



West Africa Power Pool (WAPP)

**Terms of Reference for the
Recruitment of the Biodiversity specialist for the Environmental and Social Panel of
Experts**

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List of Abbreviations and Acronyms

CLSG	Côte d’Ivoire-Liberia-Sierra Leone-Ghana (Interconnection Project)
DS	Dam Safety
ECOWAS	Economic Community of West African States
EHS	Environmental Health and Safety Guidelines
ESIA	Environmental and Social Impact Assessment
ESF	Environmental and Social Framework
GRM	Grievance Redress Mechanism
GBV	Gender Based Violence
GM	Grievance Mechanism
IDA	International Development Agency
LESSAP	Liberia Electricity Sector Strengthening and Access Project
LRP	Livelihood Restoration Plan
OPs	Operation Procedures
PAPs	Project Affected Populations
PCN	Project Concept Note
PIPES	Department of Planning Investments Programming, and Environmental Safeguard (PIPES)
PIU	Project Implementation Unit
PoE	Panel of Experts
RAP	Resettlement Action Plan
RCC	Roller Compacted Concrete
SEP	Stakeholders Engagement Plan
SH	Sexual Harassment
TORs	Terms of Reference
VAC	Violence Against Children
WAPP (SG)	West African Power Pool (Secretariat General)
WBG	World Bank Group

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1. Presentation of the Organization and its Objectives

1.1 Organization in Brief

The West African Power Pool (WAPP) – “the Organization” - was established by the highest decision-making body of ECOWAS, the Authority of Heads of State and Government of Member States, as a mechanism and institutional framework for integrating the national power systems of ECOWAS member countries and help meet the energy needs of the ECOWAS citizenry by providing least cost, reliable and sustainable electricity supply for economic development.

1.2 Objectives

The Implementation Strategy of WAPP is based on realizing complementary and mutually reinforcing infrastructure sub-programs that encompass various regional generation and transmission projects, which when implemented, would result in a fully integrated grid in West Africa. The WAPP Infrastructure Program is derived from the ECOWAS Master Plan for the Generation and Transmission of Electrical Energy, which was developed in 1999, and revised in 2005 and 2011. The new version was approved for implementation by the Authority of the ECOWAS Heads of State and Government in 2019.

The outcomes of the 2011 Master Plan involve the development of, among others, about 16,000 km of transmission lines, 7,092 MW of Hydropower, and 800 MW of Renewable Energy projects for the period 2012 to 2025. The implementation of these projects shall not only result in a complete integration of all the national power systems of ECOWAS Member States thereby promoting trade, but shall also significantly augment the quantity, quality and access to low-cost clean energy resources, which in turn shall support poverty reduction and improve the economic well-being of the ECOWAS citizenry.

It is therefore evident that the successful attainment of a fully functional power pool in West Africa that would permit the trading of electricity and the efficient delivery of power from energy-rich countries to energy-deficient countries is contingent on the timely preparation and realization of the key projects that would interconnect the national utilities of the Member States of ECOWAS. As such, the WAPP Secretariat has placed great emphasis on proficient project development, management and delivery with particular prominence on the timely preparation and implementation of projects.

2. WB Technical Assistance

In support to the WAPP Secretariat’s program to establish an interconnected and coordinated network for fourteen countries in West Africa, the World Bank, under the Component 2 of the Côte d’Ivoire–Liberia–Sierra Leone–Guinea (CLSG) Interconnection Project, provided an IDA grant in May 2012 (Parent project) in order to mobilize Technical Assistance aiming at (i) enhanced WAPP integration, (ii) synchronization of WAPP transmission networks and (iii) capacity building of the WAPP. The World Bank also

provided in December 2017 an additional IDA grant to the Parent Project to scale up the impact of the WAPP Integration and Technical Assistance Project and among others, finance preparatory studies for possible hydropower development in Liberia to produce cost-effective electricity that could be exported using the CLSG transmission line and to provide technical assistance to the CLSG countries as needed to support efficient energy trade through the CLSG interconnection. To enable pre-investment studies to continue after the ITAP project closure, the World Bank has granted technical assistance to WAPP under the Regional Emergency Solar Power Intervention (RESPITE) Project.

Indeed, RESPITE is part of the World Bank Group's (WBG) responses to the energy crisis faced by the region. RESPITE supports the clean energy transition to reduce the fiscal impact of rising oil prices in the region. Thus through Sub-Component 4A: Regional Integration and Technical Assistance (RITA), WB is continuing support for activities that commenced under Component 2 of the WAPP APL4 (Phase 1) – Côte D'Ivoire, Sierra Leone, Liberia, and Guinea Power System Re-Development Project (WAPP-CLSG Project, P113266) when financing under that project closes, namely: (i) finalization and operationalization of the legal, regulatory and technical frameworks to enable efficient regional trade between WAPP countries including for the CLSG Interconnection and the North Core Interconnection; (ii) technical integration of the WAPP network by improving the synchronous operation and reliability of interconnectors; (iii) preparation of priority regional projects as per the WAPP Master Plan 2018 including preparatory studies for the solar PV project on Mt Coffee Island and the MCHPP extension, the Saint Paul 2 hydro power project, the WAPP Ghana-Burkina-Mali interconnection and the WAPP Median interconnection; and (iv) strengthening of the institutional and technical capacity of the WAPP Secretariat to undertake its regional mandate.

At this point, hydropower projects funded by the World Bank under the WAPP Regional Integration and Technical Assistance (RITA) are essentially focused on activities in Liberia to support pre-investment studies for the optimization of the existing hydro generation at Mount Coffee on the St. Paul River, including the possible development of upstream storage capacity (Via reservoir) and additional hydropower capacity.

Associated studies/reports prepared by Consultants which are envisaged to be submitted for review by the PoEs are listed below (see Appendix 1 for a general overview of the project):

Future hydropower development on the St. Paul River in Liberia

- Optimization Study;
- Feasibility Study of the priority project (FS);
- Environmental and Social Impact Assessment (ESIA) of the priority project (such as the SP2 hydropower plant, the extension of the Mt Coffee hydropower plant, and up to 90 MWp of solar power plants, including an estimate of the number of potential PAPs (Project Affected Populations);
- Resettlement Action Plans (RAPs), Local Development Plans, and Livelihood Restoration Plans.

Any other hydropower projects in West Africa under this grant may be added to the list at a later date, with the mobilization of the Experts by the WAPP subject to WB's approval.

