



**MINISTRY OF WATER AND ENVIRONMENT
WATER FOR PRODUCTION DEPARTMENT**

**TERMS OF REFERENCE FOR CONSULTANCY FOR FEASIBILITY STUDIES
FOR ENENGO IRRIGATION SCHEME IN RUKUNGIRI AND KANUNGU
DISTRICTS**

1 PROJECT BACKGROUND

Uganda's total population is estimated at 34 million with an annual growth rate of 3.2% per annum. Between 85% and 90% of the population live in rural areas and derive their livelihood from agricultural related activities. The incidence on poverty is highest among the food crop producing category in the rural areas due to low income, with 31.1% living below the poverty line. Since majority of the population living in rural areas earn their living from agriculture, efforts to reduce poverty need to take in account increasing agricultural growth rates, diversifying agricultural production and expanding non-farm employment, without jeopardizing the dynamic stability of the agricultural ecosystems that ensures sustainability of the agricultural production. This concept is consistent with the National Development Plan and vision 2040 whose main goal is to eradicate poverty through appropriate investments and policies for agricultural sector transformation.

About 40% of the population is food insecure due to unsustainable production methods especially in water stressed areas. This is not likely to change unless more attention and more resources are allocated to agricultural services and research. Seasonal changes and variations have become more common and are significantly affecting the rain-fed agriculture.

The Government of Uganda is committed to addressing the above challenges by prioritising irrigation development through provision of formal irrigated agriculture systems in the Country as well as increasing functionality of both new and existing irrigation schemes. To consolidate these efforts, the Government of Uganda with financial support from the World Bank intends to undertake Detailed Feasibility Studies for Enengo Irrigation Scheme in Rukungiri and Kanungu Districts. This will further foster Government programme of modernizing Agriculture that aims at increasing incomes and improving the quality of life of poor subsistence farmers and their households. It will further ensure food security and provision of gainful employment through improved agricultural enterprise development and promotion of sustainable land use and management of natural resources. The project design is hinged on community-based participation with the districts and sub-counties as focus of implementation, and the private sector as main technical service providers.

The Detailed feasibility study for which these terms of reference are formulated will cover assessment of available water resources, estimates of irrigation and other water demands, water source option assessment, weir/barrage/reservoir development for multi-purpose uses, irrigation

and drainage infrastructure development, upstream watersheds management as well as water supply system development for auxiliary use (municipal and livestock water supply, etc.); essential agricultural support services to enable maximizing the irrigation investment benefits for agricultural production and productivity increase with transformational effects; and institutional development and capacity building for sustainable delivery of irrigation services. The study will ensure that the project is:

- (i) technically sound and best of the alternatives considered and analysed,
- (ii) attractive to and acceptable by the intended beneficiaries,
- (iii) operationally and managerially workable,
- (iv) economically and financially viable compared to without the project scenario, and
- (v) sustainable and environmentally sound.

Scheme Site Details

Scheme	River system	Targeted Irrigable Area (Ha)	Possible Crop enterprises	Required	Documents available
Enengo	R. Mitano	6,698 - Gross 2,500 to 3,500 - Net	Coffee, Upland Rice, Bananas, vegetables	Feasibility Study Report	None

This study is being financed by the World Bank under the Uganda Irrigation Development and Climate Resilience Project (ICRP) under the Water for Production Department of the Ministry of Water and Environment. The goal of the ICRP is to improve financially sustainable irrigation and drainage services, and increase farmers’ agricultural revenue in the project areas. It has three main components as follows:

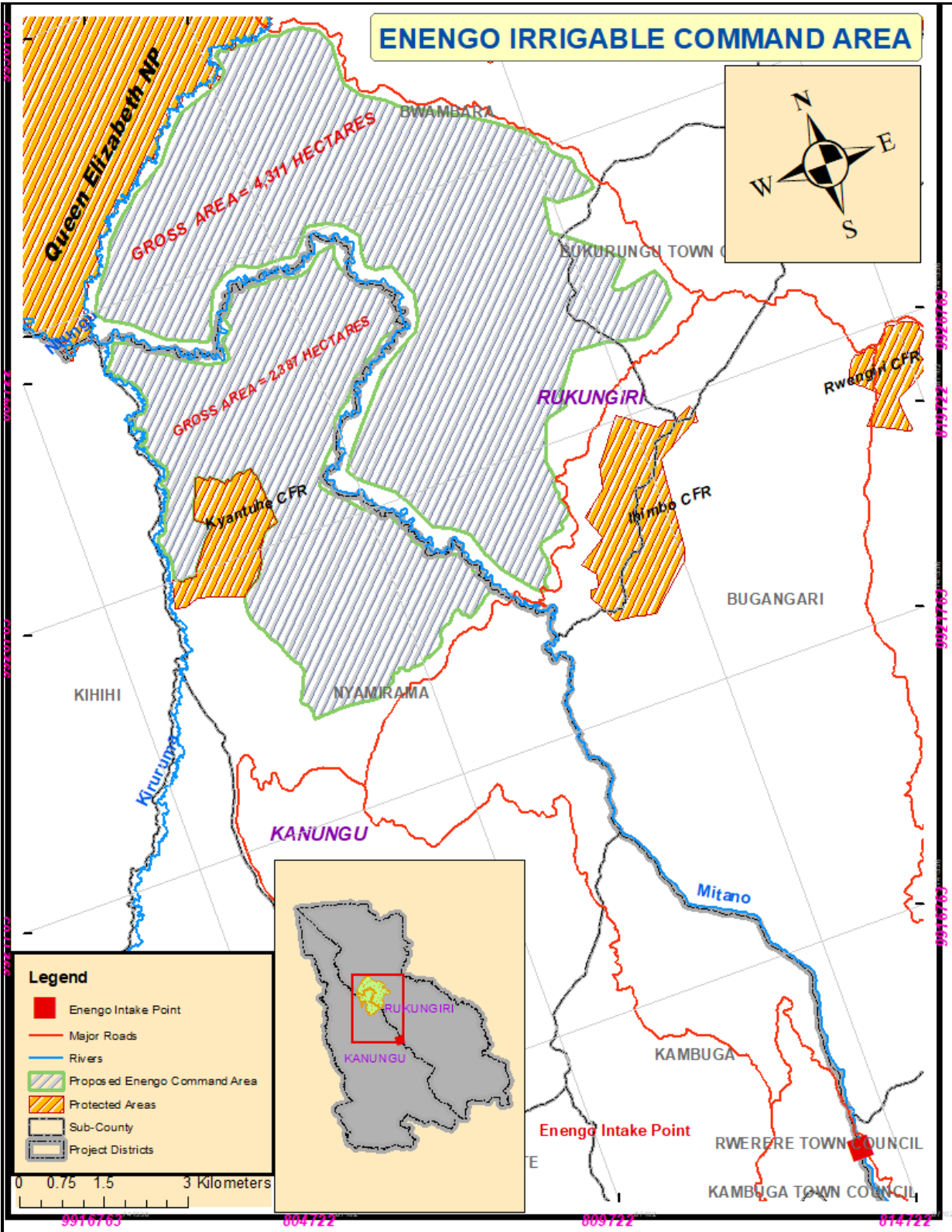
Component 1. Irrigation infrastructure development: The objective of this component is to develop the irrigation and drainage infrastructure primarily for supplemental gravity irrigation services. It will finance construction and equipment for the water source works (storage reservoirs, river diversion weirs and pumping stations), related catchment management interventions, and several irrigation systems (including main canal and drainage system, cross structures, on-farm works, and operation and maintenance (O&M) facilities), associated resettlement and environmental management costs. It will also finance consultancies for scheme feasibility studies, designs and safeguards assessments including for the follow-up investments. The schemes are likely to concentrate on 1-2 regions. This is in view of the promising commercial production prospect (southwestern) and high drought-vulnerability and severe food insecurity (eastern), and very importantly implementation readiness for a successful first phase. Scheme selection will be guided by the GoU irrigation policy and groundwater option considered where adequate studies exist.

