ENVIRONMENT AND SOCIAL DUE DILIGENCE REPORT (ESDD)

सत्यमेव जयते

IRRIGATION & WATERWAYS DEPARTMENT, GOVERNMENT OF WEST BENGAL

DAM REHABILITATION AND IMPROVEMENT PROJECT (DRIP-II)

(Under World Bank Fund)

ESDD REPORT

For

Kangsabati-Kumari Dam
Bankura, West Bengal

Prepared by

ISO 9001:2015

WAPCOS LIMITED

(A Government of India Undertaking)

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ABBREVIATIONS AND ACRONYMS

- AIDS : Acquired Immunodeficiency Syndrome
- BDO : Block Development Officer
- CGWB : Central Ground Water Board
- COVID : Corona virus Disease
- CPMU : Central Project Management Unit
- CSS : Centrally Sponsored Scheme
- CWC : Central Water Commission
- DI : Within DamArea
- D/PMC : Design/Project Management Consultant
- DRIP : Dam Rehabilitation and Improvement Project
- DSRP : Dam Safety Review Panel
- DVC : Damodor Valley Corporation
- E&S : Environment &Social
- EAP : Emergency Action Plan
- EMC : Engineering and Management Consultant
- ESA : Environment & Social Assessment
- 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
- ESS : Environmental and Social Standard
- ESZ : Eco-Sensitive Zones
- GBV : Gender Based Violence
- GIS : Geographic Information System
- GoI : Government of India
- GP : Gram Panchayat
- GRM : Grievance Redressal Mechanism
- HIV : Human Immuno-deficiency Virus
- IA : Implementation Agency
- I & W : Irrigation and Waterways

- IPF : Investment Project Financing
- IWDP : Integrated Wastelands Development Project
- JFM : Joint Forest Management
- LB : Left Bank
- LMP : Labour Management Procedure
- LPG : Liquid Petroleum Gas
- MoH & FW : Ministry of Health & Family Welfare
- NIDM : National Institute of Disaster Management
- NREGS : National Rural Employment Generation Scheme
- PDO : Project Development Objective
- PE : Physical Environment
- PM : Particulate Matter
- PMC : Project Management Consultancy
- PPE : Personal Protective Equipment
- PPEQMP : Pollution Prevention and Environment Quality Management Plan
- PST : Project Screening Template
- QPR : Quarterly Progress Report
- RCP : Resource Conservation Plan
- RET : Rare Endangered and Threatened
- RL : Reduced Level
- SC : Scheduled Castes
- SDO : Sub Divisional Officer
- SEA : Sexual Exploitation and Abuse
- SEAH : Sexual Exploitation Abuse and Harassment
- SEF : Stakeholder Engagement Framework
- SEP : Stakeholder Engagement Plan
- SF : Screening Format
- SH : Sexual Harassment
- SH : State Highway
- SPMU : State Project Management Unit
- ST : Scheduled Tribes
- TOR : Terms of Reference
- WAPCOS : Water and Power Consultancy services
- WB : World Bank

A. EXECUTIVE SUMMARY

Kangsabati Kumari Rehabilitation Dam Project, has proposed to undertake rehabilitation measures (structural, non- structural, instrumentation 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.

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; and conducting preliminary stakeholder consultations.

In the current restricted circumstances due to COVID19, total 32 persons, external to dam authority were contacted ensuring social distancing and their views recorded while preparing ESDD. Two sets of questionnaires were prepared, one for each category of stakeholders – direct workers and community stakeholders. Direct workers included Engineers/staff working at barrage (present or working from home) – full time or contracted and community stakeholders included local people from vicinity villages. The consultation mainly brought out the data regarding profile of the neighbouring villages, impact of the barrage on public, connection of the public and the dam authority.

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, Fisheries, Physical Environment, labour and SEAH/GBV. Environment risks of air, water, noise, and resource use as well as social risks of labour, civil work within the dam body and road work are Moderate along with environment and social risk of labour camp and disposal of debris. Risk of all other activities has been identified as low 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.

Since risks and impacts are low to moderate category, a standard ESMP customized to sub-project willbe prepared in accordance with the ESMF. The customized 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 (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 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 I

B. INTRODUCTION

B.1. Project Overview

The proposed Dam Rehabilitation and Improvement Project (DRIP II) would complement the suite of ongoing and pipeline operations supporting India's dam safety program.

The DRIP project activities will focus not only on the rehabilitation and improvement of dam structures, but will also address shortcomings in instrumentation, maintenance and provide for improvements in operation of the dams.

The project would finance towards (i) physical and technical dam rehabilitation and improvement; and managerial upgrading of dam operation and maintenance, with accompanying institutional reforms and strengthening of regulatory measures pertaining to safe and financially-sustainable dam operations. It aims at assuring the full reservoir capacity of project dams, achieving effective utilization of the stored water, and managing and monitoring the long-term performance of the dams The project development objective (PDO) is to improve the safety and operational performance of selected existing dams in the territory of the participating states. Project comprises three Components namely (i) Rehabilitation and Improvement of Dam and Associated Appurtenances; (ii) Dam Safety Institutional Strengthening and Project management.

Component 1: Rehabilitation of Dams and Appurtenant Structures: This component supports improving the safety of barrages through structural and non-structural interventions. Structural measures include measures for seepage reduction, hydrological and structural safety measures (e.g., renovation and strengthening of existing structure, cementations grouting, shaping of embankment, improvement of draining arrangement, removal of vegetation and weeds etc.), enhancing the reliability of operational facilities (e.g., spillway gates, head regulator gates with hoisting system), and improving basic barrage facilities (e.g., access roads, downstream inspection roads). Non-structural measures could include standardized barrage safety instrumentation, monitoring, assessment and reporting protocols for barrage health.

Component 2: Dam Safety Institutional Strengthening: This component supports further strengthening of Dam safety management through institutional modernization. A major focus of activities under this component will be increasing the oversight of dam safety by developing dam safety guidelines and by strengthening the capacity of various dam safety actors to carry out the regulatory functions defined in the proposed Dam Safety Bill, which has been passed by the Lok Sabha.

Component 3: Risk-informed Asset Management and Innovative Financing for Sustainable Operation and Maintenance of Dams: This component aims to increase the financing available for periodic dam safety needs and regular O&M by improving asset management and dam risk assessment. Currently, expenditures needed for dam rehabilitation are based on seasonal (pre and post monsoon) inspections, rather than a longer-term needs-based approach grounded in asset management and risk assessment. This component will put in place systems to improve the identification of financing needs for dam safety and develop more sustainable sources of funding for dam safety. An asset management system and risk assessment will identify long-term funding needs for the sector and trade-offs related to investment decisions.

Component 4: Project Management: This component ensures effective implementation of project activities and monitoring and evaluating project implementation progress, outputs and outcomes. The component will support: (i) establishment and operations of State level Project Management Units (SPMUs) within State implementing agencies, which can hire experts in various fields as and when needed on a contractual basis; (ii) setting up of a monitoring and evaluation system; and (iii) establishment of a Quality Assurance and Quality Control system. This component will also finance consultancies, as well as related material, office equipment and incremental operating costs. The project will provide investment and technical support for the establishment of a Management Information System and Information and Communication Technology systems.

Component 5: Contingent Emergency Response Component: The Contingent Emergency Response Component (CERC) allows provision of immediate response to an Eligible Crisis or Emergency, as needed. For example, following an adverse natural event that causes a major natural disaster, the government may request the World Bank to re-allocate project funds to support response and reconstruction. This component will draw resources from the unallocated expenditure category and/or allow the government to request the World Bank to re-categorize and reallocate financing from other project components to partially cover emergency response and recovery costs. This component could also be used to channel additional funds should they become available as a result of the emergency.

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 power services provided by the dam 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, 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.

The approximate estimated cost of the works mentioned under Component 1,2,3,4 & 5 will be around **Rs. 47 Cr.**

B.2. Sub-Project Description – Kangsabati Dam

Kangsabati Dam is situated in the district of Bankura, West Bengal. The Dam is located over rivers Kangsabati around 2.0 km upstream of their original confluence point at Gorabari Ambiknagar, Mukutmonipur of Bankura. It is a Gravity Type Dam with Concrete Spillway. Acute crisis of irrigation water even drinking water in dry period of April-May, had led to initiation of this project in the middle of20th century and finally the project started its operation in the year of 1965. Total length of the Dam, embankment and spillway is 11.30 km. The spillway has 11 radial gates with a discharge capacity of 6372 Cumec (2,25000 Cusec). The catchment Area at the Dam point is 3626 Sq. km. Salient features of the project area are reported below:

Table 1 : Salient Feature

Project	**Kangsabati Kumari Rehabilitation Dam**
River	At confluence of Kangsaboti and Kumari river in Damodar river Basin
Lat/Long	22°57'49.92" N / 86°47'21.30" E, Khatra, Bankura
Type Of Dam	Gravity Type Earthen Dam With Concrete Spillway
Submergence Area Of Reservoir	14.685 Sq km
Length Of Dam	11.30 Km

Nos. Of Spillway Gates	11
Size Of Gates	9.14 m x 11.33 m
Type Of Spillway Gates	Radial
Design Discharge Of Spillway	6372 Cumec.
Max. Flood Level	135.63 m
Full Reservoir Level	134.11 m
Gross Storage Capacity	962.00 MCM
Live Storage Capacity	848.65 MCM
Command Area	340.93 Th. Ha.

View of Dam

View of Spillway from downstream side

Left Bank head Regulator

In Annexure V, more photographs of current condition of proposed rehabilitation areas are given.

B.2.a. Proposed Interventions/ Activities and intended Outcomes

The Dam Safety Review Panel (DSRP) constituted by Irrigation and Waterways Department of Government of West Bengal has inspected and reviewed the Kangsabati dam and its three Barrages. They recommended measures in January, 2020 on the repairs and rehabilitation works to improve the safety and performance of dam and associated appurtenances in a sustainable manner.

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 works are proposed based on the DSRP recommendations and these proposals form the basis for preparation of present ESDD Report.

Section I. Kangsabati Dam Proper earthen embankment portion

Repairing of local sliding of rip rap pitching to resist further disturbance or movement of soil particle just below the filter. U/S toe protection at critical sections by dumping boulder sausage crates.

Rock toe at downstream of dam is damaged & disturbed at few locations Resetting of damaged rock toe portions to resist the piping from the dam body. Repairing of disturbed country side Boulder pitching.

(i) Construction of the toe drain after the rock toe to collect the seepage and to guide to nearest 'V' notch for measuring the quantum of seepage. Necessary slope shall be given towards the nearest notch for easy movement of seepage water thus collected. Restoration of all the chute drains dam top for avoiding the movement of soil particle during surface flow from dam body.

(ii) Renovations of all the 'V' notches with proper shape and size stainless steel or Cast Iron 'V' to allow the flow over it. Setting well defined arrangement, free from any kind of obstruction like vegetation of the upstream approach from toe drain up to notch and the downstream drainage system.

(iii) Construction of bituminous and concrete inspection road along the length of the earthen countrysidetoe and construction of culverts and protective measures for road embankment.

(iv) Make the piezometric well to function properly. Rehabilitation of the chocked path/pipe vent fromupstream of reservoir up to this well.

(v) Repair of Spillway structure especially vertical joint crack on left abutment of spillway/retaining structure after spillway proper.

(vi) Renewal of Left Bank Head Regulator structure.

(vii) Identification and suitable treatment of the leakages to arrest the leakage

(viii) Alignment of Head regulator and gates

(ix) Renovation of the hoisting arrangement of gates

(x) Restoration for full functionality of chute drains including instrumentation for measurement of seepage

(xi) Freeing from encroachment over the dam body

(xii) Renovation of entire spillway stoplog / emergency gates & its rail track ystemin an elevated structure

(xiii) Provision of suitable DG set in the control room

(xiv) Freeing from the encroacher over the entire DG room

(xv) Deputing trained professional Mechanical staffat Dam for safe operation & maintenanceof HM items

(xvi) Checking of the stability of dam considering fresh assessment of seismic parameters

(xvii) Repairing/replacing/ servicing Hydromechanical components

Section II. Restoration of dilapidated Right Bank Head Regulator Structure with Gates

(xviii) Construction of a Cross-bundh for a height of 12 ft. (RL 407.00 - RL 395.00) for renovation of Right Bank Head Regulator Structure with its wing wall & repairing of Gate component.

