtaining approval of the PST from World Bank.
3	Procurement– instrumentation, goods, inspection vehicles	NIL		

1.4 PURPOSE OF ESDD

The overall project (DRIP II) was categorized as Low to Moderate 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;

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 held on 13.08.2021.

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 regulations requiring environment clearance is 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 (CA).

Therefore, for the proposed dam rehabilitation activities at Kadamparai dam, regulatory clearances will be applicable as per Indian regulation, such as permission from Forest department is required for transport of men and material inside protected area. Another applicable regulatory requirement is discussed in ESMF.

2.2 DESCRIPTION OF INSTITUTIONAL FRAMEWORK

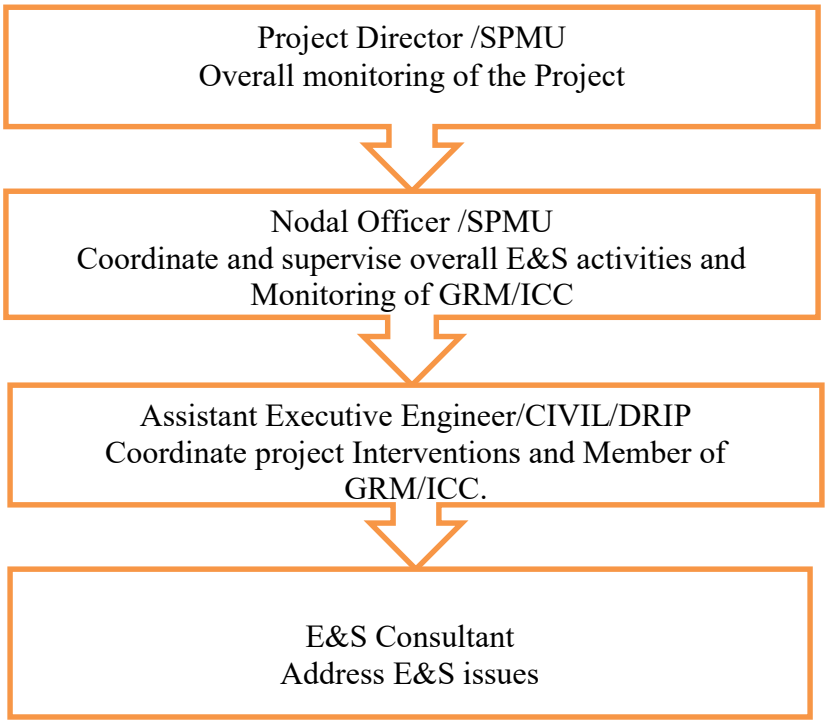
The sub-project will be implemented by Tamil Nadu Generation and Distribution Corporation, Government of Tamil Nadu. TNGECL being responsible for power generation, transmission and distribution; have a well-established customer complaint system for power consumer; where they

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 Corporation Limited do 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 TNGECL in resolving E& S issues.

SPMU will designate Nodal Officer(s) (full time in-house engineering staff with E&S expertise) to coordinate and supervise E&S activities. They shall be at the level of Executive Engineer/ Deputy Directors and shall provide commensurate time to comply with E&S related activities. Brief TORs for these Nodal E&S officers is included in ESMF. The SPMU, in case in-house expertise not available, will hire the qualified staffs on need basis to support management of E&S risks including Environmental and Social Experts for ensuring compliance with the Bank's ESF and ESS's and ensuring that these activities shall be implemented as per the procedures.

Presently, Grievance Redressal Mechanism has been established with two nodal officers, one at SPMU level and another at Field level. Sexual Harassment complaints can be made to either at dam level or SPMU level. As committed in ESCP, a Grievance Redress Mechanism (GRM) will be established and operated by the contracted agencies to address Project workers workplace concerns. SPMU will have oversight responsibility on the functioning of the GRM.



Chapter 3 ASSESSMENT OF ENVIRONMENTAL AND SOCIAL CONDITIONS

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's land use and environmental sensitivity was analyzed using GIS techniques. Land use/ land cover map within 5 km radius of dam is presented at Figure 3.1. Present land use is mainly evergreen/semi-evergreen forest, deciduous forest, plantation, fallow land and water-bodies. There is no significant habitation or village falling in 5 km of radius of the Kadamparai Dam location. One settlement village called Navamalaipathi is at the downstream side of this dam near Navamalai (2x60MW) Power house.

