IUCN Eastern and Southern African Regional Office

CONSULTANCY ADVERTISEMENT

Terms of Reference: To Improve and Stabilize Annual Water Flows and Dry Season Base Flows in 3 Micro-catchments in the Karamoja Sub-region, Uganda

1 Background

In 2014, the Food and Agriculture Organization of the United Nations (FAO), with funding from the United Kingdom Department for International Development (DFID), contracted International Union for Conservation of Nature (IUCN)[i], and International Institute for Rural Reconstruction (IIRR), to implement components of the project titled: "*Strengthening Adaptive Capacity of Local Governments and Communities in Karamoja to Reduce Impacts of Climate Risk to Livelihoods through Strategic Planning and Response*" in the Lokok and Lokere Catchments in Karamoja, Uganda (Figures 1 and 2 respectively) in line with FAO's Strategic Objective V: "*Increase the Resilience of Livelihoods to Threats and Crises*". The project is strategically designed to directly contribute to Uganda's Catchment Management Framework and builds on past and ongoing initiatives of IUCN and IIRR in collaboration with FAO. In particular, it builds on the pilot Integrated Water Resources Management (IWRM) project work for the Lokok sub-catchment supported by European Commission on Humanitarian Aid and Civil Protection (ECHO), and capacity building initiatives on Community Managed Disaster Risk Reduction (CMDRR) and Community Based Integrated Watershed Management supported by FAO.

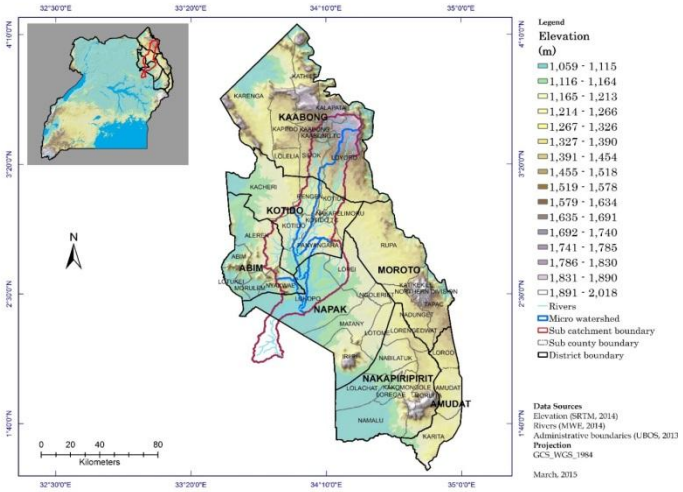

Figure 1: Lokok Catchment

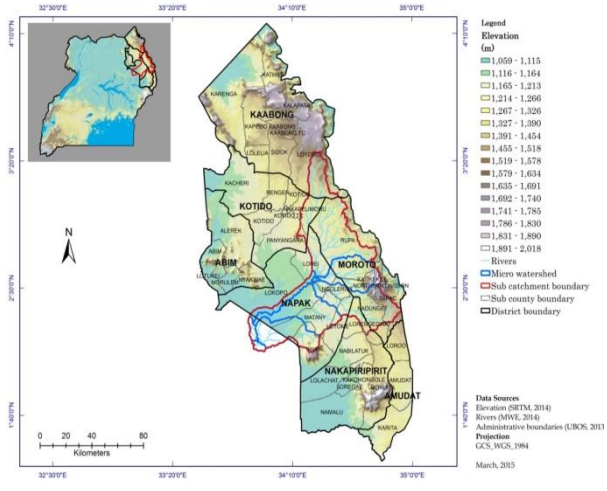

Figure 2: Lokere Catchment

One of the key outputs of this project is a report on the Watershed Assessment and Geospatial Analysis of Lokok and Lokere Catchments. This report identified key challenges in relation to

sustainable water resources management in Karamoja. These include but are not limited to: highly variable and unreliable rainfall; silting of surface water resources; and low storage capacity of the soils and reservoirs. This is majorly caused by human and non-human factors including but not limited to: poor farming methods; overgrazing around watering points and protected kraals; un-controlled bush wildfires; deforestation for charcoal burning, wood fuel, building, construction of kraals, and fences of homesteads. This is compounded by; increasing human population, poor soil texture/structure and weak natural resources management institutional structures. The result has been; soil erosion, reduced soil productivity, poor water quality and reduced surface water sources.

This situation has been worsened by the climate related shocks and risks such as; prolonged dry spells, frequent drought, flooding and flash floods which are increasing in both intensity and frequency. In many areas, the rainy season either starts early or late and generally has become shorter and heavier than in previous years. The increasing risk of droughts resulting from the changing rainfall patterns is, therefore, putting at risk the food and livelihood security of farming and pastoral communities in the Karamoja Region. The combination of these distortions have led to water deficits during planting time, and in some areas heavy rainfall is creating erosion and landslides, resulting in soil erosion and degradation of agricultural lands in the watersheds and rangelands. Consequently, this has reduced the coping ability of an already vulnerable community to socio-economic disasters and climate related shocks and risks.