(xix) Replacement of Vertical Gates of Right Bank Canal Head Regulator and its emergency gate,

embedded parts comprising of Bottom seal beam, side seal path, roller path (rail), gates (service gate) including its roller assembly, side/top/bottom seal and different components of hoisting system etc. Removal of all damaged gate after observing the same in dry condition by dewatering within the structure up to sill level of 395.00 ft from the Reservoir Level of 404.00 feet, including removal and re- fixing of all side seals and bottom seals of the vertical gates.

(xx) Right Bank Canal Head Regulator is having profuse leakage due to perforation in concrete wall & misalignment of gates. Renovation of Hoisting arrangement. Repairing of the concrete surface of RBHR Structure with 37 mm thick guiniting/shotcrete with cement mortar (1:3) on concrete surface after proper fixing of 9 gauge welded mesh of size 50 mm x 50 mm of good quality rust free, with anchors/ clamps on surface.

Section III. Repair of Staff Quarter & Development of Office Colony at Mukutmanipur

Section IV. Construction of Control Room.

Section V. Instrumentation for operation and monitoring.

Section VI. Preparations of as-built drawings & conducting bathometric survey & other testing's.

Project Area showing major intervention locations

B.2.b. 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 work main package, Hydro Mechanical work and instrumentation to improve dam

safety.

Civil work and Hydro Mechanical work will be carried out by contractor(s) as these are labour intensive activities and would be completed over a period of 24 months. SPMU 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. Monsoon period will be avoided for executing civil and hydro mechanical work. Downstream work will be done when the water level is not increasing and the requirement of gate opening will not be envisaged for few months. This will be done typically during post monsoon season when water level in reservoir is continuously dropping. Following is the overall implementation schedule.

Overall phasing of project implementation:

a) Proposed starting of implementation: March, 2022 Proposed ending of implementation: February, 2024 Implementation duration: 24 months

b) Phasing of Project Implementation

Sl. No.	Description	From (Month/Year)	To (Month/Year)
1	Pre-constructional activity	March 2022	June 2022
2	Construction work	April 2022	February 2024
3	Instrumentation and other repairing works	February 2023	February 2024

** These are all tentative date collected from their proposed Work Plan

B.2.c.Purpose of ESDD

The overall project (DRIP II) was categorized as **High 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 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.

B.2.d. 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 carryout 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;

Chapter II

C. INSTITUTIONAL FRAMEWORK AND CAPACITY ASSESSMENT

C.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 was 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" 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 requiring environment clearance is for new dam projects specifically for the purpose of hydropower generation and/or irrigation projects. It varies with generation capacity for hydropower projects and culturable command area served by irrigation projects. Forest related clearances become applicable, if new or any modification in any existing project require 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 Kangsabati Kumari Dam, regulatory clearances will not be applicable as per Indian regulation. Other applicable regulatory requirement is discussed in ESMF.

Policy and institutional framework of the Govt. of Indian as well as relevant safeguard policies of the World Bank with regard to environmental and social management of development projects will be applied through the following Ministries/Statutory Bodies.

- The Ministry of Environment & Forest (MoEF)
- Central Pollution Control Board (CPCB)
- State Pollution Control Board (SPCB)
- Ministry/Department of Environment in the States

Applicable Environmental Regulations:

None of the components of this rehabilitation project falls under the ambit of the EIA notification, 2006 and therefore no EIA study or Environmental Clearance is required for this project. Beside EIA Notification, 2006 there are other acts, rules, policies and regulations currently force in India that deal with Environmental and Social issues that could be apply to rehabilitation work. The specific regulatory compliance requirements of the project are shown in the table below:

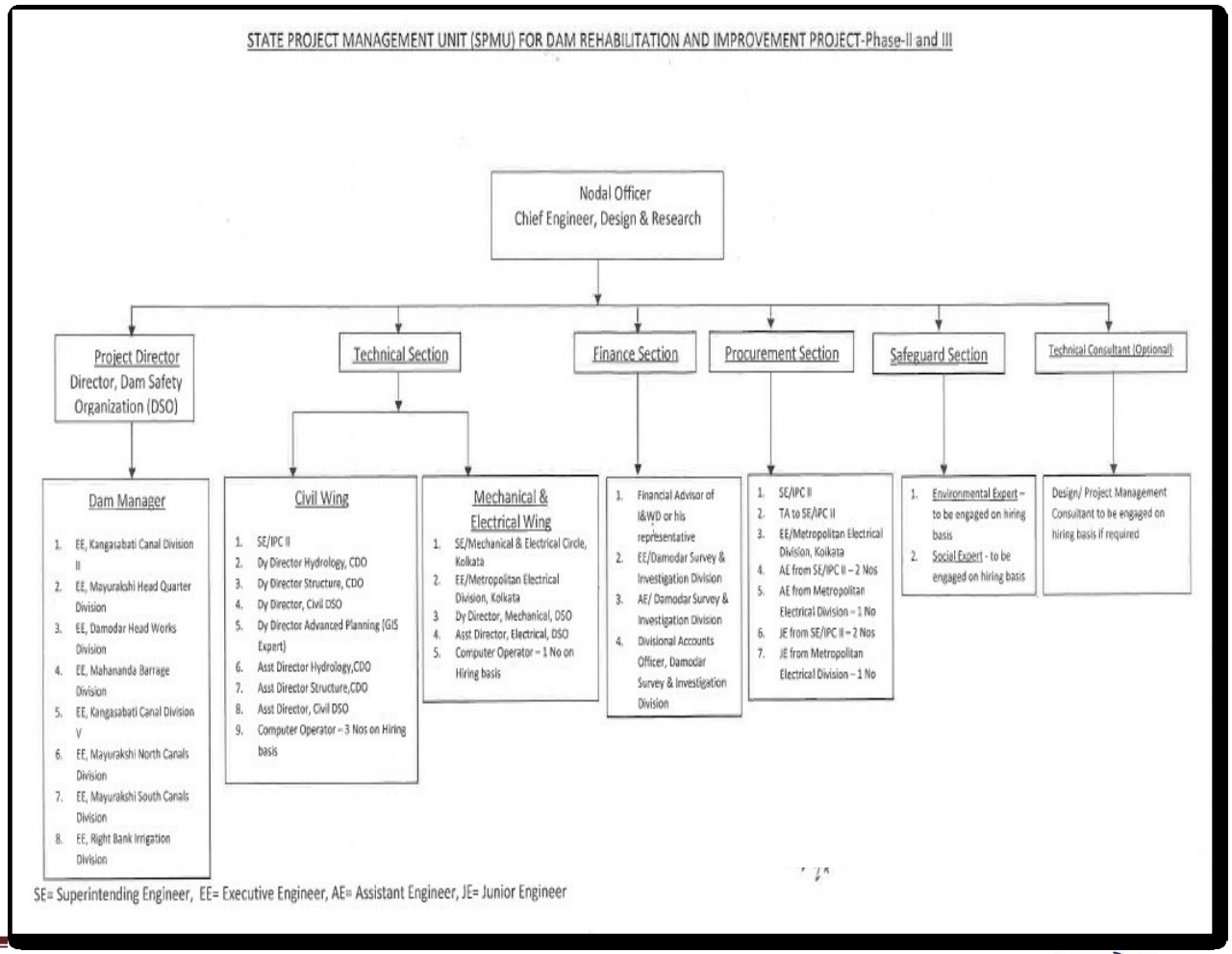
Law	Description	Requirements
Environment (Protection) Act, 1986 and Central Pollution Control Board Environmental Standards	Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards	Ambient air quality standard and Vehicular norms should be maintained as per CPCB standards.
NoisePollution(Regulation and Control) Rules, 2000 amended upto 2010	Rule 3 of the Act specifies ambient air quality standards in respect of noise for different areas/zones.	Noise standard should be maintained as site as per CPCB norms
Air (Prevention and Control ofPollution) Act, 1981, amended 1987 and its Rules, 1982.	Applicable for equipment and machinery's potentialto emit air pollution (including but not limited to diesel generators and vehicles); Consent to establish (CTE) and consent to operate (CTO) from West Bengal Pollution Control Board (WBPCB); Compliance to conditions and emissions standards stipulated in the consent to establish and consent to operate.	Applicable as per requirement. Emission should be within the standard. If any hot mix plant or Batching Plant is use, then proper CTE and CTO needs to be obtained from Pollution Control Board.
Municipal Solid Municipal Solid Wastes Management Rules, 2016	Rules to manage municipal solid waste generated; provides rules for segregation, storage, collection, processing and disposal.	Solid waste generated at proposed facilities shall be managed and disposed in accordance with the MSWM Rules
Construction and Demolition Waste Management Rules, 2016	Rules to manage construction and to waste resulting from construction, remodeling, repair and demolition of any civil structure. Rules define C and D waste as waste comprising of building materials, debris resulting from construction, re-modeling, repair and demolition of any civil structure	Construction and demolition waste generated from the project construction shall be managed and disposed as per the rules
Labor Laws	The contractor shall not make employment decisions based upon personal characteristics unrelated to job requirements. The contractor shall base the employment relationship upon equal opportunity and fair treatment, and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment or retirement, and discipline. The contractor shall provide equal wages and benefits to men and women for work of equal value or type.	Applicable labour laws including amendments issued from time to time applicable to establishments engaged in construction of civil works.

Law	Description	Requirements
West Bengal Trees (Protection and Conservation in Non-Forest Areas)Act, 2006	This Act has put restriction on felling of trees in the State unless until permitted by the Tree Officer. Any person desiring to fell a tree shall apply in writing to the DFO for permission in that behalf. It further defines clauses for planting adequate number of trees, planting in place of fallen/destroyed trees, preservation of trees and adoption of trees.	Tree cutting may be required for construction work. In that case, prior permission should be obtained as per requirement

C.2. Description of Institutional Framework

The sub-project will be implemented by Irrigation & Waterways Department, Govt. of West Bengal. The department has seven distinct divisions and the present work will be under Kangsabati Canal Divn No. II.

The state is the lowermost riparian state of Ganga Basin and situated at the Foothills of several Himalayan rivers of Brahmaputra Basin. It is beset with extensive network of rivers, their tributaries, rivulets, jhoras, irrigation canals, wetlands, ponds, beels and low-lying pockets of water bodies
The Irrigation & Waterways Department, West Bengal, will be responsible for implementing the project and **Chief Engineer, Design & Research unit will lead as Nodal Officer and Project Director will head the** Dam **Safety organization**.



The I & W department is entrusted with the following tasks:

- Providing irrigation facilities
- Offering reasonable protection against flood
- Alleviating drainage congestion
- Arresting erosion
- Maintaining internal navigation channels and
- Up-keeping the natural waterways in the state

Irrigation and Waterways Department, Govt. of west Bengal does not have in-house expertise to address E&S issues. Presently, Assistant Director at SPMU and Executive Engineer at dam level look after these aspects.

Environment and Social activities within the scheme will be dealt by individual experts procured by SPMU. Presently, no formal system is established for dealing with external complaint or a formal GRM. However, such complaints can be made to the Executive Engineer at dam level and Project Director at SPMU.

SPMU 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. The committee shall comprise Dam Manager of the dam site level, DDO and PD from SPMU and will be headed by the Secretary, I&WE, GoWB at state level.

There is internal complaint committee as per Sexual Harassment Act at dam site. The committee comprises Dam Manager and Drawing & Disbursing Officer (DDO) in the rank of Executive Engineer who is lady officer and headed by PD.