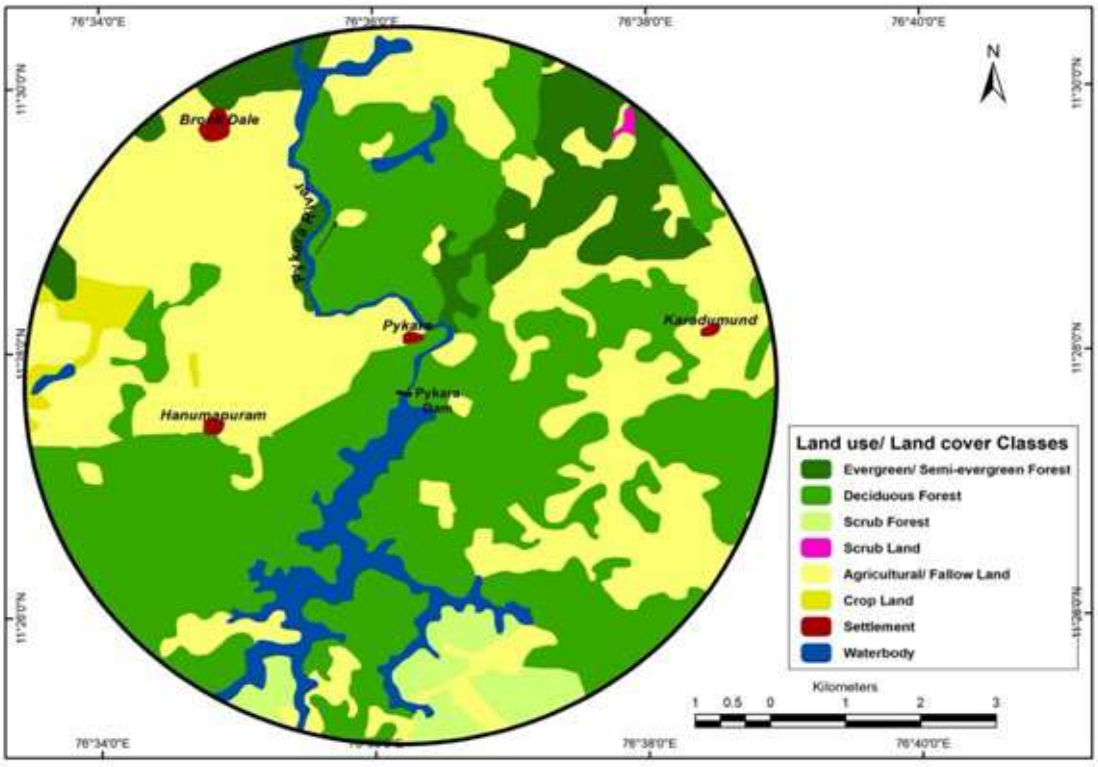


Figure 3.1: Land Use and Land Cover Map of 5 km radius around Kadamparai Dam site

Natural Hazards

Potential of natural hazards such as flooding and earthquake has been assessed.

In terms of Indian Standard IS 11223-1985 criteria, Kadamaparai Dam is classified as a 'Large Dam' and, accordingly, qualifies for PMF (Probable Maximum Flood) as the design flood. The Original Spillway Design discharge of 517.80 cumec has been revised as 777.94 Cumec . The Revised Inflow Peak Design Flood of 632 Cumec, evaluated by the Central Water Commission, is within the revised Spillway Design discharge. Hence, safe.

Project falls in earthquake zone III, and same was considered at the time of design and there is no need for seismic design review. The 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