Component 2. Essential support services for agricultural production and value-chain development: This component aims at filling critical gaps in provision of essential support services for crop production and value-chain development. The proposed irrigation infrastructure development is aimed at providing water for production that would improve agricultural production, productivity and profitability of the agricultural enterprises benefiting from this investment. These enterprises should be able to produce agricultural products that are competitive

both in the local and regional markets in order to generate enough revenue that would enable them to support the operations and maintenance of the infrastructure services sustainably while at the same time improving the farmers profitability for improved livelihoods. In order to achieve this, farmers in the command area will require essential support services that include strengthening their groups/cooperatives for better access to quality inputs and appropriate technologies or agronomic practices with the aim of improving production and productivity.

This component may also support selected critical interventions to increase the marketed volumes and value of traded items for better economic gains to the target population. The interventions will largely involve retooling extension officers for diagnostic assessments and for imparting knowledge and skills to the participating farmer groups; promoting access to quality agricultural inputs from registered agro-input dealers; and financial support in form of credit or matching grants towards investment in produce storage facilities and value addition technologies. Interventions under this component will be complementary to ongoing agricultural development operations by the government and other development partners, such as the Bank-financed Agricultural Cluster Development Project (ACDP), the Millennium Villages Project (MVP), and the EU-funded Common Market for East and Southern Africa (COMESA) initiative. The approach to be adopted for this component would be consistent with that followed by the ACDP for improving farmer access to quality agricultural inputs and post-harvest handling. It is envisaged that this component would contribute to the transition from the current subsistence production system to a vibrant, commercially oriented and economically viable agricultural enterprises that will generate sufficient revenue commensurate of the proposed investment.

Component 3. Institutional Strengthening and Implementation Support: This component is intended to support development and strengthening irrigation management institutions through technical assistance, capacity building and implementation support. The institutional strengthening will finance: (a) consultancies for irrigation regulation and guidelines development, and necessary supporting studies (e.g. irrigation water tariff) for implementing the national irrigation policy; (b) consultancies and training for formulation and capacity building of irrigation management organizations for irrigation service delivery and system O&M , including management entities and farmer irrigation water users associations (WUAs); and (c) training and consultancies for skills development for staff at national, district and scheme levels including beneficiary communities and farmers, in irrigation policy and regulations, irrigation technology and management, and agricultural water management. Implementation support will include technical and project management consultancies, necessary facilities (goods) and incremental operating costs for project implementation management.



2 OBJECTIVE OF THE ASSIGNMENT

Agriculture is the most important economic activity in Uganda employing between 85% and 90% of the population. Providing water and irrigation infrastructure has been identified as a strategy to support agricultural production and productivity geared improvement of farm incomes, rural livelihood and food security.

The goal of the project is to improve financially sustainable irrigation and drainage services, and increase farmers' agricultural revenue in the project areas.

The overall objective of the study is to undertake detailed feasibility studies of the irrigation scheme to meet the World Bank project appraisal requirements for World Bank financing. The studies should consider multipurpose development opportunities and ensure they are technically feasible, economically, and financially viable, socially acceptable, and environmentally sustainable.

The specific objectives of the assignment are to carry out relevant technical investigations and studies comprising of water resources (hydrologic and hydro-geologic) assessment, socio-economic assessment, agricultural soils and agronomic studies, irrigation water requirements, topographical surveys, geotechnical investigations, hydraulic studies and design, and undertake detailed feasibility studies for Enengo Irrigation Scheme in Rukungiri and Kanungu Districts. Similarly, the study will determine the needs/demands and the potential for multipurpose infrastructure development, conduct the required studies/investigations and include them in the feasibility study as an integral part of the scheme. Finally, the consultants will prepare cost estimates and perform financial and economic analyses which will form the basis for project appraisal, investment finance mobilization and project implementation.

This project phase will result in in-depth technical reports of the project that would include a community-based irrigation scheme and improvement in the productivity and management of the upstream watersheds and other multipurpose infrastructures. The feasibility studies will provide sufficiently accurate estimates of costs and expected results to enable decisions to be made on project financing. Accordingly, the consultant should take into consideration the World Bank policies, guidelines and safeguards requirements, especially those for environmental and social impact assessment to prepare the feasibility studies.

In addition, the definition of the project components, organizational arrangements and procedures will be detailed enough to permit the executing agencies to use the study as guidance on project implementation.

3 SCOPE OF THE STUDY

3.1 GENERAL

This project adheres with international best practice, policies/guidelines and safeguards. The study will entail feasibility studies, preparation of preliminary designs, cost estimates, and implementation arrangements for the finally agreed development options for Irrigation development, multipurpose infrastructure and watershed management. The feasibility studies will comprise analyses related to: (a) basin-wide water resources (qualitative and quantitative), (b) drainage and flood management (drainage canals and flood control dykes), (c) watershed management plan, (d) topographic survey, (e) geologic and geotechnical investigations, (f) soil and agronomy, (g) cropping pattern and crop water requirements, (h) headwork (weir/barrage/diversion and/or pump) and related multipurpose hydraulic structures, (i) irrigation infrastructure, (j) overall agricultural potential and support services including market and value chain development for maximum water resource use, (k) land tenure, (l) environmental and social analyses, (m) institutional analysis, (n) water management and operation and maintenance, and (o) economic and financial analysis in close consultation with farmer communities and other stakeholders. Upon selection and approval of the analyzed alternatives by the Client, preliminary designs and cost estimates will be prepared as appropriate. The study will also propose implementation arrangements and development phasing.

The Consultant shall define in consultation with the Client and other stakeholders the scope of the project options, assess the practicability of the development, and provide the basis for decision making on the choice of design options. The consultant shall define the benefits (direct and indirect) and costs, and determine financial feasibility, economic justification and cost recovery. The Consultant will adopt participatory approaches to ensure the optimal involvement of stakeholders from national to community levels, during the study. In planning and scheduling of the tasks, the consultant should note that not all tasks will be conducted in linear fashion and the consultant should propose a schedule on how the tasks can be scheduled to meet the objectives of the assignment and for optimal linkage/sequencing.