3. WB Environmental and Social Framework (ESF)

The World Bank Environmental and Social Framework sets out the World Bank's commitment to sustainable development, through the Bank Policy and a set of Environmental and Social Standards that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity.

This Framework comprises:

- A Vision for Sustainable Development, which sets out the Bank's aspirations regarding environmental and social sustainability.
- The World Bank Environmental and Social Policy for Investment Project Financing, which sets out the mandatory requirements that apply to the Bank funded projects; and
- The Environmental and Social Standards, together with their Annexes, set out the mandatory requirements that apply to the Borrower and their Bank funded projects.

The Environmental and Social Standards set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts associated with projects supported by the Bank through Investment Project Financing. The Bank believes that the application of these standards, by focusing on the identification and management of environmental and social risks, will support Borrowers in their goal to reduce poverty and increase prosperity in a sustainable manner for the benefit of the environment and their citizens. The standards will: (a) support Borrowers in achieving good international practice relating to environmental and social sustainability; (b) assist Borrowers in fulfilling their national and international environmental and social obligations; (c) enhance nondiscrimination, transparency, participation, accountability and governance; and (d) enhance the sustainable development outcomes of projects through ongoing stakeholder engagement.

The ten Environmental and Social Standards establish the standards that the Borrower and the project will meet through the project life cycle, as follows:

- Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
- Environmental and Social Standard 2: Labor and Working Conditions;
- Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention and Management;
- Environmental and Social Standard 4: Community Health and Safety;
- Environmental and Social Standard 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement;
- Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- Environmental and Social Standard 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities;
- Environmental and Social Standard 8: Cultural Heritage;

- Environmental and Social Standard 9: Financial Intermediaries; and
- Environmental and Social Standard 10: Stakeholder Engagement and Information Disclosure.

The Project Consultants who are undertaking the studies need to comply with all WB ESSs in conducting their studies (ESIA/ESMP, RAP, Livelihood Restoration Plans for PAPs etc.). Also, the International Financing Institutions and Donors refer to WB Environmental and Social framework and standards and/or to its principles.

For projects listed in the TOR Appendix 1 and in the Project Concept Note (PCN) on Oct 1, 2018 or later, the World Bank's Environmental and Social Framework (ESF) replaces the OPs.

4. Panel of Experts (POE)

The Organization will establish two Panels of Experts (PoEs), namely, i) the Dam Safety Panel (D&S PoE) and ii) the Environmental and Social Panel (E&S PoE) to independently and comprehensively review all aspects of the project already identified (and other hydropower projects to be facilitated or supported by WAPP and by the WB under this grant), including the TORs for the proposed studies, and ensure that the quality of pre-investment studies promotes sustainable development of available hydropower resources.

The Panels of Experts are members of two separate and independent international panel of experts for the project, where one member for each would be appointed by the project to coordinate the communications, to call and chair its Panel meetings, to ensure the membership's objectivity and to provide balance to its reviews and recommendations.

The primary objectives of the two Panels are respectively,

- for the D&S Panel:
 - To provide an independent and high-level engineering evaluation of Projects as it relates to dam safety;
- for the E&S Panel:
 - To provide an independent and high-level Environmental and social evaluation of Projects relevant to Environmental and Social issues.

Members of the PoEs will be requested to provide advisory services and make evaluations and recommendations with the overall purpose of achieving adequacy, efficiency, safety, and cost-effectiveness of the Project(s) as well as sustainability (including mitigation or compensation for negative environmental, social and health and safety impacts).

Skills transfer is strongly encouraged, and the project may appoint nationals to understudy the international experts. The E&S PoE members are required to cooperate with such individuals to ensure that effective skills transfer takes place. The PoEs should take into

consideration, the national and international technical standards (applied to the works stipulated in the TORs) and WB E&S standards, and the ESF Framework.

Whilst it is crucial to ensure coordination between them, the two Panels (the Dam Safety Panel and the Environmental & Social Panel) shall be established separately and independently. Related to the above activities/reporting by the Project Consultants, the Panels shall review and provide comprehensive opinions/recommendations on:

- (i) Dam Safety aspects; report on the soundness of the engineering studies, and design, including basic data, design memoranda and calculations, field investigations, models (hydraulic and structural), technical and economic selection of Projects and optimization of their components, and construction methods and procedures, as well as the operation and maintenance procedures. Including reviewing ESIA and other management plans (i.e. dam safety management plan, and Emergency Response Plan in case of dam failure).
- (ii) Environmental and Social aspects; on all relevant environmental and social documentation related to project preparation and implementation, which would include Project Brief Report, TORs, methodologies, and other reports for Environmental and Social Impact Assessments (ESIAs), Resettlement Action Plans (RAPs), Livelihood Restoration Plans for PAPs, Local Development Plans, Emergency Preparedness Plan (EPP), environmental flows to maintain downstream biota and use of stakeholders, water resources management options, biodiversity management and offset and impacts of Climate Change on water availability, dam height as related to the number of potential PAPs, etc. The E&S PoE should attest that the Consultant(s)' E&S reports comply with the international best practices, the World Bank Environmental and Social Framework and regional/national (project) legislation.

The Organization is planning to utilize the same Panels for several projects and for different phases of these projects. They will dedicate special care to the position of Dam Specialist as the requested profile may evolve over time. Indeed, apart from the very first tasks where broad skills may be required, requirements for a dam safety specialist's expertise / qualification could vary over time. For example, a seasoned RCC specialist is not expected to review the rockfill dam design. A flexible composition of the Panels may then be considered as well as mobilization of ad-hoc expertise. The constitution of Panels may change over the project cycle, but it is highly desirable to maintain a strong continuity.

The WAPP Secretariat General (SG) will hire the services of the Experts for each Panel. WAPP SG shall appoint a senior staff member of WAPP SG/PIPES as Project Coordinator. to support the activities of the Panels and to assist them and their members in all travel and logistics arrangements.

The WAPP SG will directly contract the members of the Panels on an individual basis.

Conflict of interests shall be avoided; Consultants maintaining a close working relationship with any Experts on the Panel will not be allowed to submit a Proposal to carry out part of or the activities for the projects.