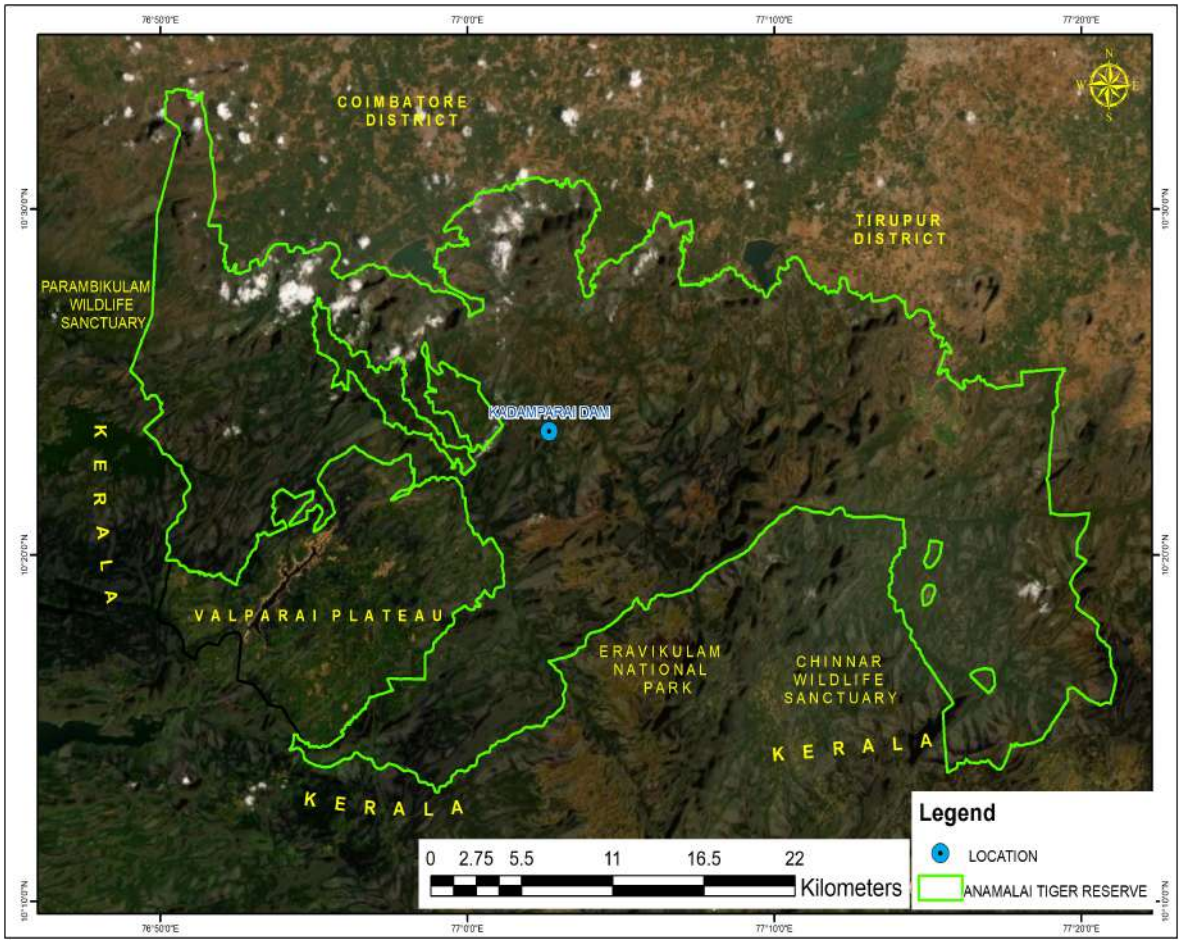
Kadamparai dam is located in the TNGECL's own land and was constructed during the period 1972-84. The area falls under the 'Anaimalai Reserve Forest" and was nominated as Karian shola National park in 1989 and Tamilnadu Environment and forest department declared as Anaimalai Tiger Reserve vide notification dated 27.06.2007.

Anaimalai Tiger reserve (Indira Gandhi Wild life sanctuary and National Park) is spread over an area of 958.59 Square KM and is situated in Anaimalai and Valparai Taluks of Coimbatore District in the State of Tamil Nadu. Anaimalai Wildlife Sanctuary being a part of Western Ghats is rich in wildlife with at least 40 types of mammals, about 120 species of birds including 14 species of migratory birds and rich diversity of fishes, reptiles and amphibians. There are more than 2272 species of flowering plants recorded here apart from 62 species of orchids and 91 species of ferns.

The sanctuary, towards north, borders Thirumoorthy Dam; Kadamparai is located bordering Indira Gandhi National Park. Due to its location, within the protected area, permission is required from Wildlife Department to transport construction materials, manpower and equipment to dam site. Rehabilitation works, including resurfacing of existing roads, were undertaken during DRIP I for Kadamparai Dam, of TNGECL (all falling within the Anaimalai Tiger Reserve) after obtaining permissions from Principal Chief Conservator of Forest and Wildlife Warden. Permissions were granted by Officer of Forest Department after award of work and before commencement of works to transport construction materials, manpower and equipment to dam sites. Same procedure shall be adopted in the present case also.

Location of the dam with respect to Indira Gandhi National park and Anaimalai Tiger reserve is given at Figure 3.2.

Figure 3.2: Protected Areas around Dam Site



3.3 SOCIAL ENVIRONMENT

Kadamparai Dam is located in district Coimbatore in Tamil Nadu. There is no significant settlement in the proximity areas of the project. There are no Schedule V1 areas in Tamil Nadu. The Coimbatore district has its headquarters in Coimbatore and it is divided into three revenue divisions and eleven Taluk (tehsil). There are 295 revenue villages. The district has 38 Community Development Blocks consists of 295 Village Panchayat.

The economy of the district is primarily dependent on non-agriculture sector. The brief demographic characteristic of the district is given in the table below:

No. of Households	9,58,035	**Household Size**	**04**
Total Population	**34,58,075**	**Population (0-6 age)**	**1,82,350**
Male	17,29,297	Boys (0-6 age)	52,275
Female	17,28,748	Girls (0-6 age)	49,794
Sex Ratio	997	Sex Ratio (0-6)	953
Population (SC)	**535911 (15.49%)**	**Population (ST)**	**28342 (0.82%)**
Male	266960	Male	14245
Female	268951	Female	14097
Literates	**33,07,644**	**Literacy Rate (in %)**	**91.30**

With 34,58,075 population, the district ranks at 7th place in population size of the state and has sex ratio of 997 which is 1% higher than the state sex ratio of 996. The population density is 731 persons per sq km in the district which is moderately populated district in the state.