Chapter III

D. 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. Detail is discussed below.

D.1. Physical `Environment

D.1.a. Land Use/ Land Cover

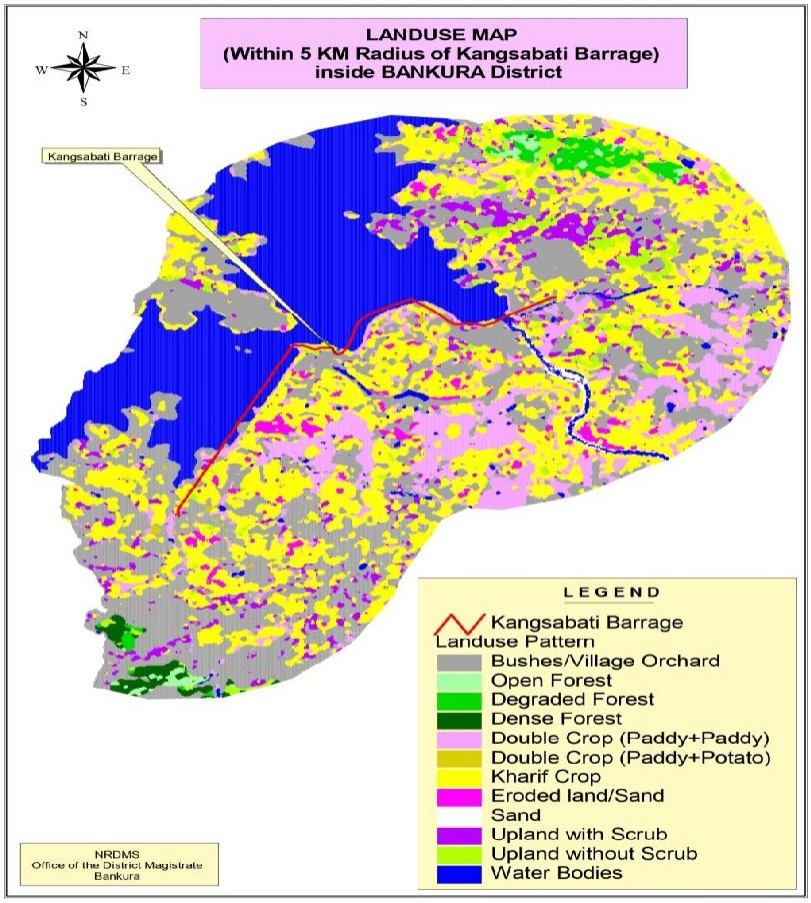
The distribution of the particular types of land use in Bankura district depends largely on natural factors like the distribution of water and soil. It also depends on the traditional preferences and Government policies of zoning and land use planning decisions. Among food crops, paddy is the most widespread crop. The following table shows the land utilization statistics of the district for the last five years.

Table 2: Land Use Characteristics of Bankura District

	Land Use Class	Subclass	Subclass Total (acre)	Class Total (acre)
A.	**Built Up Area**			**177964.10**
	A1.	Urban Settlement	6539.23	
	A2.	Rural Settlement	165937.87	
	A3.	Commercial Area	34.07	
	A4.	Industrial Area	2782.48	
	A5.	Abandoned Airstrip	27.67	
	A6.	Ash Pond	586.69	
	A7.	Archaeological Site	23.53	
	A8.	Area Under Infrastructural Development	271.98	
	A9.	Brick Kiln	541.77	
	A10.	China Clay Quarry	94.15	
	A11.	Coal Mining Area (Active/Disused)	132.03	
	A12.	Eco Tourism	11.38	
	A13.	Gravel/Stone Quarry	720.13	
	A14.	Pebble Querry	200.54	
	A15.	Stone Crushers	60.59	
B.	**Agricultural Land**			**1013534.81**
	B1.	Single Crop	603427.63	
	B2.	Single Crop (Boro)	140.60	
	B3.	Single Crop (Rabi)	739.03	
	B4.	More Than One Crop	403360.30	
	B5.	Vegetables	5867.24	
C.	**Forest**			**357869.85**
	C1	Notified Forest Area (As Per SOI Toposheet 1970's)	305200.22	
	C2	Plantation	50590.64	

	Land Use Class	Subclass		Subclass Total (acre)	Class Total (acre)	
	C3	Plantation(Under Regeneration)		2078.98		
D.	**Waste Land**					**76454.5**
		D1	With Scrub		26228.20	
		D2	Without Scrub		41997.10	
		D3	Gullied		3214.88	
		D4	Sandy Area-Riverine		1096.41	
		D5	Stony Waste/Baren Rocky		3917.92	
E.		**Water bodies**				**92446.82**
		E1	**River**		**60767.96**	
		E2	**Canal**		**3656.71**	
		E3	**Reservoir/Lakes/Ponds/Tanks**		**28022.15**	
	GRAND TOTAL					**1718270.08**

Source: West Bengal Land Revenue Department



The land use and environmental sensitivity of the project surrounding areas were analyzed using GIS techniques. Land use map has been provided by NRDMS, Office of the District Bankura Magistrate. Land use map within 5km radius of the dam is presented in the above figure. As can be seen from the map, present land use is mainly agricultural land of Kharif crop. Eroded land is also visible at the downstream. And also from the figure, it is visible that there is habitation within the five kilometres radius of barrage premises. Proposed rehabilitation work will be confined to dam area and no structural interventions are proposed beyond existing barrage premises.

D.1.b. Natural Hazards

Bankura though being a rain fed district, it is widely known as the brought prone district of West Bengal. Drought is a regular feature in the North-West part of the district covering Chhatna, Saltora, Gangajalghati, Barjora, Bankura-I, Bankura-II, Mejia, Indpur, Hirabandh and Ranibandh Blocks. There is no drainage problem in the district due to its undulating topography, yet the incidence of flood is notuncommon, due to siltation of rivers resulting in overflowing in case of heavy rain.

However, heavy rainfall in the district and in the upper catchment areas of Damodar River coupled with breaches of river embankments and release of excess water form Kangsabati and D.V.C Irrigation Project inundate Khariff Cropped areas in different parts of the district specially, in the Bishnupur Sub-division. That results loss of crops, damage of houses and other properties.

Flood or flood like situation has attributed a new dimension to soil erosion by formation of "Gully" due to tendency of the river (specially Shali at Sonamukhi and at Patrasayer block) to change its course of direction.

Due to occasional heavy rainfall in the district, some time flood water released from Kangshabati reservoir cause flood in several parts of the districts resulting in loss of crops, house and other properties. Although where the dam is located, i.e. Khatra is partly flood prone area as per District Disaster Management report.

D.1.c. Vulnerability to Earthquakes

As per the report published by National Institute of Disaster Management (NIDM) in 2013, West Bengal experiences earthquakes at a relatively lower frequency of the seismic hazard zonation map. Asper the map of Bureau of Indian Standards West Bengal lies in seismic zones II-IV. Entire Bankura district and the project area falls in Zone III, which is classified as Moderate Damage Risk Zone in India

D.1.d. Rainfall

The rainy season sets during the month of June and lasts till September, but the climate is pleasant. The rainfall is maintained primarily by cyclonic storms, which originate from the Bay of Bengal, situated to the south-east. The winter sets in November and extends till February and the temperatures during the period are far more pleasant and enjoyable. The rainfall recorded at the various metrological stations, in and around Bankura district during the winter, summer and rainy seasons is **tabled below**:

Table 3: Rainfall

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
Normal	**18**	**29**	**27**	**35**	**94**	**258**	**336**	**319**	**197**	**88**	**18**	**4**	**1423**
2015	17.37	8.20	22.73	99.12	78.51	201.49	418.12	268.06	118.7	14.44	0	0	1246.74
2016	9.7	5.9	21.6	2.0	101.5	154.0	280.4	443.26	217.2	44.46	0	0	1280.02
2017	0.0	0.0	25.31	33.41	136.78	204.23	570.9	271.2	191.6	232.46	15.13	3.55	1684.57
2018	0.0	0.11	10.19	125.57	58.81	219.83	321.63	242.63	143.41	27.28	0	36.98	1186.44

Source: IMD (as there is no weather station at Khatra, district data have been considered)

D.1.e. Fish Diversity

The district Bankura is traversed by major and minor rivers, feeder channels, numerous ponds, bills, reservoirs which have made this drought-trodden district as the highest producer of aquatic products within the state. Field survey was conducted in randomly selected local markets covering twenty-two blocks of Bankura. Fish sampling was carried out using various conventional fishing gears. The entire region harbours a wide variety of aquatic fishes. A total number of 92 indigenous fish species belonging to 30 families were identified during this study. The Cyprinidae family dominated the population with its 36 varieties followed by Channidae, Siluridae and Bagridae. Sonamukhi block situated in Shali basin; Sarenga and Raipur of Kangsabati basin; Dwarkeshwar and seven bundhs- enriched Bishnupur were the major habitats of small indigenous fishes. This paper also denotes presence of 12 globally endemic freshwater fish species viz. Hypophthalmichthys molitrix, Cyprinus carpio, Labeo nandina, Tor khudree, Chitala chitala, Bagarius bagarius, Wallago attu, Ompok pabda, Ailia coila, Anguilla bengalensis, Parambassis lala, Oreochromis mossambicus. The substitution of native Clarias batrachus with invasive African catfish C. gariepinus was observed in various local markets. Some traders even promote illicit farming of this banned species for their own profit. As a consequence, the indigenous, nutritionally- enriched C. batrachus is becoming more endangered.

D.2. Rivers and River Basin Systems of Bankura

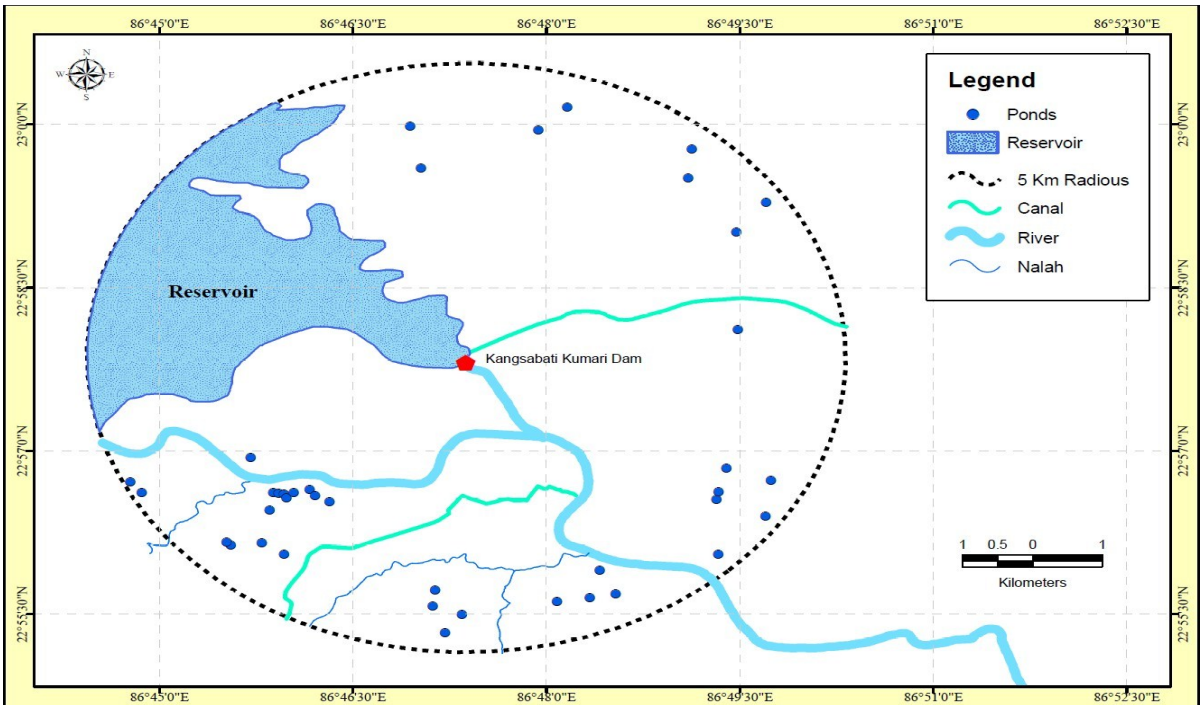
The Damodar River rises in the Palamu Hills of Chhotanagpur in Jharkhand at about 609 mabove mean sea level. After flowing generally in a south-easterly direction for 540 km (240 km in Jharkhand and the rest in West Bengal),it joins the river Hoogly about 50 km below Kolkata. The river's principal tributary, the Barakar, joins it just upstream of the Jharkhand-West Bengal border. The Damodar has a number of tributaries and sub-tributaries, namely, Barakar, Konar, Bokaro, Haharo, Jamunia, Ghari, Guaia, Khadia and Bhera, with Barakar being the prime tributary.

The Sali River is an important tributary of Damodar River that drains the northern part ofBankura district. It originates from a few miles west of Kora hill, halfway between Mejiaand Bankura, and flows northwest to south-east and meets the Damodar at Samsar village inIndas Block. The total length of the Sali river is 81 km.