The Chairperson of the E&S PoE will coordinate with other panelists to ensure its members focus and objectivity and to provide balance to its reviews and recommendations. The Chairperson should be a professional with proven experience in coordinating groups of multidisciplinary experts in relation to important dam projects. Specifically, s/he should have been involved in balancing the environmental and social aspects with engineering requirements of large water infrastructure projects. The Chairperson will also be responsible for preparing the minutes of the E&S PoE meetings and report in coordination with other experts. The person responsible for the official correspondence with the Chairperson will be the Project Coordinator.

4.1 Composition of the Panels

The Panels will consist, as necessary, of members with the following expertise and experience in hydropower projects:

Dam Safety Panel

- Dam Design and Construction Specialist;
- Senior Hydrological specialist;
- Engineer Geologist with geotechnical expertise;
- Electromechanical Specialist;
- Hydropower Specialist.

Environmental and Social Panel

- Social, Resettlement, and Livelihood Restoration Specialist;
- Senior Environmental Specialist;
- Health and Safety Specialist.
- Biodiversity Specialist

The permanent members of the PoEs shall appoint a Chairperson, who will coordinate the communications of the PoE, chair its meetings, ensure the membership's objectivity, and provide balance in its reviews and recommendations.

The Panels will, among others, assess the status and quality of work and formulate recommendations. The meetings will normally take place at projects' site and shall be attended by the relevant members of the Panel as identified by the authorized representatives of the WAPP SG. Physical or virtual meetings should be held when important decisions regarding key aspects of the Project must be made and, at minimum, on a regular basis expected to be twice a year. In addition, meetings will take place preferentially, for instance, at the time that draft reports become available for each Phase of the Consultants' work. The schedule of the meetings should be arranged well in advance,

taking into account the program of work on the Project. The duration of physical meetings is expected to take around one week including travel.

The Panels shall provide these services on a cost-efficient basis, respecting the nature of the high-level profile of the Panels and the structure of their remuneration, tailored to short time high-level advice.

4.2 Responsibility of the Panels and Tasks of Each Member

Some Tasks listed in the Scope of Work will be allocated to all members while others may be allocated primarily to specialist members. Irrespective of task allocations, under the Chairperson's coordination, the Panels' reports are a joint responsibility of the entire Panel.

4.3 Complementary Experts

As per the profiles of the Panels, the Experts will complement each other to cover, as much as possible, the range of topics related to their expertise. If that is not possible, complementary experts might be mobilized.

The Panels may request assistance on a temporary basis from other specialized experts in areas where, in the Panel's opinion, it is advisable to do so. When doing so, the Panels shall recommend qualified experts who could perform such evaluations on short notice. These experts can then be appointed by WAPP SG as Panel members for the required period of time in accordance with the Projects' requirements.

Each Expert will have to demonstrate international experience in at least 2 to 3 hydropower projects as key technical staff and/or expert in the fields relevant to the Position advertised.

All Experts will be requested to have the required competences and minimum qualifications and at least a relevant degree to Master Level (MSc.) Each must be fluent in English and have advanced written and reading skills in French. All experts should be proficient in Microsoft Office Suite (Word, Excel, Outlook etc.) Experts must demonstrate the capability to work effectively in a team and have strong oral and written communication skills.

5. Responsibilities of the PoEs

5.1 Phases

The PoEs will be responsible for independently and comprehensively reviewing all aspects of the project already identified (and other hydropower projects. These will be conducted over the following phases of the design works. They are classified here as follows:

- Pre-Feasibility Study (PFS) (and River Basin Preliminary/Reconnaissance Study);

- Feasibility Study (FS);
- Detailed Design (DD);
- Construction Supervision (CS) and Initial Commissioning;
- Operation & Maintenance (O&M).

The tasks in the TOR are divided into the above-mentioned phases. Depending on actual progress on different projects, all tasks and phases may not be triggered as part of the scope of work for the Panels as defined hereunder and in the Appendix. From one phase to another, the Panels should also review complementary data and modifications from previous stages.

The Scope of Work is defined in detail, but it cannot substitute the expertise of the members of the Panels, and during the course of their assignment, it may be modified as required. The Panels shall indeed, inter alia, review, comment, provide suggestions or recommendations as it deems prudent, or as requested by the Organization or its Consultant on any subject it considers vital to the safe and successful completion of the optimization, design, engineering, construction, and operation and maintenance of the Projects.

The Panels shall not execute any designs as such but shall identify areas where designs may not be appropriate or lack in any way and shall give general and specific recommendations for potential solutions and approaches for corrective measures, risk reduction, or value-add design (technically, socio-environmentally or commercially).

5.2 Comprehensive Options Assessment and Trade-offs

Elements of the project design may represent an optimum solution from an engineering and/or economic point of view while being suboptimal from an environmental and/or social point of view.

The PoEs shall review Consultants' work covering all engineering, economic, environmental, and social aspects with their pros and cons for options selection (dam type, height, positioning, dimensioning of all project's components, types, materials, technical indicators such as: installed power and flow, energy generation capacity, environmental flow, etc.). The PoEs shall clarify to the Client, the trade-offs between these aspects of the project elements/decisions and make recommendations.

6. Scope of Work per Phase of Environmental and Social Panel

6.1 Pre-Feasibility Study

6.1.1 Documentation

The review and evaluation of the preliminary TORs for the proposed Environmental and Social screening should be in compliance with (i) regional and national Environmental and Social requirements, (ii) the World Bank Environmental and Social Framework, and (iii) the World Bank General Environmental, Health and Safety Guidelines (EHSG) of April

2007, as well as the World Bank Power Electric Transmission and Distribution EHS, and other applicable EHSs. This includes a preliminary stakeholder assessment, a review of the Stakeholder Engagement Plan (SEP), preliminary inventory of potential socio-environmental impacts, and a preliminary review of land-related issues.

Also, review and evaluate available data, inventories and maps on the project areas environmental settings and baseline info from the government agencies, NGOs, locals, academia, etc.

As well as review/evaluate all relevant regional and national laws and policies related to the project activities as well as the required E&S permits and approvals.

6.1.2 Social Impacts

The review of the social impacts should consider the following elements at preliminary levels:

- Land acquisition requirements and the scale of displacement;
- Social impacts upstream and downstream of the dam as well as in the reservoir areas and flood prone areas;
- Social impacts within, in the vicinity, downstream and upstream of the project area;
- Impacts related to community health and safety, labor and working conditions and the protection of the labor force.