The district has literacy rate of 91.30% which is higher than that of the State average of 80.09%. The gender gap in the literacy rate is 3.75% in the district.

In the District, the Scheduled Caste and Scheduled Tribe population is 15.49% and 0.89% respectively with respect to the total population. There are no Scheduled Tribe households in the project area and there are no physical interventions planned in the downstream areas. These areas and the ST households will be taken into account during the preparation and implementation of Emergency Action Plan for Kadamparai Dam.

Work participation rate of the district is about 50.3%, the lowest among all the districts in the state and gender gap in work participation rate is 26.10%. About 4.50% of the workers are cultivators which are the 2nd lowest percentage of cultivators to the total workers and similarly the 2nd lowest percentage of agricultural labourers with 12.76%. About 86.99% of work force is engaged in other than agricultural activities including 5.27% household industrial workers.

3.4 CULTURAL ENVIRONMENT

List of National Monuments in Tamil Nadu and list of State Protected monuments in Tamil Nadu have been reviewed. There are protected monuments identified by Archaeological Survey of India however none of them are in the vicinity of the project.

Chapter 4 ACTIVITY WISE ENVIRONMENT & SOCIAL SCREENING, RISK AND IMPACTS IDENTIFICATION

4.1 SUB-PROJECT SCREENING

The subproject screening is undertaken following a three step screening methodology as described in ESMF. Process of risk /impacts identification is done using screening process considering the proposed interventions at each dam as provided in the Project Screening Template using first screening format (SF-1). Applicable interventions are further classified based on their location i.e. within dam area or outside the dam area. Each activity is reviewed for the applicability under-sub project, location of applicable activity and likely risks and impacts. The SF-1 format is used to ascertain the types of E&S risks for each of the proposed rehabilitation activity e.g. Risk/Impact on Water Quality, Fisheries, Conservation Area, Protected Area, Ecology, Physical Environment, Cultural Environment, Tribal Presence, Private Land/Assets/Encroachers/Squatters, Labor, Migrant Labor and GBV risks – each of these corresponding to the ESS 2-8.

The second format (SF-2) is used to assess the extent of risk/impact intensity for each of the identified E&S risk and is used to categorize the risk level as Low/Moderate/Substantial/High. Finally, using a third E&S risk summary format (SF-3), the risk categories for all different types of E&S risk and impacts is summarized and the highest of the risk categories is assigned as overall risk category for the given Dam sub-project. Based on the above findings, the ESDD report recommends Risk category of the Dam sub-project – whether it is Low/Moderate/Substantial/High and types of instruments that need to be prepared as part of the ESMP along with the responsibilities and timelines.

Outcome of three stage screening exercise is discussed below:

Step I Screening (using Form SF-1): Sub-Project Component, Construction Support Preparatory Intervention related Vs Nature of Risk/Impact.

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 will have risk of spillage of chemicals, construction material, and debris leading to water pollution and impacts on fishes.

As the dam is located within Wildlife Sanctuary and bordering a tiger reserve, biodiversity conservation is a priority area during the execution of rehabilitation work. Due to limited amount of rehabilitation work proposed, which is within the dam area, risk on outside sensitive habitat

due to rehabilitation work is not significant. Proposed rehabilitation work includes repair to masonry portion of dam and shutters, electrification/lighting, repair to approach road and construction of guard room. These activities will be carried out within the dam area on the land owned by TNGECL. Only risk identified on ecologically sensitive habitat in dam surrounding is due to transportation of material and involvement of outside labour for rehabilitation work.

Pre-construction and construction stage major auxiliary or preparatory intervention are within dam area. Deployment and haulage of heavy machinery, setting up of workshop, operation of concrete mixture and heavy pumps will be within dam area. Other activities such as labour camp and debris disposal will also be within the dam area due to protected habitat in dam surrounding. Activities involving machinery and equipment will have impacts on physical environment. Transportation of material, debris disposal and labour camp are likely to generate pollution and impact on physical environment. They also pose risk to protected habitat in dam surrounding.

Project will involve project managers and supervisors, contracted workers – these would also include migrant workers as the required labour will not be available locally for a number of reasons, such as worker's unavailability and lack of technical skills and capacity, there is no significant human habitation in immediate surroundings of dam. Construction contractors will stay within dam area, 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 within the dam premises; hence risk of SEA/SH is unlikely.

Non-structural interventions such Emergency Action Plan has not been proposed, however, EAP shall be prepared and implemented. Kadamparai dam drains into downstream Upper Aliyar dam and there is no significant habitation in the downstream stretch up to Upper Aliyar reservoir. Vulnerable population in the downstream area, if any, will be appropriately contacted during implementation of EAP.