The Dwarekeshwar River the largest river flowing through Bankura is the Dwarakeswar River. The river originates from Tilboni hills (445 m), in neighboring Purulia district, entering Bankura near Chhatna. The total length of the river within Bankura is 132 km, and its catchment area is 4430 km2.The Silai (or Shilabati) is the largest tributary of Dwarakeswar and it joins Dwareshwar near Ghatal (in Paschim Mednipur). The two together are known as RupnarayanRiver, which flows through Hooghly. The other tributaries of Dwarakeswar River are theGandheswari, the Kukhra, and the Berai.

- **Drainage and Drainage Basin of Gangajalghati block**. Within the block the important drainage channel is Sali River. Shape of Sali basin is elongated basin with elongation ratio less than 1.It originates at Gangajalghati Block at 87°13´37´´E longitude and 23°22´30´´N latitude. In Police Station Map, uppermost catchment area falls in Lachmanpur G.P, when the part of this G.P falls in Gandheswari sub basin flowing through Bankura district (Barjora, Sonamukho, Patrasayer, it joins Damodar river at Somsar village of Indus block in Bankura district.

- **Waterbody around Kangshabati Reservoir.** Kangshabati is the only significant river flowing through the block. flowing in the block. Some reservoir is visible in the following water body map around the Kangshabati reservoir.



D.3. Physiography

The Bankura district is described as the "connecting link between the plains of Bengal on the east and Chhota Nagpur plateau on the west." The areas to the east and north-east are low lying alluvial plains, similar to predominating rice lands of Bengal. To the west the surface gradually rises which gives way to undulating country, interspersed with rocky hillocks. Much of the district is covered with jungles. The regions of the district could be divided into broad three parts viz. 1) the hilly areas to the west, 2) the connecting undulating tract in the middle, and 3) the level alluvial plains to the east.

D.3.a. Topography and Geomorphology

The average elevation of the Bankura district from mean sea level is 448 metres. Topographically the district of Bankura is divided into 6 micro regions viz. Main Bankura Upland: characterized by undulating terrain with many hills and ridges along the north-western boundary of the district and having a gradual descent from the Chhatonagpur plateau

(i) Bankura Upland: continuation from the main Bankura Upland over a small tract in the south-east corner.

(ii) Bankura–Bishnupur Radh Plain: the elevation rises gradually with undulating topography but abruptly in hilly tract towards the west extending between the western hilly tract and eastern alluvial plains. The hillocks ranges in the region from 90 m to 180 m.

(iii) Patrasayer Plain: a fertile plain with a gradual slope towards the south-west located in the north-east part.

(iv) Silai Plain: a plain with few undulations in the west extending to the south-central part.

D.3.b. Hydro-geology and Ground Water Potential

The diverse geology of Bankura district controls the hydro-geological condition of the district. According to Central Ground Water Board (CGWB), in areas underlain by hard crystalline and Gondwana rocks, the groundwater occurs under:

(i) Unconfined condition in the weathered residuum down to the depth of about 15 meters below ground level (mbgl) with maximum to 25mbgl

(ii) Semi-confined to confined condition in the fractured zones in the depth span of 30-60mbgl. Resistivity survey shows that in some places a deeper fracture zone is also expected to occur at a depth span of 80-100 mbgl.

About two thirds of the district is covered by alluvium. Older alluvium and laterites occur in central– southern part of the district. Groundwater exploration carried out in the area indicates that the thickness of the alluvial sediments increases eastward from 36m in the marginal part to 150m in the eastern most part. Potential aquifers exist between 30 and 95 mbgl and the discharge of the wells tapping such aquifers varies from 20 to 124 m3/hr, with drawdown ranging from 6 to13 m. Depth to water level in the older alluvium varies from 6 to15 mbgl during pre-monsoon period.

D.3.c. Groundwater Quality Status

According to CGWB the high concentrations of fluoride and iron in groundwater area is a serious problem in the district. Groundwater in 10 blocks namely Taldangra, Simlapal, Raipur, Indpur, Bankura II, Saltora, Barjora, Hirabundh, Chhatna and Gangajalghati is affected sporadically by high concentrations of fluoride in groundwater i.e. more than the permissible limit (>1.5 mg/L). This occurs in different hydro-geological formations namely:

(i) In fractured granite at depths of 40 m to 50 m.

(ii) In older alluvium sediments at depths of 40 m to 50 m.

In Bankura district, quite high concentrations of iron in groundwater have been found (up to 9.5 mg/L). Though iron content in drinking water may not affect the human system as a simple dietary overload, but in the long run prolonged accumulation of iron in the body may result in homo-chromatosis, a disease in which tissues are damaged. It is generally recognized that concentrations above 0.3mg/L in household water can lead to staining of clothes during washing and may therefore be unsuitable for use.

Table 4: Compiled Summary of Fluoride Contamination in Bankura, 2013-2017

Sl. No	Name of Blocks	Number of Samples Tested	Fluoride Concentration				Affected Habitation with Fluoride Concentration	
			> 1.5(mg/L)		1.0 - 1.5(mg/L)		>1.5 (mg/L)	1.0-1.5 (mg/L)
			No.	%	No.	%		
1	Bankura I	1854	2	0.11	29	1.56	2	18
2	Bankura II	2657	25	0.94	95	3.58	19	53

Sl. No	Name of Blocks	Number of Samples Tested	Fluoride Concentration				Affected Habitation with Fluoride Concentration	
			> 1.5(mg/L)		1.0 - 1.5(mg/L)		>1.5 (mg/L)	1.0-1.5 (mg/L)
			No.	%	No.	%		
3	Barjora	2751	18	0.65	35	1.27	13	20
4	Bishnupur	2368	0	0.00	3	0.13	0	3
5	Chhatna	5250	67	1.28	198	3.77	47	137
6	Ganjagalghati	5007	26	0.52	259	5.17	20	107
7	Hirabandh	1684	10	0.59	53	3.15	10	41
8	Indpur	2651	7	0.26	36	1.36	7	27
9	Indus	2077	2	0.10	2	0.10	2	2
10	Jaypur	2054	0	0.00	0	0.00	0	0
11	Khatra	1842	6	0.33	4	0.22	5	4
12	Kotulpur	1737	0	0.00	2	0.12	0	2
13	Mejia	867	4	0.46	61	7.04	4	23
14	Onda	3378	1	0.03	1	0.03	1	1
15	Patrasayer	1704	0	0.00	0	0.00	0	0
16	Raipur	2462	11	0.45	29	1.18	5	22
17	Ranibundh	2104	0	0.00	6	0.29	0	5
18	Saltora	1969	43	2.18	131	6.65	31	59
19	Sarenga	1425	2	0.14	0	0.00	2	0
20	Simlipal	2149	167	7.77	68	3.16	95	57
21	Sonamukhi	1704	1	0.06	0	0.00	1	0
22	Taldangra	3140	21	0.67	33	1.05	12	19
Total		**52834**	**413**	**0.78**	**1046**	**1.98**	**276**	**600**

Source: IMIS data (from 2013-2017)

Summing up the last four years' data, as compiled, it has been observed that out of 52834 water samples tested across the 22 blocks, fluoride concentration above 1.5mg/L was observed in 413 samples (0.78%). Total 276 habitations are affected by high fluoride contamination. These samples were tested mainly from tube-wells. Also, an estimated 1046 (1.98%) samples showed fluoride concentration between 1.0 mg/L and 1.5 mg/L.Based on the analysis, high fluoride concentrations are noted in 10 blocks, namely Bankura II, Barjora, Chhatna, Ganjagalghati, Hirabandh, Mejia, Raipur, Saltora, Simlipal and Taldangra whichare considered as[1]severely affected. The blocks, which are moderately affected are Bankura-I, Indpur, Indus, Khatra, Onda, Sarenga and Sonamukhi. The 5 blocks which are unaffected with fluoride contamination are Bishnupur, Joypur, Kotulpur, Patrasayer and Ranibandh.

Apart from fluoride, about 68% of the groundwater samples show iron concentration above the permissible drinking water standard (0.3 mg/L). E-Coli and Coliform counts were also present above the permissible limit in samples tested. Details of other quality parameters based on IMIS

data (from 2013-2017) is tabled below:

Table 5: Summary of Water Quality Parameters

Year	Samples Tested	Samples with			
		Coliform >[MPN/100ml]	E-Coli >[MPN/100ml]	Fe > 0.3 (mg/L)	Hardness>200 (mg/L)
2013-14	14536	6927	1739	6984	895
	Range	1 –60 MPN/100 ml	0.06 –90 MPN/100 ml	0.31 – 8.70mg/L	602 – 5001mg/L
2014-15	26807	6236	2010	20091	2451
	Range	0.6 –9.0 MPN/100 ml	0.2 –90 MPN/100 ml	0.31 – 9.64mg/L	604 – 4700mg/L
2015-16	9383	4876	962	7374	617
	Range	1.0 –9.0 MPN/100 ml	0.02 –110 MPN/100 ml	0.31 – 9.68mg/L	604 – 1844mg/L
2016-17	2114	722	4	1557	65
	Range	4 –1600 MPN/100 ml	2 –17 MPN/100 ml	0.31 – 8.65mg/L	68 – 12365mg/L
Total	**52840**	**18761**	**4715**	**36006**	**4028**
Percentage of Samples Tested Positive (%)		**35.5**	**8.92**	**68.1**	**7.6**

Source: IMIS data (from 2013-2017)

D.3.d. Air Quality

Air quality scenario of Bankura district is presented in tabular form in **the following table** followed by graphical presentation of the annual behavior of the indicator pollutants during year 2015 and the estimated population exposed to such air quality in those districts.

1. The rationale for severely affected blocks has been assessed based on the consideration that the % of Samples tested with Fluoride Content > 1.5mg/Liter is more than 0.4%.

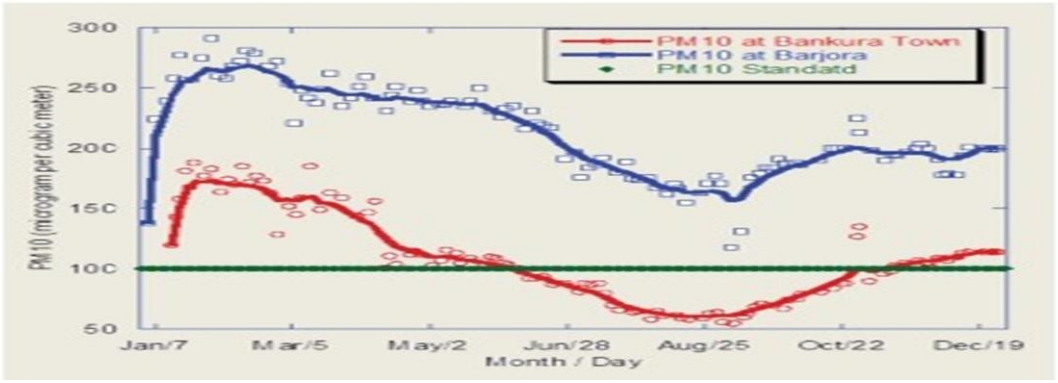
Table 6: Air Quality in Respect of Four Traditional Parameters in Bankura District
(As there is no data available of Khatra, district data are considering)

Year	PM10 (µg/m³)			PM2.5 (µg/m³)			SO_2 (µg/m³)			NO_2 (µg/m³)		
	Value	Stan-dard	% days of NC	Value	Stan-dard	% days of NC	Value	Stan-dard	% days of NC	Value	Stan-dard	% days of NC
2013	85	60	35	Not Done	40	Not Done	7	50	0	40	40	0
2014	69	60	13	Not Done	40	Not Done	8	50	0	54	40	0
2015	99	60	43	Not Done	40	Not Done	8	50	0	55	40	0

Figure 1: Trend of PM10 in Bankura during 2016

District: Bankura

Total Population	3596674
Population affected by air quality	299773
% population affected by air quality	8.33



Ecological Resource

In the western portion of the district the uplands either bare or are coveredwith scrub *jungle* of Zizyphusand other thorny shrubs. This thorny forest gradually merges into sal (*Shorearobusta*) forest. Low hills are covered with Miliusa, Schleichera, Diospyros and other trees.Some of the common trees of economic interest found in the district are: Alkushi (Mucunapruriens), amaltas (*Cassia fistula*), asan (*Terminalia tomentosa*), babul (*Acacia nilotica*), bair (*Zizyphusjujuba*), bael (*Aegle marmelos*), bag bherenda (*Jatropha curcas*), bichuti (*Tragia involucrate*), bahera (*Terminalia belerica*), dhatura (*Datura stramonium*), dhaman (*Cordia macleoidii*), gab (*Diospyros embyopteris*), harra (*Terminalia chebula*), imli (Tamarindusindica), kuchila (*Strychnosnux-vomica*), mahua (Bassialatifolia), palas (*Butea frondosa*), sajina (*Moringa pterygosperma*), kend (*Diospyros melanoxylon*), mango, date-palm, nim, papal, banyan, red cotton tree and jiyal.