6.1.3 Environmental Impacts

The review of the Environmental Impacts should consider the following elements at the preliminary level:

- (direct and indirect and cumulative) environmental risks and impacts in the vicinity, downstream and upstream of the project area (including transmission routes, access roads, borrow areas, quarry sites, camp sites and other ancillary facilities, especially to identify key seasonal activities (nesting, migration, breeding, etc.) as well as protected and sensitive species and potential areas;
- ecological and biodiversity characteristics as well as their potential losses and changes of the project areas and related ancillary facilities;
- hydrology, watershed, and aquifer characteristic and their associated changes, including related environmental flows, which would describe water flow timing, quantity, and quality required for sustainable freshwater, and estuarine ecosystems;
- geology, soils and topography attributes including sedimentation features within in the project sites and associated ancillary facilities especially for reservoir sediments; change in actual and potential land use trends and patterns within the project sites; and
- Climate change vulnerability leading to changes in rainfall patterns, river flows, water availability, flood risks, increase in reservoir sedimentation, etc.

6.2 Feasibility Study

[Note: Ideally, the preparation of the ESIA should be carried out in parallel with the Feasibility Study and the Project Consultants as well as the two Panels should work closely together to achieve this.]

6.2.1 ESIA Documentation

The Environmental and Social PoE should review and evaluate the TOR and the Scoping Report for the proposed Environmental and Social Impact Assessment (ESIA) in compliance with the country ESIA requirements and the WB ESF, as well as the WBG General Environmental, Health and Safety Guidelines of April 2007 and the World Bank Electric Power Transmission and Distribution EHSG as well as other applicable EHSGs. This includes a stakeholder assessment, SEP, inventory of impacts, review of land-related issues, and social impacts.

6.2.2 Social Impacts

The review of the social impact should consider the following elements:

- The TORs for the proposed Resettlement Action Plan (RAP) in compliance with the country's land acquisition requirements and the World Bank ESS5
- Land acquisition requirements and the scale of displacement;
- Social impacts downstream of the dam and the need for an Artificial Flood to mitigate these social, as well as environmental impacts.
- Determination of the correct height of the dam and the size of the reservoir in relation to expected resettlement;
- Social impacts upstream of the reservoir area and downstream of the dam;
- Inclusion of a minimum of two public consultation meetings: (i) the first one on the ESIA TORs to verify that all concerns of affected people are included in the TORs and (ii) the second one concerning the Final Draft ESIA Report. Assess the adequacy of the Stakeholder Engagement Plan (SEP);
- Project-Affected People (PAP) and key stakeholders in the upstream, reservoir area, and downstream of the dam;
- Existing communication channels between government and local population and the communication strategy and mechanisms;
- Mapping and profiling of the general population in the immediate basin area;
- Census and socioeconomic survey;
- Impact of river flow regimes on communities, including environmental flows and artificial/regulated floods;
- Impact of population influx during and after construction;
- Labor management, including Worker's Camp Management Plan;
- Code of Conduct to be signed by workers prior to starting work, including the prohibition of child labor, forced labor, sexual harassment, and sex with minors (<18 years);
- Capacity of governmental and non-governmental services that are locally available with reference to disease control;
- Jobs losses and jobs creation, including indirect economic activities;

- Availability and cost of alternative land to be provided to PAP;
- Vulnerable population;
- Impact of any resettlement on neighboring and host villages;
- Integration of the infrastructural development of the area into the construction requirements for the Project;
- Minimization of short-term impact during construction to be addressed in future construction contracts;
- Functioning of the Grievance Mechanism (GM) for workers and communities, including SEA/SH sensitive intake channels ;
- Other social and cultural impacts, including issues related to cultural properties;
- Determination of the adequacy of the preliminary Early Warning System.
- The assessment of health impacts of the proposed infrastructure, such as the increase of water-borne diseases associated with the reservoir (i.e. malaria, schistosomiasis, etc.) as well as downstream water quality;
- The presence or absence of benefit sharing mechanism or increase access to electricity for communities directly impacted by the civil works and the operation of the infrastructure.

6.2.3 Environmental Impacts

The review of the Environmental Impacts should consider the following elements:

- (direct, indirect and cumulative) environmental impacts on the surroundings of the project sites and its ancillary facilities especially the reservoir areas, as well as the upstream and downstream of the dam;
- Effect on the hydrology, ecology, and water quality of the river/reservoir, as well as review the flood hydrology methodology and computations for determining the project design flood hydrographs, reservoir routing and spillway sizing, and safe yield and reservoir simulation;
- Ecological effects of the flooding and construction activities, including risks to natural and critical natural habitats and topographical impacts that would induce landslides or flooding;
- Impacts of the changed river flow regime, including impact due to river impounding upstream of the dam, and river with reduced flows downstream of the dam;
- Determination of the ecological flow between the dam and the tailrace discharge;
- Determination of the need for an Artificial Flood(s);
- Effect on aquatic fauna and flora (river and reservoir) and potential for maintaining them, as well as the impacts on terrestrial fauna and flora (protected and sensitive areas), including determination of biodiversity management plan;
- Likelihood of reservoir stratification and management of the stratification;
- Biomass removal in the area to be flooded and removal requirements before flooding;
- Impact on local drinking water supply systems;
- Sedimentation of the reservoir; to also include sediment assessment, sediment mitigation strategies, screening/assessing the physicochemical properties of the reservoir sediment/remediation plans if the sediment is found to be contaminated with pollutants/higher than national/international standards/limits and associated

costs etc. This will include review of sediment assessment and management plan and preliminary operation and maintenance plan;

- Land use (trends and changes) and soil types, including the potential for reservoir landslides and soil erosion;
- Impacts of remaining biomass on water quality;
- Possible loss of cultural properties (including archaeological and historical sites), including a site survey and provision for chance finds;
- The potential impact from short-term or long-term migration of labour and/or people to the project area or such induced activities as logging and development of shanty towns, prostitution and other social vices;
- Potential for increased incidence of waterborne and water related diseases;
- Impact on fisheries and other sources of local income;
- Analysis of relevance and potential need for fish ladders;
- Risks of invasion of aquatic species, such as water hyacinth and others;
- Determine the need for a Catchment Management Plan to manage sedimentation including for reservoir sediments.
- Dam construction activities particularly from material movement, which would impact air and water (surface and groundwater) quality, noise generation, vibration, construction waste (non-hazardous and hazardous) and effect on sensitive recipients. The review and evaluation of environmental aspect during dam construction should cover these elements and activities:

- i) Diversion of river before start of construction to allow the dam site to be dewatered using either diversion tunnels or cofferdams.
- ii) Preparation of the dam foundation by excavating, removing and disposing of unsuitable material, and by importing suitable material to create a stable base for the dam structure.
- iii) Concrete or rock-fill or earth-fill materials to build the dam structure, which would involve excavating, processing, transporting, stockpiling and placing of voluminous materials for creating required dam height and shape.
- iv) Construction of Spillways and Intake Structures to safely release excess water during high-flow periods, preventing dam overtopping and to direct and control water flow into the turbines for power generation.
- v) Construction of Powerhouse tunnel to divert waterflow to the turbines to generate electricity.
- vi) Gradual filling of the reservoir behind the dam by controlling the flow of water through the spillways and intake structures.
- vii) Testing and Commissioning of the generating systems and establishment of operational and safety protocols.