Output of this screening is 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 categorized 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: OHS is a substantial risk activity in almost all cases and is not being considered under screening criteria. Occupational health and safety is considered an important requirement of every project irrespective of size and type of the projects. It will be part of Contractor's ESMP.

Analysis of extent of risk/impact for sub-activities resulted in identification of following activities as having Moderate Risks/impacts.

- Special repairs to masonry portion of dam: u/s face treatment
- Labour Camps involved
- Major Debris Disposal
- Transportation of material
- Repair and maintenance works to quarters

All other activities are categorized as low risk activities. E&S risks of none of the sub-activities for this sub-project is categorized as either 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) is summarised for major sub-project activities under **Table 4.1 below.**

Table 4.1: Summary of Identified Risks/Impacts in Form SF-3

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**
Civil (within Dam Boundary)	M	L	L	M	None	L	L	L	M	None	L
Hydro Mechanical	L	L	L	M	None	L	L	L	M	None	L
Instrumentation, surveillance	L	L	L	L	None	L	L	L	L	None	L
Painting	L	L	L	M	None	L	L	L	M	None	L
Road work	L	L	L	M	None	L	L	L	L	None	L
Safety measures (Siren, Lighting)	L	L	L	L	None	L	L	L	L	None	L
Major Civil Work like Additional Spill Way	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Major Hydraulic Structure (tunneling)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Major Civil Work extending beyond Dam Area Like training Structure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Additional activities for Tourism /Solar/Fisheries/ Water recreation enhancement	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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: OHS is a substantial risk activity in almost all cases and is being treated separately through OHS plan in accordance with WB ESHS guidelines and shall be applicable to all sub-projects. Hence is not being considered under screening criteria.

4.2 STAKEHOLDER CONSULTATION

Stakeholder consultation was conducted on 12.08.2021 amidst COVID-19 pandemic lockdown and rainfall during the South West monsoon, after providing mask to all the participants. It was attended by permanent staff of the borrower (TNGECL) working at dam and public of nearby village.

Stakeholder consultation was made as part of environmental and social due diligence. 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. Dam is located in the Anaimalai Tiger Reserve and there is no possibility of community interference during the implementation of rehabilitation works including EAP stake holders 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 inside Anaimalai Tiger reserve. There is neither displacement nor 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?	TNGECL do not have in-house expertise to address E&S issues. Presently, Project Director at SPMU and Executive Engineer at dam level look after these aspects. Hiring of Experts to be processed.
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
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 Level.
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.	NIL
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?	One village, called Navamalaipathi 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 Panchayats.
3. Does any of these villages were displaced and rehabilitated during the construction of Kadamparai Dam ? Is there any pending compensation issues?	Dam area is fully covered in Tiger Reserve. Displacement and Rehabilitation does not arise.
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?	In person or through mobile. (BSNL net work is available)
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?	Nil
12. Give your views about Kadamaparai dam , how this dam is helping Country, State, district or local communities in meeting its objectives, any specific concern can also be given?	1. Water supply 2. Power generation 3. Transport facilities, education facilities)
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.	Yes. Not yet. Consultation meeting to be conducted. Yes. Over mobile or in person.
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 for warning system.

Following is the summary of the outcome of stakeholder consultation:

1. All the participants welcomed the proposed interventions relating to dam safety and ensured that our DRIP work will not affect the villages during execution.
2. The participants explicitly mentioned that the dam is their lifeline and strengthening works will help their long term livelihood and therefore welcomed such information.
3. Participants have expressed that they do not have any grievances and as such no grievances were ever reported from their communities/ neighbor hoods.
4. There are no pending issues regarding dam construction related resettlement.
5. Sometimes people temporarily work in TNGECL and most of the time work at plains.
6. They are willing to work as daily wages labourers during execution of the DRIP works.

Communities welcomed such interactions and indicated that they would prefer Dam authorities conduct such face-to-face meeting, at a convenient location to inform of developments/interventions relevant to them. They welcomed other means of information such as advertisements in the local papers, local media, etc, but preferred to have face to face interactions.

Based on these findings relating to both structural and non-structural interventions, potential stakeholders were categorized as Affected stakeholders, other interested stakeholders and Disadvantaged and vulnerable stakeholders.

Affected Stakeholders: There are no affected persons who shall be directly or indirectly adversely affected by the proposed interventions.

Other interested stakeholders: In relation to structural interventions, these would be contractors, project management consultants, regulatory bodies/institutional stakeholders such as revenue, environmental Authorities, etc. In relation to non-structural interventions, these would be communities living downstream including farmers; village heads, community leaders; district administration, police, state disaster management authority, revenue department, electronic and print media, etc. These communities would be key stakeholders requiring to be involved in the preparation and implementation of Emergency Action Plan (EAP).