3.2 Project Description

The proposed Enengo irrigation scheme is located in Rukungiri and Kanungu Districts, in South-Western Uganda. The scheme is to be served by water from R. Mitano which forms the border between the two Districts. A weir is proposed across the river to support irrigation and other water requirements. The scheme is envisaged to serve a gross command area of up to 6,698 ha in the two districts through a gravity irrigation network system.

Preliminary assessments have been conducted to estimate a potential weir site at coordinates (143700mE, -75650mS) and potential command areas. There is a gauging station at Kanungu Rweshama Road, close to the proposed weir site and the records can be obtained from the Directorate of Water Resources Management, Ministry of Water and Environment.

The scope of the services of the consultancy, during the development of this study, shall contain, but not be limited to the following:

3.2.2 Tasks to be executed

Task 1: Formulation of Project Plans and Layout

Task 1-1 Data and information collection

The consultant should collect relevant studies, data and information, catchment management plans (if available), Basin Strategy Reports, the Investment planning reports and the bankable project planning

reports, review reports from previous studies, as well as national policies related to water resources, irrigation and agricultural development. The Consultant should screen and synthesize the data and establish a project databank related to policies, institutions, existing infrastructures, hydrology and meteorology, topography and maps, geology, agronomy (assess the current production levels (output) against the existing potential and future projections after the development of the irrigation infrastructure), agricultural and engineering soils, multipurpose aspects, agriculture and its services, input/output markets, possible positive and negative environmental impacts and socio-economic conditions for use in further analysis.

The consultant should review the hydro-meteorological station network, and study and propose a robust hydro-meteorological data collection network for both the pre and post construction phases of the irrigation scheme to enhance better understanding and monitoring of the water flux in the catchment. This information must be evaluated to determine its validity for use throughout development of the project.

Task 1-2: Formulation of Project Plans and layout

The consultant shall:

- (i) formulate project plans based on available relevant data and information, as well as employ planning parameters and criteria;
- (ii) identify suitable weir sites for the irrigation water supply system and propose suitable weir type and size taking into consideration the local conditions such as topography, geology, construction materials, available infrastructure, as well as environmental conditions; and
- (iii) determine the irrigation water requirement and multipurpose water needs and define the extent of the command area to be irrigated and other demands which can be met from the available bulk water supply/ies of acceptable quality standards.

The consultant will also be required to carry out field reconnaissance missions to the upstream watersheds, as well as downstream areas likely to be affected by the project to collect data and identify issues to be addressed by the study.

Task 2: Socio-economic surveys

The purpose of this assessment is to understand the socio-economic profile of the beneficiary and potentially affected communities, and to enable the project design to meet their development needs and mitigate negative impacts. This assessment shall serve as a baseline which will help project planning, diagnostic monitoring and impact evaluation purposes that should result into:

- (a) understanding of the area's social and economic background, socio-economic profile of the communities and the social structure and institutions;
- (b) understanding of the process of socio-economic differentiation, impoverishment and wealth such as livestock, land etc.;
- (c) understanding of the constraints that inhibit livelihoods and livelihood development which can be potentially addressed by targeted mega irrigation development interventions; and
- (d) collection of statistically reliable descriptive data on those parameters which the project intends to influence, such as health, gender, production and household incomes at the baseline and project completion.

Using internationally recognized methodologies/standards, the Consultant shall:

- (i) undertake a stakeholder analysis of the project area;
- (ii) carry out broad socio-economic surveys;
- (iii) carry out a broad analysis of gender issues;

- (iv) profile the potential beneficiaries to benefit from the proposed irrigation development activities;
- (v) identify categories of vulnerable groups specific to impacts from the project and activities that will adversely affect them;
- (vi) review land policy, land cadastre, land use and possible impacts on land-based livelihoods, as well as potential land acquisition/aggregation and likely scale of resettlement;
- (vii) recognize specific socio-economic, institutional and other constraints that can be potentially addressed in the proposed project; and
- (viii) identify possible barriers to project execution and completion.

The information obtained from the surveys will be used as a baseline for conducting a project socio-economic impact assessment. Combined with other technical studies, the outcome of this task should be adequate enough to be used as input for “with project” and “without project” scenario evaluations at economic and financial analysis stage.

In addition, the Consultant will identify the project communication needs and propose the appropriate communication strategy using the above information.

Task 3: Water Resources Assessment and Sediment Studies

Task 3-1: Assessment of Water Resources Availability

The task objective is to assess the water resources availability to satisfy the estimated uses and demands and to match the water availability at monthly time segment with the demands.

The Consultant shall:

- (i) determine the current and potential future water uses and demands for the identified water uses at the project areas, together with their seasonality, levels of services, priority of use and cumulative effects;
- (ii) assess and quantify any current or future upstream water uses (abstractions/diversions) and their impacts to the proposed project;
- (iii) assess the quantity and quality of both the surface and groundwater potential and availability and examine potential for conjunctive use of available surface and ground water resources in an environmentally sustainable manner;
- (iv) estimate the required environmental flows seasonally, with due consideration of the current and future downstream water uses
- (v) estimate optimal demands for the various water uses with the available water resources, without adversely affecting downstream users.

Based on the analysis, the consultant will match the water availability for each time segment with the irrigation needs and other demands at different levels of probability using appropriate hydrological techniques.

With respect to groundwater, the Consultant should also assess:

- the future ground water regime and behavior after the development of irrigation in the project area;
- impacts on the ground water table due to seepage and percolation and drainage from the irrigation canals; and

- drainage control, groundwater table, and ground water quality control measures that need to be incorporated later into the detailed design of the project.

Task 3-2: Hydrological Analysis

The Consultant shall:

- (i) undertake hydrological analyses such as rainfall-runoff modelling to estimate design floods (taking into account global warming) to facilitate the design and sizing of different hydraulic structures such as the intake weir and flood control embankments.;
- (ii) determine the flow duration curves to facilitate the design of hydraulic structures;
- (iii) adopt appropriate hydrological modelling techniques to derive the required design flows and other hydrological information from the nearest available gauging stations and rainfall records, where sufficient hydro-meteorological data are not available;
- (iv) assess the spatial and seasonal fluctuations of climatic variables on the hydrological characteristics for the project options;
- (v) assess the effects of the proposed irrigation diversion on existing uses; and
- (vi) undertake flood routing through the downstream channel and floodplain for design of flood control measures.

Task 3-3: Sediment Analysis

In view of the existing concerns of land degradation and erosion within the project areas, the Consultant will assess the sediment regime and total sediment transport of the river system in the project areas. This will include determination of the sediment (suspended and bedload) yield. Additional sediment data shall be collected during the course of the consultancy.

This analysis should also aid the subsequent design against increased loads on the weir, abrasion of outlet structures and blockage of outlets which could cause interruption in water uses and reduction in the ability of the barrage/weir to pass floods safely. It will also help to determine the design of any sediment settling basins and their sediment removal systems.

Sediment load estimates should include projections of changes in upstream sediment release, based on upstream development plans.