Review of the ESIA including the identification of the base-line situation, expected risks and impacts of the project, and the mitigation and monitoring plans developed for the Environmental and Social Management Plan (ESMP), LRP, GRM, Labor Management Plan, Emergency Preparedness Plan etc. including adequate institutional arrangements for the all Plans implementation during construction and operation, and the adequacy of the all Plans budget.

The E&S PoE will review and advise on the environmental aspects related to the Dam Operation & Maintenance Manual and related procedures; as well as review of the final project environmental audit report to be prepared by an independent Consultant.

6.2.4 Resettlement Action Plan (RAP)

Review the Resettlement Action Plan (RAP) that describes policies and procedures that will be applied during the entire life of the investment projects on matters of the acquisition of private land, economic or physical displacement of households, and impact on household incomes and overall livelihood as well as on community owned assets.

The E&S Panel will also review the minutes of consultation meetings to ensure sufficient information dissemination to the project affected people. The composition of the meetings (women, youth, vulnerable groups) will also be reviewed to ensure inclusive consultations have taken place.

Review the Grievance Mechanism (GM) for PAPs.

6.2.5 Livelihood Restoration Plans for PAPs.

Review the Livelihood Restoration Plans for PAPs that describe policies and procedures that will be applied during the entire life of the investment projects on matters of the restoration of livelihoods for PAPs eligible for this support.

The E&S Panel will also review the minutes of consultation meetings to ensure sufficient information dissemination to the project affected people. The composition of the meetings (women, youth, vulnerable groups) will also be reviewed to ensure inclusive consultations have taken place.

6.2.6 Health and Safety Issues

Review all aspects of the project related to the health and safety of workers and communities on and within the project sites and ancillary facilities especially during construction, as well as the safety measures related to water released from the dam during operation (Alert System including potential regulated warning water releases).

To do so, the E&S Panel will need to take ownership of all health and safety issues of the ESIA and confirm the relevance of the proposed measures, and their compliance within the applicable regulatory framework.

Similarly, the E&S Panel will analyze the relevance and compliance of the ESMP for the health and safety aspects, including the environmental monitoring and surveillance plans.

The Health and Safety Plan to be prepared and implemented by the contractors needs to be in compliance with OHSAS 18001:2007, NEBOSH, or similar standards.

The E&S Panel will analyze the relevance of the Health and Safety Plan which may include personnel training, emergency procedures and contingency plans including risks to the local community and the provision of procedures for warning, and emergency responses.

The E&S panel would also review and advise on the relevant environmental aspects related to the Emergency Preparedness Plan (EPP) for the project and its implementation.

6.3 Detailed Design

At the detailed design stage, the E&S panel will review the adequacies and effectiveness of mitigation measures adopted for project implementation and opportunities to enhance the project's development impact in an environmentally and socially acceptable and sustainable manner.

The E&S panel will also provide expert input into process and quality assurance with respect to programs and studies implemented under the general framework of the project.

The E&S Panel will review any additional information or modifications in the project's design that could affect any socio-environmental components of the project (as described hereabove at the Feasibility Stage). When needed, this will include a review of updates or addendums to the ESIA, ESMP, and the finalization of the RAP, and any other plans produced by the consultant in charge of E&S studies.

Moreover, the E&S PoE will review all requirements derived from all E&S activities and reports to be included in the Bidding Documents (and future contracts), including requirements from ESIA, ESMP, RAP, LRP, GM, Labor Management Plan, Emergency Preparedness Plan etc. as well as Health and Safety requirements and Gender Based Violence prevention requirements.

The E&S Panel will ensure that the design methodologies consider the incorporation of sustainability into the design; strategy for gathering baseline ESHS information; managing ESHS risks through design; obtaining environmental permits; etc.

The E&S panel will review and advise on relevant environmental aspects related to E-flow, inundation areas, the designs for dam construction spillway construction, dam height, discharge structures and intake structures construction. The E&S PoE will review the designs of diversion works, schedule, hydrology, and risk factors associated with diversion during construction and with the closure of diversion works at initial reservoir filling as well as project quality control procedures and construction supervision plan.

The ESHS risks and issues to be considered include those arising from the design and construction of the works which would be described in the ESIA/ESMPs

6.4 Construction Supervision

Prior to the start of construction, the E&S Panel will verify that the RAP for the Construction area have been fully implemented and all compensation and assistance has been provided as agreed to by the PAPs, and livelihood restoration programs have been initiated for eligible PAPs. The E&S Panel will also verify that the GM is functional (log of grievances with details on each case and its outcome, PAP's level of awareness of the GM). The E&S Panel will assess the management of proposed Gender Based Violence (GBV) SEA/SH/VAC violence against children, and labor risks (and monitoring measures

related to the Codes of Conduct) prevention measures. The E&S Panel will do the same verifications for the area of the reservoir six months before filling the reservoir and review the Reservoir Impoundment Plan for its adequacy on E&S measures.

Before starting construction, the contractor will provide for review: the Construction ESMP (C-ESMP) and H&S Plan for construction. The E&S PoE needs to review the plans for their adequacies and requirements according to the project approved E&S permits and deliverables and provide comments and check the Construction Phase to ascertain whether the Contractors' plans are implemented.

At the construction stage, the E&S Panel will (i) assess the soundness of the data processed at design stages versus information newly collected through construction activities and (ii) assess compliance of the implementation of construction activities and mitigation measures with E&S requirements defined in previous stages. On this basis, the E&S Panel will assess the adequacy of the choices and measures defined at design stages and potentially recommend updates of specific studies and of targeted mitigation/preventive measures. The E&S Panel will also review the availability, accessibility, and clearance of the relevant documentation, including reports prepared by the Owner's Engineer.