D.3.e. Surface water quality

Raw water quality tests of Kangshabati reservoir was carried out by the Public Health Engineering Department. It is being noted from the water quality test results that all the chemical quality parameters are well within the permissible values,18 excepting iron. So, only conventional treatment process is adequate to meet potable water standards. No special or tertiary treatment is required. Iron content marginally exceeds the desirable value, but well within the permissible limit (value detected0.41 mg/L, desirable limit 0.3 mg/L, permissible value 1.0 mg/L). The chlorine added for disinfection (pre and post) will oxidize a portion of the iron present and in the process, it is expected that the iron content will come down within/ closer to the desirable value.

	Parameters	Unit	Desirable Limit as per BIS 10,500	Permissible Limit as per BIS 10, 500	Test Results According to Sample Collection Date		
					4/8/2015	2/9/2015	6/9/2015
1	Temperature	°C	-	-	27	-	-
2	Turbidity	NTU	5	10	95	39.4	37.6
3	pH	-	6.5	8.5	7.6	6.84	6.93
4	TDS	mg/L	500	2000	90	57.6	54.2
5	Alkalinity	mg/L	200	600	34	79.128	74.732
6	Calcium (Ca)	mg/L	75	200	20	-	-
7	Total Hardness (CaCO3)	mg/L	200	600	80	56	60
8	Chloride (Cl)	mg/L	250	1000	52	-	-
9	Iron (Fe)	mg/L	0.3	0.3	0.41	0.09	0.08
10	Residual Chlorine	mg/L	0.2	0.2	Nil	-	-
11	Colour	Hazen	5	15	56	-	-
12	Odour	-	-	Nil	Nil	-	-
13	Fluoride (F)	mg/L	1	1.5	BDL	-	-
14	Magnesium	mg/L	30	100	8	-	-
15	Sulphate	mg/L	200	400	40	-	-
16	Nitrate	mg/L	45	100	18	-	-
17	Aluminium (Al)	mg/L	0.03	0.2	0.002	-	-
18	Manganese (Mn)	mg/L	0.1	0.3	0.16	-	-
19	Phenolic Compound	mg/L	0.001	0.002	BDL	-	-
20	Coliform Bacteria (CFU/100ml), Max	-	NIL/100ml	-	540	-	300
21	Escherichia Coli	-	NIL/100ml	-	120	-	-
22	Non-Faecal Coliform (CFU/100ml), Max	-	NIL/100ml at 37°C	-	320	-	-
24	Faecal Coliform MPN/100	-	-	-	-	-	40

Source: PHED.

D.3.f. Forest

The total geographical area of the district of Bankura is 6882.00 km^2 and the total area of forest of this district is 1,45,006.56ha (1450.06 suqare kilometer) which constitutes 21.5% of total geographical areaof the district coverage. A total area of 7305.76 ha has been declared as reserved forests under section 20 of Indian Forest Act. An area of 43643.87 ha of protected forests area has been covered under 438 proposals for declaring as reserved forests.Bankura district forest is pre dominantly Sal and its associated species and plantation forest of Eucalyptus and Akashmoni. Bankura holds one of the best quality of Sal forest in West Bengal particularly at Radhanagar, Sonamukhi and Patrasayer and the entire Bishnpur sub-divisionaljurisdiction. Its flora bio-diversity increased substantially over time. From the geographical, socioeconomic and environmental consideration, the district offers lot of scope for development of this activity. In view of Govt. supports for development of this sector, long term potential for development through credit may be estimated at 2500 hect. for next 5 years with annual phasing of 500 ha.The district is covered under the programmes of National Waste Land Development Board. IWDP is being implementation in 7 blocks viz. Indpur, Chhatna, Saltora, Khatra, Hirbundh, G.Ghati and Ranibandh. Various schemes and projects like NREGS,13th Finance Commission, CSS Elephant Project are being implemented to improve the living conditions of the forest fringe area population. Elephant depredation is a very major problem in Bankura in view of very fast growing elephant population and seasonally moving elephant start straying back in Bankura for longer time and the number of residential elephants have also increased significantly. All-out efforts are being made with the help of local forest protection committee to tackle the problem with a human face to mitigate the problem and it is an on-going process. 194. State Government has implemented social forestry

project in the district covering roadside, riverside, railway embankment plantation etc. West Bengal forest development corporation, pulpwood development corporation are also working for forest and wasteland development in the district during the past years. Govt. has stressed for biotic plantation distribution of seeding etc. in the district.

The total forest area is spread over 27 territorial Range under three forest divisions. Forest area of Indpur range is 5997.656 Ha (Bankura S division) and that of Taldangra range is 7484.080 Ha (Panchyat S.C Div).In forest areas, majority of the population depend on the forest for various purposes like grazing, firewood, collection of Sal leaves and seeds, mushrooms etc. Since the pressure on the forests is high, some minimum amount of forest degradation has almost become unavoidable. However, the Joint Forest Management (JFM) has taken roots in the district and its contribution for greening and conserving the forests of the district is immense.

D.3.g. Agriculture

In spite of presence of small and marginal farmers, agriculture accounts almost 70 per cent of the district's total income. Due to land reforms, usage of high fertile and hybrid crops, the district has overcome its poor state as was to be in the past. Only 60 to 65 per cent of the total land area of the district is fertile due to availability of sufficient water supply either by canal or deep tube wells. Agricultural land of the district is of three types- Sali, Suna and Tara or Danga. 'Sali' is suitable for growing of aman rice, 'Suna' for various crops like 'aus' kharif, sugarcane, cotton, tobacco, mustard etc. 'Suna' is also used for production of fine kind of rice. Remaining lands of the district is not cultivable dueto undulation of land and morum soil.

Agriculture in the district is largely dependent of monsoon. Drought constitutes a major hazard in the district. Intermittent gaps of in precipitation and moisture stress during the monsoon gives rise to serious setback in production during the Kharif, which is the main stay of Agriculture in the district. Farmers are working hard to get more production of crop with their limited area of land. Seed farms areworking jointly. Fertilizers are available at every village. The main agricultural crop is paddy and it is produced in the 90.0 per cent of the total cultivated area of the district. Wheat, barley, jute and potato are the other important agricultural products of the district.

D.3.h. Eco Sensitive Zone

There is no eco sensitive zone present near the project area. Although a deer park is situated 4km away from Kangshabati Dam and also 5 km away from river bank. But it is not notified eco sensitive zone by MoEF, it is used as a tourist place.
Although there will not be any negative impact on the deer park as it is far away from the project area and it is situated at upstream site.

D.4. Social Environment

D.4.a. District Profile

Bankura district The District Bankura is bounded by latitude 22038‟N to 23°38´N and longitude 86036‟E to 87047‟E. It has an area of 6,882 square Kilometres (2,657sq. mile). It is a part of Midnapur Division of the State and included in the area known as "Rarh" in Bengal. It has 3 subdivisions. The dam is located in the block and police station Ranibandh under Khatra sub division of Bankura district. Damodar River flows in the northern part of Bankura district and separates it with the major part of Burdwan district. The district head quarter is located in

Bankura town. The district is the connecting link between the plains of Bengal on the east and Chhota Nagpur plateau on the west.

The areas to the east and north-east are low lying alluvial plains, known predominantly rice bowl of Bengal. The western portion, with ferruginous soil and hard beds of laterite, marks the gradual descent from the table land of Chhota Nagpur to the delta of lower Bengal, consisting largely of spurs projecting from the western tableland and of low swelling ridges. However, there is no marked ridge of hills. Much of the area is covered with jungles. In the northern portion of the district the alluvium contains seams of coal belonging to the Raniganj system.

Bankura is economically underdeveloped and is mostly dependent on agriculture. Almost 70% of the district's income is generated through agriculture where 80% of the farmers are small & marginal in nature. It is one of the most draught prone districts of West Bengal. However due to protective irrigation system, land reforms and use of high fertile & hybrid crops the economic condition of the district has improved. Also, cottage and small-scale industries, such as Stone-crushing, Weaving, Oilseed-crushing, handicraft units like Dokra, Terra-cotta, Baluchari Sari play a key economic role in district.

The brief demographic characteristic of the district is given in the table below:

Table 7: Demographic Feature

Total No. of Household (Year 2014)	**766902**
No. BPL Household (Rural HH survey of 2005)	28.87%
HH size	5
Population	
Total	3596674
Percent of West Bengal population	3.94%
Percentage of rural population	91.67 %
Percentage of urban population	8.33 %
Female No.	1758579
Female Percentage	48.9
Male No.	1838095
Male Percentage	51.1
SC Total	1174447
Percent of Total population	32.7
Female No.	581007
Male No.	593440
ST Total	368690
Total Percentage	10.3
Female No.	185223
Male No.	183467
Literacy Rate	
Total	2232992
Percentage of Total population	70.26
Female No.	933655
Female Percentage	60.05
Male No.	1299337
Male Percentage	80.05
Percentage in SC population	53.30
Percentage in ST population	59.18

Literacy rate (excluding 0-6population)	70.26 %
Population Density	523
Decadal growth rate	12.64%
Average Sex Ratio	957
Work Participation Rate (%)	40.8

Source:1) Directorate of Panchayat, Govt. of W.B 2014., 2) Census of India, 2011, 3) L.S.G. Cell under D.M. Office, Bankura

Bankura district has a population of 3,596,674 as per 2011 census out of which 1,758,579 (48.9%) were females and1,838,095 (51%) were males. The district has a population density of 523 inhabitants per square kilometer. Its population growth rate over the decade 2001-2011 was 12.64%. against 13.84% in West Bengal. 30.2% household lives below the poverty line as per district level HH facility survey 2008, under MoH&FW. Bankura has a sex ratio of 957 females for every 1000 males. The district has a scheduled caste population of 1,174,447 i.e. 32.7% and a scheduled tribe population of 3,68,690 which accounts 10.3% of total population of the district .

The literacy rate of the district 70.26% is below the state average of 76.26% as per the census of India 2011. The gender gap is 20%, higher than the state level gender gap – 16.3%. Far more widen among SC 23.82% and ST 26.98%.

Table 8: Workforce

Total Worker Population	**1466220**
Percentage tototalpopulation	40.77
Female No.	415398
F Percent on F pop	28.33
Male No.	1050822
M Percent on M pop	71.67
Main Workers Total	916393
Percentage to respective totalpopulation	25.48
Female no.	154305
F Percent on F pop	8.8
Male No.	762088
M Percent on M pop	41.5
Marginal Workers Total	549827
Percentage to respective totalpopulation	15.29
Female no.	261093
F Percent on F pop	14.85
Male No.	288734
M Percent on M pop	15.71
Non Workers Total	2130454
Percentage of Total	59.23
Female no.	1343181
F Percent on F pop	76.38
Male No.	787273
M Percent on M pop	42.83

Source : Census of India, 2011

The male worker population in the project district is 71.67 percent and female worker population is around 28.33 percent. Male main worker population is significantly higher than female main worker population whereas in case of marginal worker population the gap is very close. However,

non-worker female population is s i g n i f i c a n t l y higher than male. The work participation rate in Bankura is 44.7 whichis higher than the state average of 36.8.