Task 3-4: Water Quality and Quantity Assessment

The Consultant will provide a detailed assessment and evaluation of the direct and indirect effects of water quality and water quantity change on downstream ecosystems dependent on periodic natural flooding, water quality during low flow periods, turbidity due to changes in sediment transport regime, social considerations (like loss of water access and livelihoods), cumulative effects and any potential riparian issues (in the river catchment and downstream of the proposed irrigation schemes) due to the proposed developments to inform devising of mitigation measures.

Task 4: Irrigable Command Area Design

Task 4-1: Irrigation Potential Assessment

The objective of this task is to identify/verify, evaluate and physically delineate the areas that can be potentially developed for irrigated agriculture. The area which can potentially be irrigated depends on the availability and suitability of soil/land and water, combined with the irrigation water requirements, crops and cropping patterns, and irrigation systems that are feasible, and the local climatic factors. This task will thus include:

- (i) evaluation of potential crops and cropping patterns;

- (ii) assessment of land suitability for irrigation;
- (iii) evaluation of irrigation water requirements; and
- (iv) assessment of water resources availability and options for developing water resources in the locality to meet the irrigation demand.

(a) Soil Surveys and Land Suitability Studies

The Consultant shall:

- undertake a semi-detailed soil survey for the delineated irrigable command area, using appropriate sampling and observations in conformity with guidelines for soil surveys of Food and Agriculture Organization (FAO);
- submit a soil sampling and test pit location plan to the Client for approval before starting sample collection;
- prepare soil maps on an appropriate scale based on the soil surveys; and
- collect and analyze soil samples required for the determination of standard physical and chemical properties of the soils required for evaluation of irrigation system design and scheduling, and soil suitability for the proposed crops, as well as establish proper drainage modules for the project to affect the design of the drainage system. The Consultant shall take appropriate measures to verify and ensure the quality and reliability of test results using accredited laboratories.

The Consultant shall then:

- develop a suitable land classification system for assessment of irrigability and drainability;
- critically evaluate and analyze findings of the topographic, soil surveys and land characteristics; and
- identify and delineate on a map areas in terms of suitability for irrigated agriculture development.

(b) Evaluation of Crops, Cropping Patterns and Markets

The consultant shall collect baseline information on the type of soils, topography and land-use patterns; analyse water-use patterns (rain-fed crops, irrigated crops, drainage, surface and groundwater extraction); examine existing field-crop production and soil management practices; establish and delineate major cropping pattern zones (considering types of irrigated crops grown, crop calendar and cropping intensity); propose schedules of crops for consideration; estimate expected yields and crop water requirements for alternative cropping programs, and examine the existing Agricultural Support Services. Due consideration should be given to the key commodity crops under the National Development Plan III, as well as the crops suitable for the project area as per the country's Agricultural Production Zoning. The assessment will cover:

- the production and performance of the existing crops based on the current cropping patterns
- the potential of commercially oriented production systems based on the available markets in the surrounding shopping centres, other urban markets such as Kampala and the neighboring countries in the region,
- the most profitable value chains that can be developed or upscaled in the proposed irrigation schemes,

- availability of competent service providers for technical advisory services, agro-input dealers, financial services (savings and credit/loans), agro-processors, traders/aggregators and warehousing among others which will be needed for extension support to the project's producer organizations;
- the margins of the top five commodity value chains
- potential market for the top five commodity value chain in terms of the volumes and monetary value.
- determination of whether to employ a supplementary or major irrigation (for all crops or combination for selected crops);
- the ownership structure of farms including consulting the potential irrigation farmers;
- constraints on farm productivity;
- the market potential of the possible crops within and around the project areas;
- the potential for increased competitiveness of its products including an analysis of the comparative advantage of the project areas;
- availability of and accessibility to input supplies, storage, technology, finance, input markets, transport and distribution networks;
- option for farm mechanization, product storage, handling and transportation,
- availability of output market (incl. potential for grower/out-grower linkages) and
- value chain and Climate Smart agriculture.

The Consultant will also analyse the gender division of labour in irrigated agricultural production for each socio-economic group, identify the needs of both women and men related to proposed agricultural activities. Based on the analysis, the Consultant shall formulate the cropping and irrigated agriculture development plans for the proposed schemes including the potential distribution of land areas between the small-scale individual farms and large-scale commercial farms. Also identify suitable and appropriate cropping patterns for each type, estimate farm level crop production volumes, input and production costs, farm budget as well as gross and net returns, and generate incremental benefit estimations for use in the feasibility level of economic and financial analyses.

(c) Determination of Irrigation Water Requirement

The aim of this task is to evaluate irrigation water demand under the most optimal scenario (supplementary and/or major irrigation) for the basic design parameters generated under task 3 and 4 so far. The Consultant shall:

- collect all the existing available agro-meteorological data for the project areas required for estimation of crop and irrigation water requirements of the scheme;
- verify the reliability and accuracy of data, and make corrections as necessary before use; quality analysis of collected data and gap filling of missing data using appropriate standard approaches and techniques is necessary;
- carry out “Agro-climatological assessment” where the Consultant shall review available climatic data and make estimates of farm and project level irrigation requirements for viable crops, cropping patterns and crop rotations and irrigation technologies to be adopted, using all available agro-meteorological data for the project area;

- deduce the peak irrigation water demand for both the average rainfall and the one-in-five dry rainfall year supported by analysis of different cropping patterns in the respective project areas for the purposes of fixing conveyance canal/pipe and pump designs; and
- deduce irrigation water requirements at salient intervals for deciding the cropping pattern in order to compare with water availability.

Task 4-2: Preparation of Topographic Maps for the Irrigation command area

The Consultant shall prepare:

- (i) GIS based 1:10,000 scale topographic maps of the project with appropriate contour intervals, from high intensity satellite imagery and ground controls, for use in planning;
- (ii) use these maps to evaluate the topographic features which would influence design of layout of the irrigation scheme and locations of major hydraulic structures of the supply source(s), irrigation water conveyance and distribution systems, drainage systems; and
- (iii) demarcate possible physical locations and boundaries of the primary parameters of the irrigation system layout, including layout of main irrigation canals/pipeline and drainage systems, location(s) of potential irrigation supply sources (e.g. weir, river etc.), and drainage system layout.

Task 4-3: Command Area Development

The scope for command area development will include the following:

- (i) analysis of flood protection, land reclamation, leveling and drainage works required to ensure sustained economic operation of the command areas;
- (ii) determination of access road requirements both to and within the area; and
- (iii) preparation of general layout plans showing the location and principal features of main works required for the most suitable irrigation supply and drainage system using the appropriate scale and contour interval.

The Consultant shall examine the reliability of water supply, considering the various existing and future water uses and identify appropriate water conveyance systems for different levels of the irrigation system to supply water to all parts of the land to be developed and recommend appropriate irrigation methods best suited for the command area. To adapt against potential adverse impacts of climate change and improve water management and use efficiency, the Consultant is expected to introduce recent innovative water distribution options.