Disadvantaged and vulnerable persons and groups: Illiterate persons, physically challenged, women and elderly would be key stakeholders – requiring special focus and outreach to ensure that they are well informed about the provisions of the EAP.

4.3 DESCRIPTIVE SUMMARY OF RISKS AND IMPACTS FROM ACTIVITIES BASED ON SCREENING

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

Environmental Impacts and Risks

1. Dam is located within the protected area, although no activity is proposed outside the dam area which is owned by TNGECL, moderate risk is identified on protected habitat due to labour movement and movement of material through protected area.

2. Environment risks and impacts, as assessed above, for various project activities under this sub-project are categorized as Low and Moderate due to localized nature of proposed activities i.e. activities remain limited to dam area except for labour camp and muck/debris disposal.

3. Execution of civil and hydro-mechanical work within dam body will generate localized impacts on physical environment and resource use; pose risk of exposure of workers requiring personal protective equipment (PPE) use.

4. Civil work interfaced with water body pose risk of water pollution and impact on fish fauna.

5. Construction waste and muck from repairs to masonry portion of dam like u/s face treatment, approach road etc require careful disposal at pre-identified and approved site to minimise the risk of pollution on this count.

6. Rehabilitation work would require labour to work on various sections of dam involving working at height, working in confined spaces, working on reservoir side, etc; Further, workers will also be exposed to dust and noise and will have to handle chemicals/gases for some of the works; these will lead to occupational health and safety risks.

Social Impacts and Risks

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 there 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 little 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 no such sites ate identified in project vicinity.
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/ work force 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, Physical Environment, labour, protected area and SEAH/GBV. The summarised environmental and social risk of identified activities, with level of risk, is presented in previous chapter. Environment risks of air, water, noise, land use, soil and resource use for special repairs to masonry portion of dam like u/s face treatment are Moderate. Similarly, environment and social risk of transportation of material, labour camp and disposal of debris has been identified as moderate due to location of dam within the protected area. 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 generic ESMP and guidelines.

Hence the overall risk of this sub-project Dam is categorized as Moderate. OHS is a substantial risk activity and is being treated separately through OHS plan in accordance with WB ESHS guidelines.

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 legislation 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.

In addition to overarching ESS1, four 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
ESS2: Labour and Working Conditions	Due to engagement of Direct worker, Contracted workers and Community workers (likely for EAP and other non-structural interventions) for rehabilitation work
ESS3: Resource Efficiency, Pollution Prevention and Management	Civil and hydro-mechanical work including resource consumption; requiring protection of physical environment and conservation of resources
ESS 4: Community Health and Safety	Rehabilitation work, although limited to dam complex, can increase community exposure to risk and impacts; directly or indirectly.
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural resources	Dam is located within the Anaimalai Tiger Reserve. As no interventions are planed outside the dam, no direct impacts have been identified

	on natural
Relevant ESS	**Reasons for Applicability of the standard**
	To eliminate risks of indirect impacts due to outside labour and transportation of man and material, Biodiversity Plan will be prepared.
ESS 10: Stakeholder Engagement Plan	For engagement of stakeholders in all structural and non-structural measures e.g. implementation of Early flood Warning system, siren systems, broadcasting facilities, Emergency Action Plan etc.

5.2 RECOMMENDATIONS

5.2.1 Mitigation and Management of Risks and Impacts

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

a. SPMU 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. ESMP will provide due measures for labour management and protection of environment quality and resource conservation (during handling of resources) in line with ESF standard ESS2 and ESS3 respectively. Likewise, due attention will 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). SPMU/IA shall customise the standard ESMP in line with outline provided in the ESMF and ensure its adherence by contractor. 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)
- Bio-diversity Conservation Plan (ESS6)
- Stakeholders Engagement Plan (ESS10)

c. Contractor shall submit BOQ as per ESMP of the sub project.

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
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	Gender Based Violence or SEA/SH related actions	SPMU/IA	Before mobilization of contractor
ESS2: Labour and Working Conditions	Labour Management Procedure (LMP) including	SPMU/IA	Before mobilization of contractor

	OHS management plan.		
WB-ESS Triggered	**Mitigation Instrument**	**Responsibility**	**Timelines**
ESS3: Resource Efficiency, Pollution Prevention and Management	Pollution Prevention and Environment Quality Management Plan (PPEQMP)	SPMU/IA	Before mobilization of contractor
ESS 4: Community Health and Safety	Community Health and Safety Management Plan (CHSMP)	SPMU/IA	Before mobilization of contractor
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural resources	Biodiversity Conservation Plan	SPMU/IA	Before mobilization of contractor
ESS 10: Stakeholder Engagement Plan	Stakeholder Engagement Plan	SPMU/IA	By negotiation

ESDD and ESMP will be placed on the www.damsafety.in website as well as other accessible locations such as the office of Engineer in Charge at Dam site as well at SPMU for reference and record. These documents would be disclosed/disseminated through other appropriate means like project meetings, workshops etc. Each IA will translate these documents in their local language, if required, and will upload in their respective websites and also make available at other accessible locations.