Table 9: Type of Worker

	Both Main & Marginal				
	Cultivators	**Agriculture Labours**	**HH Industrial workers**	**Other Workers**	**Total**
Total	**309723**	**647374**	**61386**	**447737**	**1466220**
Percentage of TotalWorker	**21.12**	**44.15**	**4.19**	**30.54**	**100**
Female	32742	262325	31387	88944	415398
Female % of Dist.	7.88	63.15	7.56	21.41	100
Male	276981	385049	29999	358793	1050822
Male % of Dist.	26.36	36.64	2.85	34.14	100

Source : Census of India, 2011

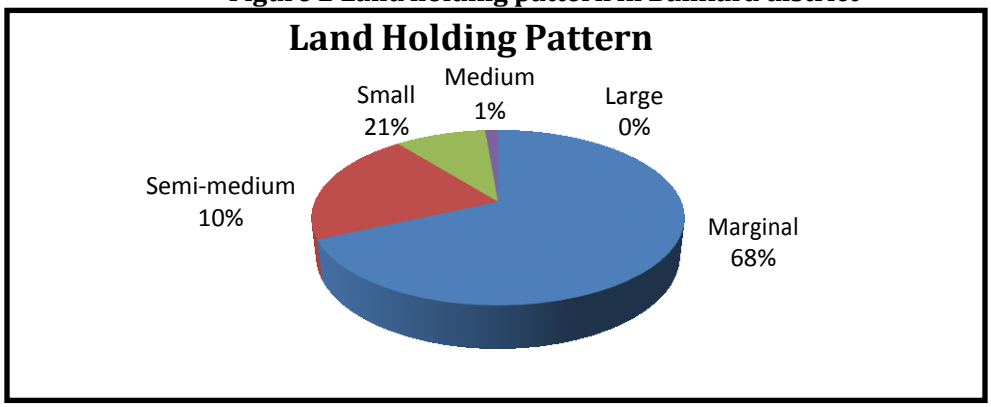
The livelihood of highest percentage of worker population is Agriculture labours, in which female participation is larger 63.15 percentages. In the district, apart from Agricuture labourer, a larger section of workforce ekes out living as other workers. Participation in cultivation comes as the third options.

Table 10: Land Holding

Land size												Avg. size of holdings (ha)
Marginal Below 1.0 hectare		Small 1.0 to less than 2.0 hectares		Semi-medium 2.0 to less than 4.0 hectares		Medium 4.0 to less than 10.0 hectares		Large 10.0 hectaresand above.		Total		
No. of holding	**Area of holdings**	**No. of holdings**	**Area of holdings**	**No. of holdings**	**Area of holdings**	**No. of holdings**	**Area of holdings**	**No. of holdings**	**Areaof holdings**	**No. of holdings**	**Area of holdings**	
275108	135442	84905	125671	37932	100578	5326	26059	7	84	403278	387834	0.96
68.22	34.92	21.05	32.40	9.41	25.93	1.32	6.72	0.002	0.02	68.22	34.92	

Source : Agricultural Census, W.B.

Figure 2 Land holding pattern in Bankura district



Land holding pattern reflects that the district has significant percentage of marginal and small farmers.68.22 percent farmers are having less than 1 ha land and percentage of holding to total holding is 34.92 percent. Of the total farmers 21.05 percent are having 1 to 2 ha land with 32.4 percent of the total land whereas only 11 percent farmers are in the holding category of greater than 2 ha land with 33 percent ofthe total area of holding. The average land holding of the district is less than 1 ha, precisely 0.96 ha.

Table 11: Land Type & Land use (Area in thousand hectares)

Total Geographical Area	688.0	pc on total area
Gross Cropped Area	383.93	55.80
Net area sown	264.09	38.39
Area Sown more than once	220.3	32.02
Cropping Intensity	164	
Area Under Forest	148.93	21.65
Area Under Wasteland	2.0	0.29
Area under Nonagricultural use	148.48	21.58
Barren & Unculturable land	1.42	0.21
Permanent pastures & other grazing land	0.78	0.11
Culturable waste land	2.13	0.31
Current fallow	118.76	17.26
Fallow land other than Current fallow	1.97	0.29
Protected Forest	136230	19.80
Reserved Forest	4572	0.66

Source : Directorate of Agriculture (Evaluation), Govt. of W. B. , Statistical Handbook 2014

Total geographical area of the district is 688 thousand ha. The gross cropped area is 56 percent of the geographical area. The net sown area is 38.4 percent to total geographical area. Area sown more than once is 83 percent of the net sown area. The cropping intensity is 164, whereas that in state is 184.

Land use refers to “man’s activity and the various uses which are carried on land” and land cover refers to ‘natural vegetation, water bodies, rock/soil, artificial cover and others resulting due to land transformation. Area under agriculture is highest followed by area under forest. 21.65 percent is forest area of which 19.8 percent is protected forest area in the district.

D.4.b. Road Network and Connectivity

The National Highway 60 or NH-60 connects NH-5 (At Balasore) to NH-34 (At Morgram). Within Bankura, it runs through Bishnupur, Bankura, Gangajalghati and Mejia, an approximate distance of 93 km before crossing over to Ranigunj. State Highway-2, 4, 8 and 9 are the major State Highways connecting / interconnecting Bankura, with the rest of the districts. Details of the major2 National / State Highways within the district and their connectivity as per available information are presented below:

Table 12 : Roads in Bankura District

Sr.No	National / State Highway Number	Length (km)		Details of Major Blocks which PassingThrough
		Total	In Bankura	
1	NH-60	446	93	Bishnupur, Onda, Bankura, Gangajalghati and Mejia
2	NH-60A	84	33	Bankura-II,Bankura-I
3	State Highway-2	323	117	Saltora, Chhatna, Bankura-II, Chhatna, Indpur to SH-4
4	State Highway-4	466	80	Hirbandh, Khatra to Sarenga
5	State Highway-7	289	-	Bishnupur, Joypur, Kotulpur
6	State Highway-8	292	112	Beliatore, Sonamukhi, Patrasayer and Indua
7	State Highway-9	251	82	Durgapur, Beliatore, Bankura, Onda, Taldangra, Simlapal, Sarenga, Raipur

Source: http://www.pwdwb.in/road/state_highway

D.4.c. Vicinity Village Profile

There are 183 villages which fall within 10 km radius of the dam, spread over 13 blocks of the district. And 13 villages located within the 5 km radius of the dam. The project area does not fall within the 'Schedule V ' areas and also the tribal households in the area do not meet the characteristics outlined in ESS 7 as they are well mainstreamed into the society. Past flood incidents: There was no incident of heavy flood in villages in vicinity of the dam during last 5 years. Construction of this structure was fully completed more than 50 years ago. Considering the present condition of the existing structures it is felt essential to conduct necessary renovation work of various components of the project. The socio-economic profile of the villages is given in the table below.

Table 13: Vicinity Village Profile

Particulars	10 km radius of the Dam	Within 5 km radius of Dam
Total Households	27468	1322
Total Population of Village	126880	6466
% of dist. pop	3.53	
Total Male Population of Village	64944	3288
% of tot village pop	51.19	50.85
Total Female Population of Village	61936	3178
% of tot village pop	48.81	49.15
Total SC Population of Village	**32123**	**1845**
% on Total Population of Village	**2.74**	**28.53**
Total SC Male Population of Village	16462	930
Total SC Female Population of Village	15661	915
Total ST Population of Village	**30781**	**2412**
% on Total Population of Village	**8.35**	**37.30**
Total ST Male Population of Village	15327	1170
Total ST Female Population of Village	15454	1242

Source: Census 2011

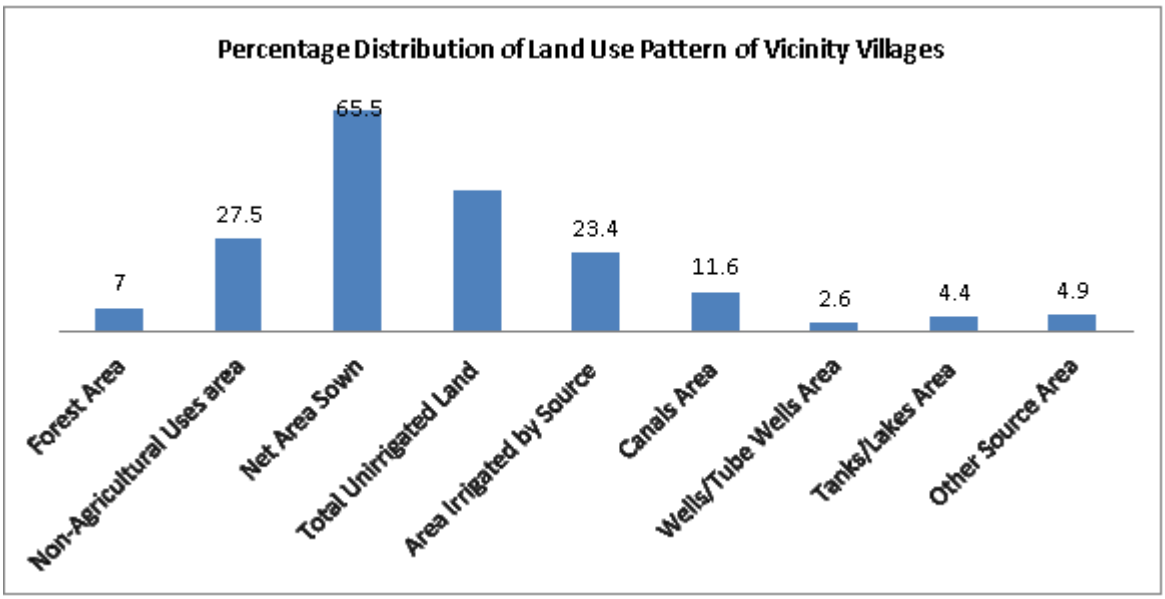
The habitation of the vicinity villages of the dam site consists of multi caste people such as Scheduled Caste (S), Scheduled Tribe (ST), other caste. Within the 5 km radius 65.84% are SC and ST. ST constitutes 37.30%, higher than SC. Out of 13 villages , 8 villages are dominated by ST categories. No SC population lives in Damdi, Palashbani, Jumbeda, Loadihi, Kumar Bahal and Pareshnath, but ST.Whereas in 10 km radius, only 8.35% is tribal population and 2.74% is scheduled caste 2.74%. The population in the 10 km radius is 3.53 percent of the district.

Table 14 : Land Use of Vicinity Villages in10 km radius of Dam

Total Geographical Area (in Hectares)	27251.52	pc on total area
Forest Area (in Hectares)	1894.68	7.0
Area under Non-Agricultural Uses (in Hectares)	7493.80,	27.5
Net Area Sown (in Hectares)	17863.04	65.5
Total Unirrigated Land Area (in Hectares)	11478.74	42.1
Area Irrigated by Source (in Hectares)	6384.30	23.4
Canals Area (in Hectares)	3149.44	11.6
Wells/Tube Wells Area (in Hectares)	716.13	2.6
Tanks/Lakes Area (in Hectares)	1195.34	4.4
Other Source (specify) Area (in Hectares)	1323.39	4.9

Source: Census 2011

Figure 3 Land Use Pattern at Dam Vicinity villages (around 10 km radius)



The geographical area of the vicinity villages covers 4% of the district with 7% of it is forest area. 1.3%forest area of the district falls in it. Out of the total area 65.5% is net sown area.

Table 15 Working Population in Vicinity villages

Particular	10 km radius	5 km radius
Total	59866	2871
Percentage to total of Worker & Non Worker total population	42.6	
Female No.	19629	1073
F Percent on tot Work pop	32.8	37.37
Male No.	40237	1798
M Percent on tot Work pop	67.2	62.63
Main Workers Total	33838	1279
Percentage to respective total work population	56.5	44.55
Female no.	6218	
F Percent on tot Main work pop	18.4	
Male No.	27620	
M Percent on tot Main Work pop	81.6	
Marginal Workers Total	26028	1592
Percentage to respective total population	43.5	55.45
Female no.	13411	
F Percent on tot Marginal work pop	51.5	
Male No.	12617	
M Percent on tot Marginal Work pop	48.5	
Non Workers Total	80590	
Percentage of Total	57.4	
Female no.	48923	
F Percent on F pop	60.7	
Male No.	31667	
M Percent on M pop	39.3	

Source: Census 2011

The male worker population in the vicinity villages of 10 km radius is 67.2 percent and female workerpopulation is 32.8 percent. Male main worker population is higher than female while female marginal worker population is higher than the male marginal worker population. In case non worker populationmale number is significantly more than female. In the 5km radius of the dam area no. of marginal worker is more than the main worker.

D.4.d. Cultural Environment

As per the list of monuments of National importance by the ASI, a Temple (Parashnath Mandir) situated5km away from the Dam.