For the Interim Report the Consultant shall present various alternatives for irrigation water conveyance systems including canals and pipelines for gravity-fed irrigation of the command area with the intake weir(s) located at appropriate elevations to supply the required pressure for each alternative. For surface irrigation systems there should be consideration for using pipes for secondary and tertiary distribution, which allows for control by valves thus reducing spills and allowing the connection of low-head drip, sprinkler, and hosepipe irrigation systems where there is adequate pressure, and for boosting with pumps for the option of irrigating with portable sprinkler systems. Canal design shall also consider the use of easy flow measurement devices, regulating reservoirs, and/or night-storage reservoirs.

Task 4-4: Irrigation System Engineering Design

The Consultant will prepare preliminary designs for major structural and hydraulic elements of the proposed irrigation system, including, the water conveyance system, on-farm water distribution

system, drainage canals system, flood protection and control considering both structural and hydraulic safety.

The Consultant shall take into consideration intensive labour engagement and use of local construction capability in case labour is available and local materials during the design as necessary. The Consultant shall prepare the layouts and drawings of the different project components using AutoCAD software. The Consultant shall also prepare a schedule of quantities in line with the latest Civil Engineering Standard Methods of Measurement (CESMM), for use in preliminary cost estimates and the economic and financial analysis.

Task 5: Determination and preliminary design of other infrastructures of multipurpose uses

The Consultant shall assess the demand and the development potential and prepare preliminary studies to introduce such multipurpose infrastructures as domestic water supply system and hydropower plant (incl. associated hydro-mechanical appurtenances) as an integral part of the scheme as appropriate. Specialized studies and detailed analysis shall be carried out for each aspect (water supply system and/or hydropower) of the multipurpose schemes including preliminary designs and cost estimates.

Task 6: Preliminary Design of the Weir/Barrage

Task 6-1: Topographical Surveys

This task aims to establish the following:

- the configuration of the weir/barrage site and reservoir area,
- accessibility to weir/barrage site,
- accessibility to construction material sources, as a means towards confirmation of weir/barrage type and appurtenant structures selection, and
- influence on type, layout, and downstream inundation in the selection of the spillway.

The Consultant will carry out topographical survey with appropriate contour intervals for use in planning and capturing specific site features such as the proposed axis, energy dissipation area, inundation extent, surface area-volume-depth relationship, river channel profiles, and location of proposed intake for irrigation, water supply, livestock and fish farming as appropriate. The survey will also capture site features such as existing infrastructure within the vicinity of the proposed weir and reservoir areas (roads, buildings, bridges, power lines, etc.), trees and vegetation, rock outcrops, etc.

Prospective borrow areas for construction materials and aggregates shall be mapped at a scale 1:2,000. The consultant shall survey cross-sections of the rivers and their flood plains within the project areas at intervals and locations deemed relevant for incorporation in the mathematical hydraulic models of the rivers for purposes of routing floods. Topographic survey of the reservoir area extent shall be done to an appropriate scale with contour intervals of 1m up to an elevation of maximum water level + 10m.

The final output will be detailed and clear site maps of a scale equal or better than 1:1,000 with 0.5m contour intervals, detailed Digital Terrain Model and high resolution orthophotos of the project areas. The weir cross section of both vertical and horizontal shall be prepared at a scale of 1:100 indicating the pertinent features to the head works.

Task 6-2: Geological and Geotechnical Investigations

Geological investigations will be conducted with a combination of geophysical explorations and test pits for all significant structures including weir/barrage, canals, reservoirs, and pump stations at reasonable intervals to determine:

- (i) the general geologic and tectonic setting of the site area by analysis of the lithology, stratigraphy, structural geology, and tectonic history;
- (ii) the geologic conditions related to selection of the weir site like rock type, overburden, fractures, bedding which have a strong influence on the need for foundation treatment and costs;
- (iii) the characteristics of the foundation soils and rocks;
- (iv) other geologic conditions such as faults that may influence design, construction, and long-term operation;
- (v) seismicity and earthquake intensity of the project area; and
- (vi) the sources of construction material.

The Consultant shall: identify and geo-reference crucial soil and rock features, establish the engineering properties of rocks and soils, surficial deposits, and tectonic-structural patterns. The extent, depth, and type of exploration will depend on the complexity of the geology and size and type of barrage/weir as conceptualized by the Consultant.

Field Investigations:

The objective of the Geology, hydrogeology, and geotechnics: geological model of the foundation (different lithographic layers, geological faults, dip, mechanical characteristics of different formations, etc.), geotechnical and geological model of the backfill, filters, drains, borrow area, physical and mechanical characteristics of soils, etc...

Field Investigations will include but not limited to:

- exploratory trial pits for soil sampling and testing for engineering properties relevant for project design;
- foundation investigation of weir axis (includes carrying out geophysical tests as needed, at selected intervals to obtain data on stratification and groundwater) around energy dissipation areas, intake areas, river diversion works and construction materials borrow areas;
- assessment of uncertainties arising from interpretation of geophysical results and their possible impacts on costs and site viability;
- preparation of geological profiles for the weir/barrage foundation, abutments, reservoir rim area and potential project command areas major structure sites, showing all the geological structures in place and inducing the potential permeability and stability;
- preparation of geological map of the reservoir floor and rim, drawn to sufficient detail commensurate with the feasibility level to permit identification and assessment of potential leakage paths;
- geo-reference possible sources of construction materials, and carry out tests to assess their engineering properties; and
- analysis of the tectonic/ seismic intensity of the area and recommend safety design measures (against sliding of barrage/weir slopes, settlements, sliding of abutments, liquefaction of foundations, cracking of weir/barrage body, loss of filter zones). Additional trial pits may be required to develop geologic correlations and to determine the type of barrage/weir suitable for the site.

The final output of this task will be a detailed report on the project geology/geotechnical aspects, with engineering properties for further use in the hydraulic and structural design of the weir/barrage and other structures.

Task 6-3: Preliminary Engineering Design for the weir and appurtenant structures

The Consultant shall:

- (i) carry out structural and hydraulic designs of the weir components including foundations and abutments, energy dissipating works, retaining walls, river diversion works, intake, bottom outlet and gates, outlet works, terminal works; electro-mechanical system and components considering both structural and hydraulic safety;
- (ii) prepare the layouts and drawings of the different project components using AutoCAD software;
- (iii) prepare a schedule of quantities in line with Civil Engineering Standard Methods of Measurement (CESMM), for use in preliminary cost estimates and the economic and financial analysis.

Task 7: Formulation of Upstream Sustainable Land Management Actions

The task objective is to take stock of the baseline condition of the watersheds in the project areas and identify major erosion hotspots areas and interventions required to improve, protect and maintain the watershed in a healthy and sustainable manner. This will in turn address sedimentation risks related to future depletion of storage; abrasion of outlet structures and mechanical equipment and increment of loads on the weir in order to sustain the proposed infrastructure.