5.2.2 Institutional Management, Monitoring and Reporting

ESMP will be customized for the sub project by SPMU/IA from standard ESMP included in ESMF and shall be shared with CWC by SPMU for their review/endorsement and approval before including in the bid document.

SPMU/IA will designate Nodal Officer(s) (full time in-house engineering staff with E&S expertise) to coordinate and supervise E&S activities. They shall be at the level of Executive Engineer/ Deputy Directors and shall provide commensurate time to comply with E&S related activities. Brief TORs for these Nodal E&S officers is included in ESMF. The SPMU, in case in-house expertise not available, will hire the qualified staffs on need basis to support management of E&S risks including Environmental and Social Experts for ensuring compliance with the Bank's ESF and ESS's and ensuring that these activities shall be implemented as per the procedures.

SPMU/IA shall advise contractors about applicable legislative requirements and ensure that contractors prepare its own ESMP (C-ESMP) as outlined in ESMP for this sub-project 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 ESMF on quarterly basis.

SPMU/IA shall establish and operationalize a grievance mechanism to receive and facilitate

resolution of complaints and grievances, from the communities and other stakeholders including implementation partners. GRM works within existing legal and cultural frameworks and shall comprise project level and respective State level redressal mechanisms. Most Project related grievances could be minor and site-specific.

EMC (Engineering and Management Consultant) 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) need to be carried out for the environment and social staff engaged and this will be an area of continued focus, with a view to generate awareness at to dam level. EMC will develop formats for regular supervision and monitoring on E&S issues and undertake site visits/ inspections of the dam sites to monitor for compliance; collate and review QPRs and set up a monitoring and reporting system on E&S issues.

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.

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), Physical Environment (PE), Cultural (C), Tribal Presence (T), Impact on private land/assets/ encroachers/ squatters (LA), Labor (L), GBV risks (G), (Write whichever is applicable)
1	**2**	**3**	**4**	**5**
A	**Nature of Project Component and related sub activity 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 u/s face treatment etc.)	A	DI	WQ, F, E, PA, PE, L, G
5	Structural Improvement/Repair work - Downstream of Dam site (with no interfacing with dam reservoir)	A	DI	PE, L, G
6	Re-sectioning earth dams to safe, stable cross sections	NA		
7	Hydro-mechanical activities with interface with dam reservoir	**A**	**DI**	**WQ, PE, L, G**
8	Hydro-mechanical activities Downstream of Dam site (with no interfacing with dam reservoir)	**A**	**DI**	**PE, L, G**
9	Instrumentation, General lighting	**A**	**DI**	**PE, L, G**
10	Basic Facilities (like access road improvement, renovation of office, etc)	**A**	**DI**	**PE, E, PA, L, G**
11	Utility installation like standby generator	**A**	**DI**	**PE, L, G**
12	Painting of dam u/s or d/s or both faces	**A**	**DI**	**WQ, PE, L, G**
13	Water recreation activities	**NA**		
14	Tourism Development	**NA**		
15	Installation of Solar power/floating solar	**NA**		
16	List any other component not listed above			
B	**Pre-construction and construction stage major auxiliary or preparatory intervention**			
1	Acquisition (diversion of forests land for non-forest purposes) of forest land	**NA**		
2	Acquisition of private land Resettlement and Rehabilitation (including physical or economic displacement/impact on livelihood	; **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), Physical Environment (PE), Cultural (C), Tribal Presence (T), Impact on private land/assets/ encroachers/ squatters (LA), Labor (L), GBV risks (G), (Write whichever is applicable)
1	**2**	**3**	**4**	
3	Temporary loss of business or Damages to crops or trees or structures outside the ROW during Construction activities by Contractor	**NA**		
4	Borrowing earth to meet Borrow materials requirement	NA		
5	Sourcing of Quarry materials	**NA**		
6	Blasting	**NA**		
7	Setting up Labour Camps (location within dam premises or outside)	**A**	**DI**	**WQ, PE, L, G, E, PA**
8	Heavy machinery deployment and setting up maintenance workshop	**A**	**DI**	**PE, L, G**
9	Setting up Hot mix plant		**NA**	
10	Deployment of Concrete mixture and heavy pumps	**A**	**DI**	**PE, L, G**
11	Temporary land acquisition	**NA**		
12	Need of Tree felling/ vegetation clearance	**A**	**DI**	**PE, E, L, G**
13	Disposal of large amount of Debris	**A**	**DI**	**PE, L, G**
14	Transport of large construction material	**A**	**DE**	**PE, L, E, PA, G**
15	Utility shifting	**NA**		
16	Discharge of reservoir water (lowering of reservoir water involved)	**NA**		