Chapter IV

E. ACTIVITY WISE ENVIRONMENT & SOCIAL SCREENING, RISK AND IMPACTS IDENTIFICATION

E.1. Sub-Project Screening

The subproject screening was undertaken based on site visits and followed a set methodology. Process of risk /impacts identification was done using two step Screening process. Step I identifies the applicable sub-project activities, preconstruction stage 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.

  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 riskof spillage of 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 heavy pumps will be within dam area. Other activities such as labour camp and debris disposal will be beyond dam area. Transportation of material, debris 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.

  Proposed non-structural interventions include Emergency Action Plan, Early Warning System and Flood Forecasting System, etc. During implementation, project will reach out to downstream

population including the disadvantaged and vulnerable persons and groups. During implementation of EAP, 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 anddont's during such scenarios.

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 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 most of the activities proposed as Low risk, except for following which have been assessed as having Moderate Risk/impact.

.

- Treatment on u/s face for reducing leakages up to RL 100 m
- Construction & Improvement of approach road to Kangshabati Dam
- Setting up of Labour Camp
- Disposal of Large amount of debris

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.

- **Step III Screening (using Form SF-3):**

This is one of the important screening template which brings out the risks identified in the SF-2. These risks are distributed in to environmental and social risks to complete a matrix to bring out a complete scenario of risks and their classification in a matrix format. Any of the activity comes an H or S will make the sub project a high risk sub project and will undergo a detailed ESIA. Low to moderate will prepare Standard ESMP.

Based on consideration of all the above, summary of Risk/Impact in SF-3 for major sub-project activities is given at Table 16 below. Environment and Social Due Diligence (ESDD) Report

for Kangsabati-Kumari Dam

Table 16: Summary of Identified Risks / Impacts in Form SF3

Project Activity	Environment Risks							Social Risks			
	Air, water, noise, land use, Soil, Resource use	Pollution downstream and upstream	General Ecology	Protected Area (WildLife 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	M	M	L	L	L	L	M	M	L	L
Hydro Mechanical	L	L	L	L	L	L	L	L	L	L	L
Instrumental SCADA, surveillance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Painting	L	M	L	L	L	L	L	L	L	L	L
Road work	M	L	L	L	L	L	L	L	M	L	L
Safety measures (Siren, Lighting)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Major Civil Work like Additional Spill Way	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Major Hydraulic Structure (tunnelling)	M	M	L	L	L	L	L	L	L	L	L
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.

E.2. Stakeholders Consultation

In the present situation of the COVID 19 pandemic, Government of India has announced country wide lockdown between March 23 till May 31, 2020 and thereafter restriction on large public gathering which constrained holding of consultation meetings. However, 32 persons, outside the dam authority were contacted ensuring social distancing and their views recorded while preparing ESDD. Two sets of questionnaires were prepared, one for each category of stakeholders – direct workers and community stakeholders.

The purpose of Stakeholder consultation as part of environmental and social due diligence, is as follows:

- Provide initial information to the workers and communities on the proposed project interventions and particularly the non-structural interventions, if any;
- Help identify potential stakeholders who are involved at this stage and will be involved a later stage.
- Assess their responses in understanding the potential risks and prepare mitigation plan to address their concerns
- Identify mechanisms that would be deployed to engage with different stakeholders and particularly communities living downstream

Stakeholder consultation meetings were conducted at thedam site on 15th October, 2020. It was attended by SDO, Engineer and office personnel working at dam, worker from nearby villages; Boatman's Cooperative member from the villages. Stakeholder Consultation Questionnaires are attached in **Annexure III**. List of stakeholders who participated in consultation is enclosed as **Annexure IV**. Following is the outcome of the stakeholder consultation exercise.

E.2.a.Interaction with Dam Officials

- **Implementation arrangement:** At present Executive Engineer, Kangsabati Canal Division No. II deals with thecommunities regarding E & S issues. At SPMU level, SDO, Kangsabati Dam LB Sub-II is in charge of dealing E & S issues.
- **Legal issues relating to displacement or resettlement i.e. pending from the time of dam construction:** No such issue is pending. There is no encroachment at dam premises.

- **Proposed rehabilitation works Location of proposed works:** All rehabilitation work will be limited to the Dam body or Dam compound only. The local peoples will be happy if they do the rehabilitation work.

- **Tree felling:** As per primary design of approach road 15 to 18 number of trees are present within the road alignment which needs permission for cutting from forest department. Some shrubs and herbs are present within approach road alignment as well as downstream of toe drain which needs to be cleaned during development of approach road and toe drain

- **Archeological structure:** One Parashnath Temple situated 5km away from the Dam which is under ASI list..

- **Distance from the dam to the nearest Habitat:** The nearest habitat Damdi Village is located 100 Meters from downstream canal.

- **Eco sensitive zone:** Banpukuria Deer Park situated on the upstream riverside, at a distance of 4km from Dam. But it is not notified eco sensitive zone as per MoEF

- **Existing Mechanism to contact dam officials by community:** Kangsabati left Bank Sub-Division-II office is located nereby the Kangsabati dam. Officers & staffs are allotted duty by 24 Hour basis during flood seasons alternatively. Generally, Local people contact them directly or over telephone during any emergency. Work assitants & Khalasis roam in the nerby villages during flood season. Villagers may also contact them for any emergency. Local people also informs local government and police. For other issue community people give mass petition or letter to the Dam Officials.

- **Information dissemination - Mechanisms to communicate with downstream communities on unregulated releases of water during high flood time:** Dam authority informs through siren in time of water release and also informs Local Police and Local authority (BDO, Panchayat) through whatsapp, letter, email etc.

- **Mechanism to ensure downstream community fully aware of the mechanism:** Dam Authority depends upon Police and Local authority (BDO, Panchayat). Sometimes Local Police arrange Police picketing to restrict local people's movement in the danger zone.

- **Gender:** There is no women employee at the dam site and nearby rest house.

- **Grievance mechanism**: No Grievance Redress Mechanism (GRM) exists. Complaints can be filed to the Executive Engineer at Dam office.

- **Areas within the dam restricted access:** As it is a tourist spot local people are allowed in some parts of the Dam.

- **Tribal area:** Tribal population exists in the area. Sabar Tribes lives in adjacent Damdi, Palashbani, Jumbeda, Loadihi, Kumar Bahal and Pareshnath villages.

- **Tourism potential**: It is a major tourist attraction. More than 20 Lakhs tourists visit every year in the area. Mukutmanipur Development Authority (It is a local authority) collects revenue, but the Dam Authority does not have any share in it., also they do not have any revenue generation mechanism from the tourist. Boating facility is a great attraction and there exists a Boatman association.

- **Engagement of local labour:** Local people are engaged via Labour Contractor or staff.

E.2.b. Information dissemination/ awareness programme on social and environment: No such programmes are organized.Interaction with Communities

- **Schedule V area or tribal area:** It is not a Schedule V area. Damdi, Palashbani, Jumbeda, Loadihi, KumarBahal and Pareshnath villages located within 5 km radius of the project site is dominated by Sabar tribe.

- **Immediate downstream vicinity area and livelihood of people:** 4 such villages are situated. However, insignificant number of people's livelihood from these villages depends on dam directly. Few people worked under labour contractor or Master roll staff and some people engaged with fishing and boat. At present Boatman Association is present and this boating facility is one of the attraction of this place.

- **Fishing occupation practiced in the area:** Earlier there was a Fisherman Cooperative but due to lack ofproper support it was closed 10 years back. The fisher man community lives in nearby Akadua Gram andNodipara Gram

- **Lands taken for the original dam construction and legacy issues**: There are no pending resettlementissues.

- R & R affected person currently working with dam: **No**

- **Affected or impacts due to dam operations:** Operations do not block farmlands.

- **Women affected by the dam operations:** There isn't any differentiated impact on women in the area.

- Any dam related accident**: No**

- **Foul smell from dam:** Foul smell comes from the barrage area due to decomposition of vegetation at reservoir which disappears during summer and winter. However, they have not communicated withDam Authority for that.

- **Communication with Dam authority and attitude of Dam authority:** No such communication takes place till now. If required local community can contact over phone or send letter/public petition. During monsoon Dam authority comes to village to communicate and they keep watch of the situation. They help villagers in emergency time.

- **Aware of any early flood warning system:** The administration, arranges for vehicles with loudspeakers to move around in the downstream villages to convey information on release of water. Community members identify this as an early warning system. In addition, Pradhan and Police are informed by dam authorities, who, in turn, warn the villagers.

E.3. Descriptive Summary of Risks And Impacts From Activities Based On Screening

E.3.a.Environmental Impacts and Risks

1. 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.

2. Execution of civil and hydro-mechanical work within dam body will generate localized impacts on physical environment and resource use.

3. Civil work interfaced with water body such as work on upstream face of dam shall pose risk of water pollution and impact on fish fauna. Ingredients for the preparation of mortars and grouting suspensions include cement, clay and fillers, bentonite, asphalt, additives for stability and water. Some ingredients and chemicals used in the preparation of mortars and grouting suspensions may be toxic and irritants. Their use may have negative impacts on both humans and the environment.

4. One Deer park which is not notified as eco sensitive area by MoEF is situated 4kmfrom upstream water body at the dam site. Drinkable water for the deer and cattle will not get contaminated by construction work.

5. No Objection Certificate for Tree felling within approach road is required from forest department. Compensatory plantation will be applicable as 1:5 ratio

6. Construction and demolition waste and muck require careful disposal at pre-identified and approved siteto minimise the risk of pollution on this count.

7. An Archeological structure is present 5 km away from dam site. There will be no impact on archeologicalstructure due to construction work of dam.

8. No impact on general ecology is envisaged.

9. 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

E.3.b.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. There are Scheduled Tribes households in the vicinity, which are mainstreamed into the overall society and do not meet the characteristics outlined in ESS 7. Further, there will be no physical interventions outside the dam.

3. Number of migrant labour will be low (max 10%) as these works require only few but very skilled labour. 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 orresult in any impact.

6. Labour related risks 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/workforcein 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 V

F. CONCLUSIONS AND RECOMMENDATIONS

F.1. Conclusions

F.1.a. Risk Classification

As per the ESDD exercise, risk/impacts that have been identified relate to Water Quality, Fisheries, Physical Environment, Occupational Health, Labour and SEAH/GBV. The summarized environmental and social risks such as, of labour and OHS to labour/community of identified activities with level of risk is presented in preceding chapter. Environment risks of air, water, noise, and resource use as well as social risks of labour, civil work within the dam body and road work are Moderate Hence the overall risk of this sub-project Dam is categorized as Moderate

F.1.b. 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/improvementwork.ESS standards are found relevant to this sub-project as per reasons given in Table 17below:

Table 17: WB ESF Standards applicable to the sub-project

Relevant ESS	Reasons for Applicability of the standard
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	During construction work of dam safety, baseline pollution level may be increase; Due to construction activity labour, Staff and others persons safety.
ESS2: Labour and Working Conditions	Due to engagement of Direct workers, Contracted workers and Community workers (likely for EAP and other non-structural interventions)
ESS3: Resource Efficiency, Pollution Prevention and Management	Civil and mechanical 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
ESS 6 : Biodiversity Conservation	Deer park located 4km away from river bank and if water contaminated due to construction activity there could be a impact on cattle of that particular park as well as the fish habitat.
ESS 10:Stakeholder Engagement Plan	For engagement of stakeholders in all structural and non- structural interventions

F.2. Recommendations

F.2.a. Mitigation and Management Of Risks And Impacts

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

1) SPMU shall customize 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.