The Consultant should:

- (i) identify/review watershed degradation hotspots in the catchments upstream;
- (ii) identify current interventions being applied to combat catchment degradation, funding sources and the organisations involved;
- (iii) using soils, climate and topographic characteristics delineate priority areas for rehabilitation and management using satellite imagery, GIS or other techniques in the watersheds;
- (iv) undertake a quick assessment of the current status of the watersheds based on an appropriate sample sub-catchment;
- (v) consult the people living in the sample sub-catchment to understand their level of dependence on the resources of the watersheds;
- (vi) propose suitable soil, water and sustainable land conservation measures required to enhance the integrity and productive capacity of the watersheds; and
- (vii) undertake preliminary designs of measures for proposed upstream watershed improvement works to reduce erosion and sediment entry into the irrigation system. This information will be used to estimate the associated impacts on the watershed and for financial and economic analyses.

Task 8: Environmental and Social Considerations and Assessment

The Consultant will analyse the environmental and social aspects including land acquisition and resettlement sensitivities in the project area and, through the consideration of alternate project designs, develop project proposals that avoid or minimize potential adverse environmental impacts. Specifically, the consultant should:

- (i) assess environmental and social impacts that could make the project non-feasible or financeable, or result in costs likely to exceed the intended benefits when mitigation is taken into account;

- (ii) estimate the extent of resettlement and land and asset acquisition that would be associated with the project, and develop a preliminary concept of a development program for the area; and
- (iii) examine design alternatives such as changes in weir location, alignment, height, reservoir size, access road alignment, material sources (borrow areas), etc. and make comparison of such alternatives, in technical, economic, social and environmental terms, so that the best recommendations are passed on to the team members working on the engineering aspects for incorporation in the project designs.

The assessments will be guided by the national environmental including land acquisition and resettlement related legislation as well as World Bank safeguards.

The depth of the assessment will be sufficient to adequately inform the development of alternate project designs, the selection and justification of the preferred alternatives. Project alternatives that substantially convert or degrade important natural habitats should not be considered unless they include equivalent habitat restoration and maintenance within the project area or elsewhere.

A separate procurement for detailed Environmental and Social Assessment is being undertaken by the Client. The Consultant will coordinate his work with the Environmental and Social Assessment carried out under this separate consultancy and have feedback and incorporate the findings and recommendations of that study in this report.

Design features to avoid adverse impacts, minimize land acquisition and involuntary resettlement, or enhance environmental/natural resource services are to be clearly noted in the description of preferred project alternatives, with suitable maps. Acceptability of the final project design will depend not only on its technical and financial feasibility, but also on its environmental and social suitability.

Task 9: Assessing and Designing Agricultural Support Services

To support the design of interventions under the Project Component 2, necessary assessment and design activities to be undertaken include but not limited to the following, taking a complementary approach:

- (i) The margins of the Crop enterprises currently existing in the proposed command areas
- (ii) An analysis of best-bet crop enterprises based on their profitability, market opportunities, yield potential and suitability of environment
- (iii) Potential for crop intensification due to limited land access as a result of small holdings.
- (iv) An assessment of the existence of supportive infrastructure and institutions in regards to agricultural production, storage, processing and marketing.
- (v) Analyze successful contract farming business models with existing business operators especially for seed multiplication and its potential in the proposed irrigation infrastructure.
- (vi) Identify successful public private partnerships business model with existing producer organization(s) with a view to replicating the model in the proposed irrigation scheme.
- (vii) Existence or ongoing legal and regulatory framework to support PPP and/or contract farming.
- (viii) Existing or proposed infrastructure development to support the storage, preservation, processing and transportation of fresh produce to the markets.
- (ix) An analysis of service delivery mechanisms and actors in regards to supporting farmers in accessing inputs, financial services (savings and credit), advice and markets

- (x) A review of likely interventions required to ensure that targeted population obtains the intended benefits from irrigation. (e.g. issues of land, environment conservation); and
- (xi) Suggestion on how project shall obtain “buy in” from key stakeholders.

Task 10: Institutional Assessment

The objective of this Task is to design institutional arrangements for the proposed project. The Consultant will assess institutional constraints and opportunities for efficient management of irrigated agricultural production in the project areas. This will cover

- (i) Assessment of the institutional capacity of local agencies supporting agriculture and delivering irrigation services;
- (ii) Existing gap within the legal and regulatory framework to support agricultural production within the irrigation schemes (Water for production).
- (iii) Legal and regulatory framework related to contract farming and PPP in agricultural production.
- (iv) Existence of commodity state corporations like the Uganda Coffee Development Authority (UCDA) established to support the production and marketing of the various commodities.
- (v) Assessment at the field level of the importance of and access to local groups and institutions for different socio-economic groups for both women and men;
- (vi) Assessment of private sector involvement in the agriculture sector (particularly in rural finance, input supply, machine leasing, output storage, agro-processing, operation and maintenance (O&M) and marketing, including the role of cooperatives and farmers’ associations), and
- (vii) Likely implementation and operation arrangements for the potential project(s) including but not limited to potential for Public-Private-Partnerships, organizing farmers in Irrigation Water Users Associations, formation of cooperative societies, etc. The Consultant will explore opportunities for various social groups (women and men), to participate in decision making processes. The institutional analysis will define the linkages with the current institutional set-up of the transboundary water management and recommend implementation arrangements.
- (viii) Undertaking irrigation service delivery business models (options/pathways) assessments and recommending best fit option for each scheme; and
- (ix) Undertaking irrigation water tariff assessment, based on analysis and stakeholder engagement and consultation, and recommending tariff level, schedule and collection and management mechanisms, taking into consideration of irrigation system O&M cost recovery, tariff affordability and wiliness to pay by the users.

Task 11: Construction Plans and Implementation Scheduling

The Consultant shall establish construction schedules for the implementation of the project including weir/barrage, irrigation system, outlet works as well as other multipurpose infrastructures. Apart from the construction items of the earthworks and concrete works for the main structures these schedules shall include mobilisation, construction of access roads as well as routes to borrow areas, mapping and information on quantity and quality of borrow areas, establishment of the construction camp, provision of housing and transport facilities for supervising staff, construction packaging, work methods and preliminary labour force requirements. In the schedules the Critical Path Method shall

be applied. Based on this the disbursement schedule of the project main components will be estimated as an input for the financial and economic analysis.

Task 12: Preparation of Preliminary Cost Estimates and Benefits

The consultant shall identify and value the costs and benefits that will arise with the proposed project for purposes of comparison with the situation as it would be without the project and determining the incremental net benefit arising from the project investment. This will involve preparation of financial cost estimates for the various project options and components with expenditure schedules for capital costs, replacement costs, O&M, management costs, etc. for all activities and services. A summary of the financial and economic cost estimates shall be provided in a tabular form and appropriately classified and discussed. All cost estimates must show the foreign and local currency requirements; taxes, subsidies shall be identified and their implications analysed; physical and price contingency allowances should be quantified appropriately for each component/activity of the projects.