During construction phase, the E&S panel in coordination with the dam safety panel would provide oversight on dam construction and required activities such as development of borrow areas, rock quarries, processing of materials, possible development / rehabilitation of access roads with resultant impacts on environment and social issues and on health and safety. The closure / diversion of the river flow, the filling of the reservoirs with its impact on fisheries and river biota and downstream agriculture, biodiversity and local communities. The excavation, transport and placing of the materials would also impact air quality, noise and surface and ground water. It is mandatory for E&S PoE member covering dam engineering, geology, and foundation engineering to make at least one field inspection of the nearly completed foundation excavations before placement of concrete.

At construction phase, the E&S panel will review the Operation and Maintenance Plan (O&MP) and Emergency Preparedness Plan (EPP), including dam breach analysis, flooding simulation, initial reservoir filling, diversion closure method, maximum allowable filling rate, surveillance and instruments monitoring, emergency release plan, and designation of responsible operating personnel.

The E&S Panel will also verify that appropriate ESHS roles and responsibilities and key staffing requirements are in place.

It is expected that the TOR for construction supervision considers ESHS issues during any design development/ change and ensures that the contractor delivers its ESHS obligations under its contract.

6.5 Operation & Maintenance

At the O&M stage, the E&S Panel will assess (i) the adequacy of the E&S monitoring procedures, staffing, and capacity, (ii) the E&S monitoring reports and surveys (including

the dam safety monitoring and reporting), (iii) the adequacy of the livelihood restoration program and (iv) compliance of the E&S activities and mitigation measures with requirements defined in previous stages. On this basis the E&S Panel will assess the adequacy of the choices and measures defined in previous stages and potentially recommend updates of specific studies or of targeted mitigation measures. The E&S Panel will also review the availability, accessibility, and clearance of the relevant documentation.

The E&S panel will review the adequacy of the Operation and Maintenance Plan (O&MP) and Operation and Maintenance Manual and the establishment of project operations procedures.

6.5.1 Emergency Preparedness Plan

The E&S panel will review their relevant section regarding the adequacy and the degree of implementation of the applicable Emergency Preparedness Plan including notification of impending dangers to downstream municipal authorities, major flood early warning systems, major flood spilling operations plans, and site access during emergencies. Review potential needs for updates or complements. Live tests might be required for assessing downstream impacts of extreme events (full start and stop of the plants, emergency reservoir drawdown, flood warning releases...).

7. Terms of Reference for the Biodiversity specialist to be hired for the Environmental and Social Panel of Experts.

The Expert is required to have at least a Master's in natural resource management, ecology, or life science, or relevant background with more than 10 years of international experience and expertise in ecosystem management, biodiversity assessment, resource management, and nature-based livelihoods assessment especially for hydropower projects.

The general requirements for this position would be the same as those listed in section 4.3 above.

Specific qualifications required include:

- Working experience in Africa for 2-3 similar projects with proven knowledge of natural resources, biodiversity, ecosystem and protected areas conservation challenges/opportunities in West African countries
- Previous experience in hydropower projects is an asset.
- Sound understanding of hydrological processes to assess the effects of dam construction on aquatic ecosystems, including river flow patterns, sediment transport, and water quality.
- Experience in including gender dimension in biodiversity strategies/assessment is an asset.
- Proven ability to collect, verify and analyze information, and to finalize and present work with a high degree of accuracy and technical quality. This would include proficiency in biodiversity assessment methodologies, including field survey

- techniques, taxonomic identification and data analysis, familiarity with Geographic Information Systems software for spatial analysis and mapping of biodiversity data.
- Working knowledge of World ESF requirements and guidelines (especially ESS 6, 8, and 10) as well as national and international regulatory standards on diversity issues.
 - Excellent communication skills (oral and written) in English, especially for communicating complex and technical information, particularly in the context of stakeholder engagement processes.

8. Schedule, meetings and cost-efficiency

The schedule of the activities and work to be provided by the PoEs shall be coordinated by the WAPP Project Coordinator.

The Panels shall meet as frequently as deemed necessary by WAPP Project Director to assist in formulating scopes of works, at inception stages and at the issuance of key deliverables from various Consultants.

On a selective and time basis, the services of the individual members of the Panels will be used as necessary or desirable during intervals between meetings, with copies of their comments being sent to the other members of the Panels and the WAPP SG.

Except for emergency and ad-hoc desk expertise, work plan and mobilization will be agreed in principle on a rolling 6-month period between the WAPP Projects Coordinator and Chairmen of the Panels.

9. Reporting / Invoicing

The Panels of Experts shall document the results of each one of (i) their reviews (ii) meetings and (iii) the overall conclusions and recommendations following their visits and meetings at the Project sites. Reviews, minutes, and reports shall be prepared in English or French by the Panels, depending on the original language related to the Project. In general, the language of submitted reports will apply. Deliverables from overall review and/or site visits should be coordinated and signed by Chairmen who will collect and integrate each individual contribution in a single, all-in-one report.

Final versions of review and/or reports shall be signed by participating members of the Panels and presented to the WAPP Project Coordinator for distribution to WAPP SG and Consultants. The report should outline areas of concern, request for additional analysis, and present recommendations for action, if any.

The Panels of Experts shall not perform any remedial designs but should give general recommendations for potential solutions and approaches for corrective measures. After the WAPP SG and the Consultants have developed a program for modification, the Panels will

provide a review of the measures proposed. Each member has the professional duty to alert the WAPP Project Coordinator of any events or design features that in nature are likely to generate dam safety issues or to be against state-of-the-art practices or WB ESF and General Environmental, Health and Safety Guidelines of April 2007, as well as the World Bank Electric Power Transmission and Distribution EHSG.

After each meeting and after the reception of integrated reviews, the WAPP SG shall provide copies of each minute/report to the financing agency (The World Bank or others), including a statement of actions taken on the recommendations of the previous meeting of the Panels. Any reviews provided by the Experts on projects or studies which are not financed by the World Bank will not engage any responsibility of the Bank. Disclaimers Clause will have to be validated by WAPP and WB legal departments before commencing such review/services.

Selected Experts will have to (i) report at least every six months on activities implemented during the period as well as on time spent and (ii) agree with WAPP on the work plan for the coming six months. These reports and timesheets will be validated by the WAPP Project coordinator before payment. Expenditures such as flights and travel costs will be paid as reimbursable upon submission of receipts. Food and accommodation for site and country visits will be covered in accordance with WB standard allowances.