2) It is recommended that ESMP provides 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. Similarly, any impacts identified on fisheries have to be conserved. 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). Hence SPMU shall develop following plans in line with outline provided in the ESMF and ensure its adherence by contractor:

- Resource Conservation Plan (RCP)
- 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)
- Emergency Action Plan (EAP)

3) Contractor shall submit BOQ as per ESMP of the subproject 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 18** below:

Table 18: 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/Implementation agency	Before mobilization of contractor
ESS2: Labour and Working Conditions	• Labour Management Procedure (LMP) including OHS management plan • GBV/SEAH	SPMU /Implementation agency	Before mobilization of contractor. GBV/SEAH by appraisal

WB-ESS Triggered	Mitigation Instrument	Responsibility	Timelines
ESS3: Resource Efficiency, Pollution Prevention and Management	• Pollution Prevention and Environment Quality Management Plan(PPEQMP) • ESMP • Muck Management Plan • Resource	SPMU/ Implementation agency	Before mobilization of contractor
ESS 4: Community Health and Safety	• Community Health and Safety Management Plan (CHSMP) EAP	SPMU/ Implementation agency	Before mobilization of contractor
ESS 6: Biodiversity Conservation	• **Proper measure needs to be taken to stop spillage enters into the water.** • **Lubricants materials, fuel should be stored away from the water body.**	SPMU/ Implementation agency	**During working period**
ESS 10: Stakeholder Engagement Plan	• **SEP in accordance with project SEF**	**SPMU/ Implementation agency**	**By negotiation (and to be updated once the EAP preparation is to commence**

ESDD, ESMP and other related plans will be placed on the website–**www.dasafety.inof** the department 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. The executive summary of these documents would be disclosed/disseminated through other appropriate means like project meetings, workshops etc. Each implementation agency 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.

F.2.b. Institutional Management, Monitoring and Reporting

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

SPMU will designate Nodal Officer full time in-house engineering staff with E&S expertise to coordinate and supervise E&S activities. He 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 officersis included in ESMF. The SPMU, in case in-house expertise not available, will hire the qualified staff 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 shall advise contractors about applicable legislative requirements and ensure that contractors prepare its own ESMP as outlined in ESMP for this sub-project and submit compliance reports to SPMU on quarterly basis. SPMUs will share regular implementation status of ESMPs to The World Bank in line with ESMF on quarterly basis.

SPMU 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.

SPMU 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. D/PMC 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 risk category. These risks and impacts can be effectively mitigated with effective implementation of mitigation plans by SPMU, Contractors and monitoringby D/PMC and SPMU.

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 resetting of Rip-Rap, repair of training walls, treatment of Honeycombed etc.)	A	DI	WQ, PE , L
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.)	A	DI	WQ, E, L
6	Re-sectioning earth dams to safe, stable cross sections	NA		
7	Hydro-mechanical activities with interface with dam reservoir	A	DI	L
8	Hydro-mechanical activities Downstream of Dam site (with no interfacing with dam reservoir)	A	DI	L
9	Instrumentation, General lighting and SCADA systems	NA	DI	
10	Basic Facilities (like access road improvement, renovation of office, etc)	A	DI	PE, L, E
11	Utility installation like standby generator, or setting up solar power systems	NA	DI	
12	Painting of dam u/s or d/s or both faces	NA		
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	NA		
i	Addition of Geo-membrane / Concrete cladding			

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)
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**		
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			
6	Blasting	**NA**		
7	Setting up Labour Camps (location within dam premises or outside)	**A**		**PE, WQ**
8	Heavy machinery deployment and setting up maintenance workshop	**A**		**PE**
9	Setting up Hot mix plant	**NA**		
10	Deployment of Concrete mixture and heavy pumps	**A**		**PE**
11	Temporary land acquisition	**NA**		
12	Need of Tree felling/ vegetation clearance	**A**		**PE, E**
13	Disposal of large amount of Debris	**NA**		
14	Transport of large construction material	**A**		**L, PE**
15	Utility shifting	**NA**		
16	Discharge of reservoir water (lowering of reservoir water involved)	**NA**		
	List any other not listed above			

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 (Pl give brief text summary)	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/Repairwork -upstream of Dam site**			
a	Treatment on u/s face for reducing leakages	**WQ, PE, L**	Airpollution,noise pollution, , risk of reservoir water contamination,generation ofconstructiondebris,labour	**M**
b	Drilling and Grouting work of Kangshabati Dam	**WQ, PE, L, F**	Air pollution, noisepollution, , risk of reservoir water contamination and impacton fishes,generation ofconstructiondebris, labour	**M**
c	Upstream cement grouting of Dam bodyfor reducing leakages	**WQ, PE, L, G**	Air pollution, noisepollution, , risk of reservoir water contamination and impacton fishes, generation of construction debris, 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	Downstream cement grouting of Dam body for reducing leakages	**WQ, PE, L, G**	Air pollution, noisepollution, , risk of river water contamination and impacton fishes, generation of construction debris, labour and GBV risk	**M**
b	Strengthening of the dam buttress	**WQ, PE, L, G**	Air pollution, noise pollution, risk of spillage of wastewater to river, construction debris, muck, Labour &GBV risk	**L**
c	Construction & Improvement of approach road to Kangshabati Dam	**PE, L, G**	Airpollution,noise pollution,construction	**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 (Pl give brief text summary)	Risk/Impact intensity for each type of risk/impact Low (L), Moderate (M), Substantial (S), High (H)
			debris	
3.	**Hydro-mechanical activities Downstream of Dam site (with no interfacing with dam reservoir)**			
a	Repairs/ replacement of gates & hoists	**PE, L, G**	Water pollution, impact on fish, Noise pollution, waste generation from removed parts, Labour & GBV risk	**M**
b	Electrical works	**PE, L, G**	Waste generation from removed parts and packing material, Labour & GBV risk	**L**
B.	**Pre-construction and construction stage major auxiliary or preparatoryintervention**			
1	Setting up Labour Camps (location withindam premises or outside)	**WQ, PE, G**	Wastewater generation from domestic activities, waste generation, GBV risk within labour andinvolving community.	**M**
2	Heavy machinery deployment and setting up maintenance workshop	**PE, L, G**	Heavy machinery will be deployed for repair and maintenance of gates and hoists and for other activities waste, wastewater and air emissions from machines operations,azardous waste generation from oilwaste, Labour & GBV risk	**L**
3	Deployment of concrete mixture and heavy pumps	**PE, L, G**	Concrete mixture and pumps wil deployed for road repair and o civil works and de- watering w generation, wastewater and emissions from operations,hazar waste generation from oil w Labour & GBV risk	**L**
5	Transport of large construction material	**PE, L**	Materialwillbe transported from various vendors and suppliers to site for civil, hydro-mechanical work 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 (Pl give brief text summary)	Risk/Impact intensity for each type of risk/impact Low (L), Moderate (M), Substantial (S), High (H)
			instrumentation -,air and noise emissions from transportation, Labour and GBV risk	

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:Stakeholders Consultation Questionnaire

A. Interaction with Dam Engineers/Staff

Sl. No.	Questions
1.	Who is responsible for taking care for E&S related activities at dam site and at SPMU level?
2.	Have any land related litigation like unauthorized encroachers or squatters living within dam premise? If yes, are these not a threat for the dame 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 or dam authorities.
3.	For dealing of Environment and Social issue, have any institutional arrangement like in house team of expert / hired agency or individual experts?

Sl. No.	Questions
4.	(a) 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 exists during the implementation of rehabilitation measures; including stakeholder'sconsultation meeting planned for dissemination of emergency action plans which is a non-structural measure. Is there any unsettled issues (legacy) related to displacement or resettlement, pending since time of dam construction? If yes, please give brief detail.
5.	Is there any tree felling issue within the downstream vicinity, if yes, provide number of trees, species and girth of the tree.
6.	Is there any archaeological structure within 1km radius.
7.	Distance from Dam to the nearest Habitat
8.	Is there any Eco sensitive zone like National Park, Sanctuary, Bio reserve, Elephant Corridor, et. within 10 km radius
9.	In emergency situation how to contact dam officials by community? Is there any existing mechanism known to communities to contact dam officials (throughtelephone/ mobile/e-mail/official website?)
10.	What is the existing mechanism to communicate with downstream communities/public on unregulated releases of water during high
	flood time siren/written communication to district authority / telephone / mobile / text messages or any other mode of communication?
11.	How do you ensure that downstream Community is fully aware of the above existing mechanism?
12.	Are there women employees at the dam site?
13.	What is the present Grievance Redress Mechanism (GRM) within the department to address any kind of grievance / complaints by general public? And how to be maintained.
14.	Details of any grievance received lately related to this new Scheme?
15.	Is dam premises a restricted area or has openaccess to general public?
16.	What is the community profile of surrounding of dam area. If any tribal's living in the surrounding area of dam complex? Which tribes are these? Please give brief detail.

Sl. No.	Questions
17.	Have any tourism or water recreation activity associate with this dam. if yes, how many approximate tourist visits annually, annua revenue generated, whether any portion of this generated, revenue is diverted to regular O&M of this dam.
18.	Do you engage any local labourers for routine dam maintenance work? If yes, what is theprocess of engaging these locals for work at dam, whether through Government approved contractor or hired individually?
19.	Have you conducted any social, environmental awareness program in every year

B. Interaction with Local Community

Sl.no	Questions	Response provided / Observations
1.	How many villages are in immediate downstream vicinity?	Observations covered in E2b
2.	Are they dependent on dam in any way for their livelihood?	
3.	Anybody affected by the dam operation? If so, in what manner? Do any one has farmlands at downstream.	
4.	Are you aware of fishing Seasons; Are the barrage authority earning revenue; any access to general public for fishing, any suggestion etc.	
5.	Is there any fishing community living immediately downstream of dam whose livelihood are directly linked with the fishing activities of this dam? How many villagers' livelihood is fishing?	
6.	Does any village displaced and rehabilitated during the construction of Kangsaboti dam. If so, in what manner. Were their lands taken, If so, how long back. Is there any pending compensation issues?	
7.	Any R&R affected person known to you who is currently working with dam authorities? If so, in what capacity (employee/ direct worker/ contractor	
8.	Are you aware of local women affected in any way by dam operation?	
9.	Have you any experience about dam related incident happened in the past wherein some loss of life encountered? If yes, brief summary may be given Have people suffered? If yes, what is the nature of damage?	
10.	Do you get any bad smell from dam sometime; If yes, then do you	

Sl.no	Questions	Response provided / Observations
	contact dam authority for that.	
11.	In the past, on any occasion, did you contact Dam authorities for any specific reasons affecting public in general, such as water release etc.? If so, how did you contact, how many time and to whom you contacted. What was it about. How was the response of dam authority? Who contacted you. How long did it take to resolve	
12.	If required how do you contact the dam authorities; through telephone/mobile/e-mail/personally?	
13.	How the dam authority officers behave when you interact with them	
14.	Have you benefited by the action of Dam Authority, if yes please Explain	
15.	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 thisbarrage?	
16.	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 ofwater?	
17.	Give your view about Kangsaboti dam, how this Dam is helping the country, state, district or local communities in meeting its objectives,any specific concern can also be given?	
18.	Any Suggestion to improve overall system by dam authorities inany way, please give inbrief?	

Annexure IV: Stakeholder's consultation: List of Participants

Sl. No.	Name	Relation with Dam / Designation
1	Gourav Bhowmik	SDO, Kangsabati Dam LB Sub-II
2	Biplab Banerjee	Junior Engineer, Kangsabati Dam LB Sub-II
3	Mr. Sujit	Clerk, Kangsabati Dam LB Sub-II
4	Tarapada Shaw	Watchman
5	Sabir Ahamad	Boatman Cooperative Member
6	Bablu Bagdi	Boatman
7	Susanta Mahata	Agricultural Labour
8	Rajib Mahata	Welder
9	Ganesh Karmakar	Motorbike Mechanic
10	Anup Sing Sardar	Carpenter
11	Sajalkrishna Roy	Labour
12	Lakshikanta Mahanta	Petty Business
13	Sandip Gope	Labour
14	Binay Narayandev	Motorbike Mechanic
15	Bidyut Dhabaldev	Petty Business
16	Dhananjoy Bagdi	Mason
17	Sekhar Bagdi	Mason
18	Tapan Bagdi	Labour
19	Anup Bagdi	Labour
20	Jatali Bagdi	Labour
21	Aranya Bagdi	Service
22	Santimoy Bagdi	Driver
23	Krishnapada Bagdi	Agricultural Labour
24	Swapan Hembrem	Labour
25	Sundar Tudu	Agricultural Labour
26	Prasanta Tudu	Petty Business
27	Ganesh Tudu	Labour
28	Joydev Hembrem	Labour
29	Nikhil Bagdi	Petty Business
30	Joydev Bagdi	Petty Business
31	Naran Bagdi	Labour
32	Prakash bagdi	Service

AnnexureV Photographs of infrastructure proposed for rehabilitation works

Left Bank Head Regulator Structure

Right Bank Head Regulator
Detailed renovation of RBHR structure are proposed

Condition of Downstream toe & inspection road