The Consultant should prepare estimates of project benefits, which should include: direct/indirect benefits, tangible benefits (arising either from an increased value of production or from reduced costs), intangible benefits (such as new job opportunities, improved access to domestic water supply and power generation as appropriate through availability of storage etc.). The Consultant will also estimate secondary benefits created or costs incurred outside the project (using shadow pricing techniques/non market valuation), so that they can be attributed to the project investment, in the economic analysis. Residual values must be calculated. Specifically for the storage reservoir, the consultant will identify multipurpose benefits deriving from upstream storage. They will propose a number of scenarios that differ in terms of the use of the stored water (irrigation, flood management, hydropower generation, municipal water supply, etc.) and that maximize the returns on investment in storage. Scenarios should include sensitivity tests involving climate change scenarios.

Task 13 Economic and Financial Analysis

The Consultant shall:

- (i) compile and tabulate estimated incremental direct agro-economic financial benefit streams, prepared using constant prices (or suitably applied price projections if warranted) and appropriate assumptions; estimate likely build-up of agricultural production volumes and other benefits over the years following the initial investments and likely future production trends in a without-project situation
- (ii) undertake project economic and financial analysis using standard techniques for the irrigated agriculture as well as other identified uses. This should include determination of the financial and economic viability of the project, by carrying out analyses to determine the net present value (NPV), cost benefit analysis (CBA; B/C ratio), Net benefit – investment ratio (N/K) and financial and economic internal rates of return (FIRR, EIRR), including different discount rates.
- (iii) perform sensitivity analysis on important parameters (including calculation of switching values) to check their impact on the financial and economic viability. The consultant should clearly list what assumptions are made and which key developments are needed to reach FIRR and EIRR.

The key information for the project shall be presented in tabular format together with key environmental and social information. The Consultant should also provide documented analysis in Excel spreadsheets and based on this analysis make final recommendations on the way forward.

Task 14: Preparation of Feasibility Study Report

The Consultant will prepare a feasibility study report, which shall document the studies and investigations carried out, findings and information. The reports shall contain firm statements on the technical, economic/financial and environmental and social sustainability, and recommendations on project suitability and outlook, if necessary through a multi-criteria analysis.

The report shall include a concise executive summary to make the report more accessible to the public. The results of the investigations shall be compiled and appended either to the report or in a separate volume of the feasibility studies. This volume will aim at evidencing that the amount of investigation carried out brings a sufficient understanding of the site conditions to finalize the project layout and cost estimate with an acceptable level of contingencies at feasibility level. The report will form a decision point on whether to advance the studies, in case viable options have been identified, or terminate the studies in case all options are non-feasible. In the former, the Consultant in consultation with the Client and stakeholders shall agree on the best design alternatives/layouts, for which term of reference shall be prepared to support the tendering of the detailed designs.

4 METHODOLOGY AND STANDARDS

The Consultant will be expected to employ the most effective methodology and standards to achieve results with optimal national stakeholder involvement. In addition, the Consultant will be expected to:

- (i) collect most data from review and analysis of existing secondary sources of information such as Sector development plans, draft irrigation master plan, assessment reports, feasibility study reports for other schemes under the project, final design report and various other regional and relevant global publications;
- (ii) prepare clear, concise and focused reports; and
- (iii) ensure reports are delivered in time as per the agreement. British/American Standards shall be used for the feasibility studies, and their application shall be appropriately referenced. ICOLD dam design criteria shall be used to guide the definition of design floods, earthquakes, sediment management etc.

5 DELIVERABLES AND PERIOD OF PERFORMANCE

The Consultant will produce the following reports and make presentations of the same to the Client:

Report (Time)	Description	No of Copies
Inception Report (1 month after Commencement)	Contains the updated work plan, state of mobilization, refined work methodology and understanding of assignment, specify submission dates for each of the required technical reports in draft form, issues identified for Client's attention, proposed content and structure of the various reports. The proposed project schedule shall be broken down by tasks and sub-tasks and presented in Gantt chart form. A presentation shall be made by the Consultant after 1 month to review and approve the report.	5 hard copies and an electronic copy on a memory stick
Interim Report (7 months after Commencement)	The report will present the preliminary analysis of various technical options for the irrigation system and headworks, their locations and impact on/ by downstream and upstream of the project area. The report will contain preliminary results from field technical investigations and surveys, socioeconomic and environmental survey findings, geotechnical baseline report, preliminary findings of the various water use/ water demand assessments, and the relevant annexes. The report will provide sufficient details of various alternatives for the Client to select the alternative(s) to be considered going forward. The presentation shall be made by the Consultant after 7 months.	5 hard copies and an electronic copy on a memory stick
Draft Feasibility Report (10 months after Commencement)	The report will contain progress made, including details of the project area, links with existing institutions, lessons from similar projects, an assessment of constraints and opportunities, preliminary results from field investigations and surveys, socio-economic and environmental survey findings, geotechnical baseline report, preliminary findings	5 hard copies and an electronic copy on a memory stick

Report (Time)	Description	No of Copies
	of the various water use/water demand assessments, and relevant annexes. A presentation shall be made by the Consultant after 10 months to review and approve the report.	
Detailed Feasibility Report (12 Months after Commencement)	Covering Feasibility study of the selected design alternatives for Enengo. It will contain a complete technical description of the recommended schemes, including justification, analysis, computation, drawings, figures and maps as well as detailed reports on all subjects treated in the scope of the study, such as social and environmental impacts of the project. The Consultant shall also submit the raw data, models and outputs, and any working sheets utilised to generate this report. A presentation shall be made by the Consultant after month 12 to review and approve the report.	5 hard copies and an electronic copy on a memory stick
Monthly progress reports (1 st week of every month)	A narrative and bar charts or other graphic presentation, showing details of the Consultant's progress, changes in the assignment schedule, impediments and proposed remedies will be submitted on a monthly basis. Reports should include a financial summary, indicating amounts invoiced, amounts disbursed, and any other pertinent financial details.	Submission by electronic mail

6 QUALIFICATION OF THE CONSULTANT

The consultancy firm should demonstrate experience in carrying out at least two (2) similar assignments in the last 10 years in sub-Saharan Africa. The similarity of the assignment shall be defined as those comprising of feasibility studies and/or design of irrigation schemes with command area of not less than 1,000 ha, and including hydraulic structures namely dams, weirs or barrages, each of a minimum value of at least US\$ 0.2 Million.

The study team should comprise experienced professionals which will include national/regional/international consultants as necessary to ensure study relevance and effectiveness in light of prevailing local conditions. The team should reflect an appropriate mix of disciplines, education, skills and experience, an understanding of underlying development issues, and regional experience. The team should be made up of specialists each with relevant qualifications in the corresponding disciplines and experience in undertaking studies related to irrigation development and watershed management.