10. Supporting Services

The WAPP SG shall make available its authorized personnel and those of the Consultants of the Project for discussions with the Panels of Experts as per request of the Chairperson of each Panel. They shall be present during the meetings with the Panel or at least provide written responses to preparatory requests and questions. The WAPP SG and Consultants shall provide the necessary documentation such as background information, relevant data, engineering design reports (criteria and calculations), laboratory tests, and minutes of consultation meetings, related to the Project. The Project Manager, Team Leaders of the Consultants shall coordinate the collection and assembly of such information.

The WAPP SG as best suited, shall provide clerical, drafting, and documentation reproduction services during the meetings and for the preparation of the Panel's reports. The WAPP SG shall take the necessary actions to allow prompt travel clearances of the members of the Panels or specialists requested by the Panels and shall provide full safe physical access to the Project area and sites.

Members of the Panels will be requested to have their own computers and will be responsible for storing all communication and documents on their own device while ensuring the confidentiality and security of these data. Request for receiving past reports or information again should remain exceptional.

Appendix 1: Mount Coffee HPP and St. Paul River

The St. Paul River has a technical hydropower potential of nearly 600 MW. This potential could be exploited by means of one or two upstream regulating reservoirs (Via Reservoir and Diversion Reservoir, also called SP4) and a downstream cascade of three to four HPPs as follows: one plant at the foot of Via Reservoir (around 130 MW), one at St. Paul 2 Dam (214 MW), one at St. Paul 1B Dam (120 MW) and the Mount Coffee HPP. Today only the Mount Coffee HPP exists; it underwent major rehabilitation and is currently operating with an installed capacity of 88 MW. Additional groups could also be added to Mount Coffee HPP as two additional water intakes had been built initially in the dam.

Optimization Study

The first step of the optimization study will be a market study for electricity from the next hydropower project in Liberia. This will include (a) a review of regional and Liberian electricity demand forecasts under different assumptions, including mining projects, and (b) a review of existing and potential generation and transmission projects (including potential imports). This market analysis will explore national needs and export/import opportunities over time (2025, 2035, and 2045) and will assess the needs for base and peak loads as well as ancillary services expected from the future developments. For memory, in the WAPP Master Plan, Liberia is expected to export 1,860 GWh by 2025, with most of this electricity coming from St. Paul River hydropower development.

The second step will confirm the location of the best sites for hydropower development. Previous studies and national authorities identified St. Paul River as the priority. The TA will confirm this identification, based on comparison with other hydropower sources (St. John and Mano Rivers) and updated socio-environmental data, especially on forestry and on the population likely to be affected. A LIDAR will be deployed to collect topographic and land use data, as well as to identify households and infrastructure likely to be affected. The LIDAR data will need to be shared between the Feasibility Consultants and the ESIA/RAP Consultants. Hydrological data will be reviewed and revised to integrate climate change dimensions. Geological and seismic data will be collected and analyzed including, where necessary, simple geotechnical investigations such as seismic lines. Prefeasibility studies of different sites and river cascades will be harmonized to facilitate comparison. Sites will be ranked on technical-economic criteria and potential environmental and social impacts.

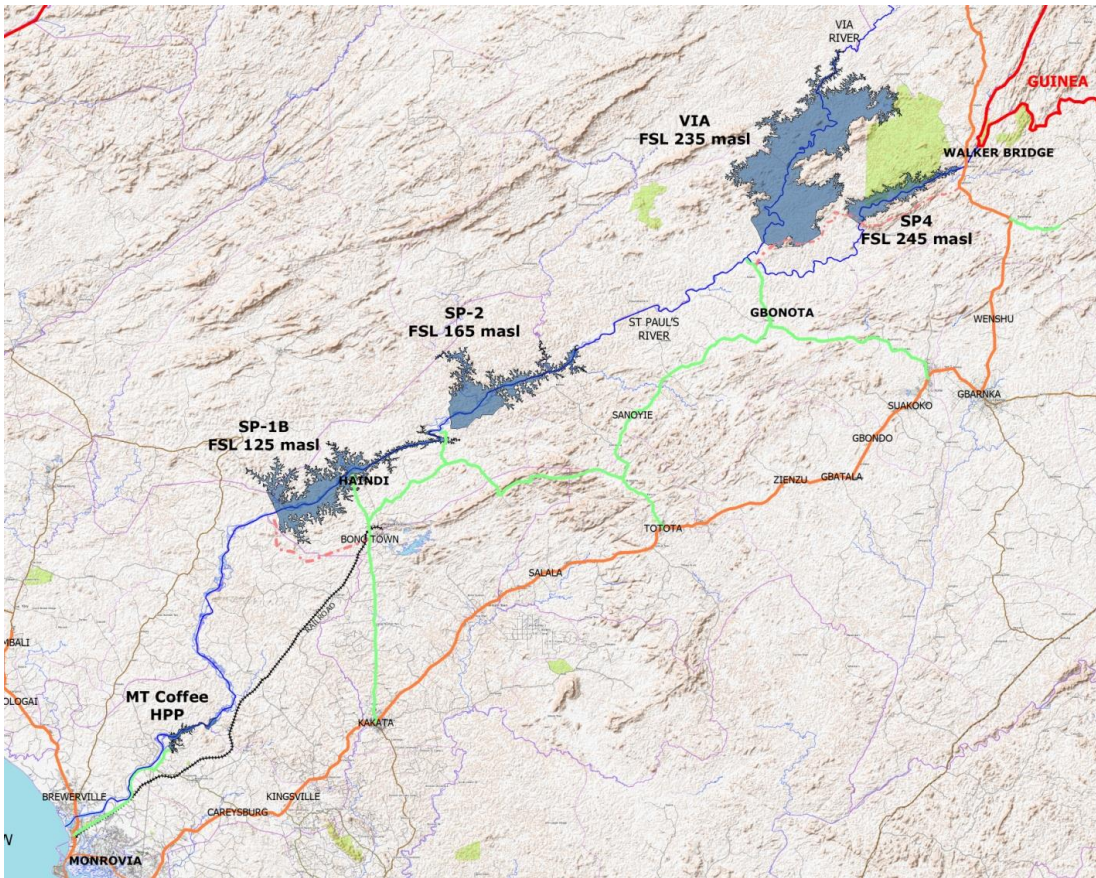


Figure 1 St. Paul River Hydropower Cascade as Studied by Chas. T. Main Int'l in 1982, and updated by Hydrotec in 2018 using LiDAR

The third step will explore the optimal mix among hydro, solar, and existing generation, aiming to reduce cost of electricity and socio-environmental impact including carbon emissions. Use of water storage and hydropower to complement intermittent generation such as solar will be simulated. A balance between storage, power production, and environmental and social impacts will be sought, including fine-tuning of reservoir operating levels (see figure 2.2 for Via Reservoir). A multi-criteria and economic analysis will be implemented including sequencing of projects over time and potential offset of existing HFO plants. As part of the multi-criteria analyses, risk analysis, readiness for implementation, and sensitivity analysis will be conducted. Integration of proposed projects within the national and regional grids as well as needs for transmission lines and/or substations will also be analyzed.