Note: Occupational Health and Safety aspects / impacts/ risks are considered important part of any dam project and this risk is separately classified. It shall be managed as per defined OH&S plans in every project irrespective of size and type of project

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	Special repairs to masonry portion of dam: U/s face treatment	**WQ, F, 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, Labour and GBV risk	**M**
b	Colour washing, painting & cement washing of dam, chipping, sand blasting, flush pointing, vegetation clearance, Water washing	**WQ, PE, E, L, G**	Impacts on ecology, waste from vegetative debris, air pollution, water pollution, Labour and GBV risk	**L**
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	Reaming the drainage shaft	**WQ, L, G**	Impacts on water quality, Labour and GBV risk	**L**
b	Approach steps	**PE, L, G**	Air pollution, noise pollution, generation of construction debris, Labour and GBV risk	**L**
3.	**Hydro-Mechanical activities Down - stream of Dam Site (with no interfacing with dam reservoir)**			
a	Repairs/replacement of shutters with seals	**PE, L, G**	Generation of waste material from packaging etc, noise pollution, Labour and GBV risk	**L**
b	Repair/renewal of hoisting arrangements	**PE, L, G**	Generation of waste material from packaging etc, noise pollution, Labour and GBV risk	**L**
c	Painting of gates	**WQ, L**	Water pollution, Labour risks	**L**
4.	**Instrumentation, General lighting and systems**			
a	Providing electrification to dams	**PE, L, G**	Generation of waste material from packaging etc, Labour and GBV 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
5	**Basic Facilities Improvement**			
a	Construction of new police guard room	**PE, L, G**	Air and noise pollution, Labour and GBV risk	**L**
b	Approach Road to gallery	**PE, L, G**	Air and noise pollution, Generation of muck and construction debris, Labour and GBV risk	**L**
B.	**Pre-construction and construction stage major auxiliary or preparatory intervention**			
1	Setting up Labour Camps (location within dam premises or outside)	**WQ, PE, E, PA, G**	Wastewater generation from domestic activities, waste generation, GBV risk within labour and involving community.	**M**
2	Heavy machinery deployment and setting up maintenance workshop	**PE, L, G**	Heavy machinery will be deployed for repair and maintenance of hoists and for other activities - risk due to machine handling, waste, wastewater and air emissions from machines operations, hazardous waste generation from oil waste	**L**
3	Deployment of concrete mixture and heavy pumps	**PE, L, G**	Concrete mixture and pumps will be deployed for road repair and other civil works and dewatering - risk due to machine handling, waste generation, wastewater and air emissions from operations, hazardous waste generation from oil waste, Labour and GBV risks	**L**
4	Disposal of large amount of Debris	**PE, L, G**	Debris will be generated from various repair activities, risk during debris handling, air and noise emissions from debris handling and transportation, water pollution risk due to debris finding its way to water body, and GBV	**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**
			risk due to labour involvement	
5	Transport of large construction material	**PE, L, E, PA, G**	Material will be transported from various vendors and suppliers to site for civil, hydro-mechanical work and nstrumentation, air and noise emissions from transportation, Labour and GBV risk	**M**

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: OHS is a substantial risk activity in almost all cases and is being treated separately through OHS plan in accordance with WB ESHS guidelines and shall be applicable to all sub-projects. Hence is not being considered under screening criteria.

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)
1.	Mrs. P. Rameshwari	Executive Engineer/ Civil/ DRIP/ Madurai	9445442372	Madurai
2.	Er. N. Purushothaman	Executive Engineer/ Civil/ Kadamparai Generation Circle	9445857114	Minparai
3.	Er. C.G.Palani	Assistant Executive Engineer/ Civil/ DRIP/ Kadamparai	9445360726	Kadamparai
4.	Er. G. Janakiraman	Assistant Executive Engineer/ Civil/ Navamalai/ Kadamparai Generation Circle	9445857087	Navamalai
5.	Er. N. Thiyageswaran	Assistant Engineer/ Civil/ Navamalai/ Kadamparai Generation Circle	9445072245	Navamalai
6.	Thiru A.S. Srinivasan	Foreman/ Civil/ Navamalai/ Kadamparai Generation Circle	9442866683	Navamalai
7.	Mrs. Jothika	Public from Navamalaipathi village	--	Navamalaipathi Village
8.	R.Rathika	Public from Navamalaipathi village	9488638160	Navamalaipathi Village
9.	Karuppan	Public from Navamalaipathi village	9445122698	Navamalaipathi Village
10.	Murugan	Public from Navamalaipathi village	9445122698	Navamalaipathi Village
11.	K.Devakumar	Public from Navamalaipathi village	9629814337	Navamalaipathi Village