The areas of expertise required include: irrigation engineering and agriculture development, watershed management, rural development, civil/infrastructure/hydraulic engineering, hydrology, soils, financial and economic analysis, geotechnical engineering, institutional analysis and environmental and social impact assessment. The Consultant may optimize their personnel to demonstrate the competences required for the assignment. The time input and qualifications of the key experts are as follows:

Position	Person-Months	Competences
Irrigation Engineer/ Civil Engineer (Team Leader)	8	Bachelor's degree in Civil/Irrigation/Hydraulic Engineering and postgraduate degree in Irrigation/Hydraulic Engineering (or related field), with a minimum of 10 years' experience in water resources planning and design and construction

Position	Person-Months	Competences
		supervision of hydraulic structures such as gravity dams, hydropower projects and irrigation systems; Must be a registered Engineer with a relevant professional body; and has experiences in designing World Bank or other IFI financed irrigation projects in recent years; strong coordination and leadership skills with proven record over past five years.
Agricultural Planner/ Agronomist	4	Bachelor's degree in Agriculture or Agronomy and postgraduate degree in Agronomy or related sciences with at least 7 years of work experience in commercially oriented irrigation or irrigated agriculture development projects.
Geotechnical Engineer	3	Bachelor's degree in Civil/Geotechnical/Structural Engineering and postgraduate degree in Geotechnical/Structural Engineering and at least 7 years of experience in geotechnical investigations, design and construction supervision of hydraulic structures including weirs/barrages.
Structural Engineer	2	Bachelor's degree in Civil/Structural Engineering and postgraduate degree in Structural Engineering and at least 7 years of experience in design and construction supervision of hydraulic structures.
Hydrologist	3	Bachelor's degree in Civil/Agricultural/Water Resources Engineering and postgraduate degree in Water Resources/Hydrology, and at least 5 years' experience in use of water resources models for surface and groundwater assessments as well as experience in use of GIS/remote sensing in river basins.
Soil Specialist/ Pedologist	4	Bachelor's degree in Agriculture/Crop Science/Soil Science and postgraduate degree in Crop Science/Soil Science and at least 5 years' experience in soil investigation for irrigation and watershed projects
Economist/Financial Specialist	3	Bachelor's degree in Commerce/Economics/Business Administration and postgraduate degree in Economics, and at least 5 years of work experience on development projects, specifically in economic and financial analysis of water resources development projects; and has experiences in irrigation water tariff assessment and design.
Land Surveyor	4	Bachelor's degree in Land Surveying and postgraduate qualifications in Land Surveying or Geographical Information Systems with demonstrated experience in use of remote sensing/GIS applications. Minimum of 5 years' experience in engineering surveys.
Social Development Specialist	4	Bachelor's degree in Social Sciences/ Social Development/ Social Work and Social Administration and postgraduate degree in Sociology, Development Studies or related fields

Position	Person-Months	Competences
		with 5 years of work experience. The Specialist will ensure that socio-economic and gender issues are appropriately included during the project preparation/design stage.
Environmental Specialist	4	Bachelor's degree in Environmental Sciences or Natural Sciences and postgraduate degree in Environment studies or related fields and at least 5 years work experience in Environmental Assessments. Knowledge of World Bank Social and environmental safeguards is a must.
Irrigation Institution/management specialist	4	Bachelor's degree Irrigation or Agriculture or related subject with over 10 years' experience working in irrigation/irrigated agriculture sector. Familiar with Uganda's irrigation and agriculture sectors and institutions, as well as international good practices in irrigation institutions and service delivery, management reforms; and have good knowledge of irrigation water user associations (WUAs) and farmer producers' organizations (FOs) development and capacity building.
Total Man-Months	43	

7 KNOWLEDGE TRANSFER

The Ministry of Water and Environment has a capacity building plan for its staff. This enables them to enhance their skills and knowledge of the water sector in order to have a cutting edge in execution of their tasks. The Client shall require the consultant to submit a training plan for staff covering all the aspects of practical water engineering and irrigated agriculture such as but not limited to, training in software, tools and the use of various software and models in analysis of data at the feasibility study stage and design of irrigation infrastructure to be a part of the proposal and clearly state the approach and methodology of how this training will be carried out.

The Consultant shall work with the designated staff with the aim of developing capacity and knowledge transfer. The training measures are aimed at improving the performance of the designated technical staff with the goal of preparing the staff such that they will be capable of carrying out a similar study on their own in the future. The Consultant should propose training topics in the technical proposal which shall further be defined during the consultative meetings with the Client. For Tendering purposes, the tentative number of individuals to be trained is 8 No. Engineers. The Consultant should as well provide a methodology for monitoring and evaluation of trainees, and any post training support and resources to the staff.

8 DATA AND SERVICES TO BE PROVIDED BY THE CLIENT

Data and documentation on hydrological, meteorological, water quality and other relevant aspects of the river basins which the Client may have will be availed to the consultant; however, the consultant has the ultimate responsibility for collecting the required data and documentation which cannot be made available by the Client from official sources. The Client shall:

- (i) Facilitate in establishing communication with the relevant institutions.

- (ii) Liaise and assist the consultant in obtaining any other information and documents required from other government agencies and which the Client considers essential for conducting the assignment
- (iii) Provide assistance to obtain work permits for staff of the Consultant
- (iv) Provide assistance in obtaining Customs and Tax Exemptions, where applicable, as detailed in Special Conditions of the Consultancy Agreement and General Conditions of Service.
- (v) Arrange consultative meetings and ensure linkage with relevant stakeholders and district authorities and
- (vi) provide any document on request that the consultant may require in the course of the feasibility studies.

The Consultant shall operate their own project office and shall bear all accommodation, local transportation, visas, and other costs necessary to carry out the assignment.

9 COSTS AND CONTRACT DETAILS

It is estimated that the work will commence in March 2024. Proposals should indicate how the funds will be best utilized to achieve the objectives of the assignment. Whilst all of the Consultant's costs are incurred in their participation, supporting the arrangement and running of national and district workshops must be included in the consultant's financial proposal, the costs of holding the workshops themselves (costs of venue, participants' expenses such as transport and accommodation, materials etc.) will be met by the Client and should not be included in the Consultant's financial proposals. The costs of all other consultations, meetings etc. required by the Consultant to adequately complete the assignment must be included in the financial proposals. Erroneously.

10 DURATION OF THE ASSIGNMENT

The duration of the consultancy services is expected to last 12 calendar months. This duration is to be understood as guidance and it is the responsibility of the consultant to establish a detailed work program within the above time estimate. The estimated staff time inputs should be provided in accordance with the consultant's professional judgment and knowledge of the local conditions and needs.

11 REPORTING AND SUPERVISION ARRANGEMENTS

The Client is the Ministry of Water and Environment. The Consultant will be directly supervised by a contract management team from Irrigation for Climate Resilience Project Implementation Unit under the Water for Production Department on behalf of the Client. The contract management team will ensure close coordination and participation of other Government Agencies to ensure information exchange.

The Client will hold discussions with the Consultant at various stages of the consultancy to assess work progress, discuss constraints and possible interventions to ensure quality and meet deadlines.

12 QUALITY MANAGEMENT REQUIREMENTS

The Consultant will be required to demonstrate in their proposal evidence of adoption of the use of a Quality Assurance System (ISO 9001 or equivalent), as well as describe how quality control will be implemented in the course of the project.