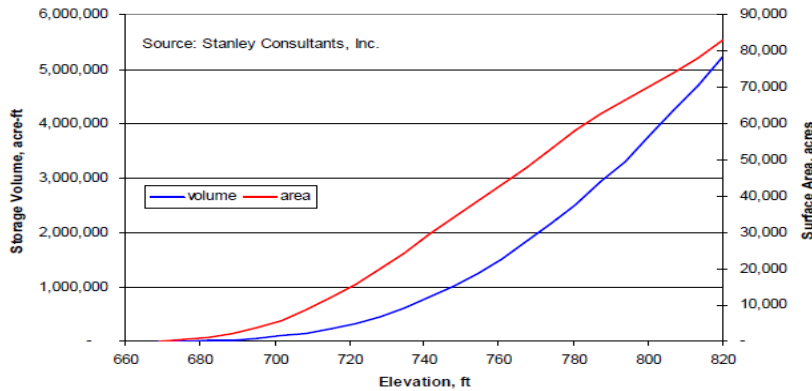


Figure 2 Via Storage Reservoir Elevation versus Volume and Area (by Stanley Consultant 2008)

To support the integrated use and management of water resources on the St. Paul River, the consultant will also review other water uses in the basin as well as the water resources management framework in Liberia. Results of this review will be integrated in the design of the project.

The consultant will also develop a model of the cascade at different time steps (monthly, daily, and hourly) to reflect hydraulic regimes as well as power production over time measured against demand forecasts and daily consumption patterns. Potential for irrigation and other multipurpose uses of the water resource will also be captured. The most promising and balanced development plan of the cascade shall then be presented for decision on the priority project. A workshop presenting the draft outcomes will help develop consensus and collect feedback from key stakeholders.

A preliminary social analysis of the characteristics of the populations likely to be affected by the priority project will be conducted, before full ESIA and RAP studies. The analysis will consider among other issues demographics, livelihoods, forestry, and severity of impacts, numbers of affected people and assets, and whether physical resettlement would be necessary.

Feasibility Study of the Priority Project to be Developed.

The activity will develop a bankable Feasibility Study for the development of the priority project, including storage and transmission lines to evacuate the power. The bankable FS will facilitate mobilization of financial resources for the project. The FS will be detailed enough to support the preparation of tenders. To facilitate a smooth transition to the development stage, the consultant in charge of preparing the FS may be asked to include in his/her bid the cost of the preparation of tenders for contractors.

The FS will follow technical best practices including design criteria, civil engineering and hydraulic studies, electro- and hydro-mechanical studies, electro-technical studies (including transformers and substations), design of the SCADA, control systems, ancillary equipment, and so on. It will also include a Geological Baseline Report (GBR) tier A to be developed on the basis of an informed risk analysis. The GBR will be developed to a level of detail suitable for integration in future tender documents. The scope of work will include geotechnical investigations in key locations and laboratory testing. If solar development is included, the FS will cover aspects related to this technology.

The FS will also include detailed analysis of the integration of the priority project within the CLSG and national transmission systems. Necessary transmission lines (225 and 66 kV) will be studied and simulated on a power system simulator for engineering model. Static and dynamic simulations of the grid will be implemented to define the transmission network and demonstrate the adequacy of the proposed design with regard to performance and stability of HPP integration to the networks.

Finally, detailed construction schedules will be prepared and the critical interfaces among subcomponents defined. To achieve the best outcome of the technical studies, save time, and avoid unnecessary transaction costs, the procurement of the FS consultant will be implemented in parallel with the optimization study. The technical consultants will work closely with the consultant for environmental and social studies (ESIA).

ESIA and other Studies for the Priority Project

Environmental and Social Impact Assessment (ESIA) and activities will be carried out for the priority project, including (a) review of the environmental and social screening from the optimization study; (b) evaluation of the design of the project including dam height, reservoir size, water conveyance structures, HPP, substation, transmission lines, quarries and access roads; and (c) development of the required ESIA, ESMP, RPF, RAP, Labor Influx, and Work Camp Management Plans for associated infrastructure, a comprehensive Analysis of Alternatives and a Cumulative Impact Assessment, which will include the part of the St. Paul River Basin in Guinea. The ESIA consultant will work closely with the technical consultants for the optimization study and FS. The consultant will make recommendations for socio-environmental aspects of the project including confirmation of environmental flows, artificial floods, needs for maintaining the ecological continuum, forestry management, watershed management and so on. Existing biodiversity and fish migration patterns will also be reviewed. The assessment will include any transmission lines and other infrastructure required, such as access roads, work camps, and site installations.

This consultancy will also include participatory and communication activities, including public consultation and workshops, based on socio-environmental studies (the ESIA, ESMP, RAP, and so on) to address issues such as future benefit sharing with host communities, citizen engagement and grievance collection mechanisms, labor influx and work camp issues, social conflict prevention, gender equality, and access to electricity in the project area.

These studies and activities will inform the GoL, LEC, and other stakeholders about potential socio-environmental impacts of the project and propose mitigation measures. The studies will be implemented according to World Bank ESF and international best practices and will follow with World Bank emerging guidance on hydropower TAs.

Project Documents

To be made available to the Panels of Experts:

- Terms of Reference for Optimization Study;
- Terms of Reference for Feasibility Study of the Priority Investment Project;
- Terms of Reference for ESIA and other Studies for the Priority Investment Project.

WB and other

- Selected Aide Memoires from the Bank expert missions;
- Other relevant documents that the Panels may request.