Based on this background, FAO with funding from DFID made an addendum to the on-going Enhancing Resilience in Karamoja Program (ERKP), number - GCP/UGA/042/UK and launched the Integrated Water Resources Management Project in Karamoja (IWRMK). The IWRMK project proposes to enhance resilience of rural communities in Karamoja and reduce their vulnerability to water related stress factors by implementing participatory catchment-based integrated watershed and rangeland management approaches. The project will provide technical support to the strengthening of water resources and rangeland management and governance frameworks at community level. Increasing the knowledge base for informed decision making in water resources and rangeland management is also among the objectives of the addendum.

The IWRMK project is organized around the following two outcomes and four outputs namely:

A. ***Outcome 1:*** Resilience of Watershed Ecosystems Improved
   i. Output 1.1: Vulnerable micro-watershed ecosystems restored and rehabilitated;
   ii. Output 1.2: Community based rangeland management introduced, and degraded range resources rehabilitated.

B. ***Outcome 2:*** Knowledge and Institutional Capacity for Integrated Water Management Improved;
   i. Output 2.1. Water Governance Frameworks Strengthened, and
   ii. Output 2.2. Water Resources Knowledge Base Improved.

IUCN, with support from the FAO, would now like to improve and stabilize Annual Water Flows and Dry Season Base Flows as well as rehabilitate and restore degraded watershed ecosystems in the 3 Micro-catchments of Loyoro, Panyangara and Omaniman of Lokok and Lokere catchments (Section 3) in order to increase their ecological resilience.

Rationale

Climate change is having a multitude of immediate and long-term impacts on water resources in Karamoja. These include flooding, drought, drying up of rivers, poor surface water quality and groundwater systems, precipitation and water vapour pattern distortions. These effects when compounded together have devastating impacts on ecosystems and communities, ranging from economic and social impacts to health and food insecurity, all of which threaten the continued existence of many communities in Karamoja. Vulnerability varies according to individual areas, geographical positioning and the capacity to mitigate or adapt to the changes. Coping, adapting and building the resilience capacities of Karamoja communities towards the impacts of climate change on water resources requires a holistic approach involving systems thinking and risk management strategies. Solutions pivot on taking urgent action to utilize science technology and innovation, policies relevant to water audit and management, and engagement of private, civil and international sectors if a major crisis is to be averted. For example, deforestation in Karamoja is well known to be increasing the frequency and magnitude of floods in Teso Sub-Region. Wetland drainage in some districts for rice growing is creating flooding because the natural storage capacity of the floodplain and the wetlands they support has been lost. During low frequency high magnitude floods, the water simply has nowhere else to go.

The impacts of floods are also exacerbated by the very fact that settlements have been built on the floodplains. Urbanization, which leads to the expansion of built-up, impermeable surface, such as roads, parking lots and shops further increases the rates of run-off. In addition, rivers capacity is often reduced in local sections of the river, in urban areas. At bridging points and contained sections, bottlenecks form without additional spillways and can quickly become flooded during high flow. Population pressure is another factor. High population pressure leads to increases in agriculture and urbanization, which further increases the rates of soil erosion and sedimentation. In some cases, poor drainage can exacerbate flood events and in places where the river has been redirected and during extreme events the river simply takes its own route, regardless of what's its way. In most cases flood management, such as dam construction and channelization reduces the frequency of floods. However, most of the valley tanks and dams built during the colonial government are now silted and no longer serve this purpose.

3 Project sites

This project is being implemented in both Lokok and Lokere Catchments in Kyoga Water Management Zone (Figures 1 and 2 above). The Lokok Sub catchment is located in the districts of Napak (23% of the catchment), Kotido (34%), Abim (9%), and Kaabong (25%) within the Kyoga Water Management Zone (KWMZ). It covers a total area of 5,491.2 km^2 and is characterized by highlands like Mt. Moroto, Mt. Napak, Mt. Timu and Mt. Morungole, from which the catchments streams originate, to drain their waters into the plains in Napak district, and subsequently into the wide wetlands complex around Lake Bisina in Teso. The Lokere Catchment is located in the districts of Napak (23.1% of the catchment), Kotido (4.8%), Nakapiripirit (2.7%), Moroto (54.1%) and Kaabong (6.7%) (Figure 1). The Lokere Catchment lies within the Kyoga Water Management Zone (KWMZ) and covers a total area of 6,664km^2, and it is characterized by highlands like Mt. Moroto and Mt. Napak from which, the catchment's streams originate, to drain their waters into the plains in

Napak district, and subsequently into the wide wetlands complex around Lake Bisina in Teso. The Lokere River is the largest seasonal river defining the catchment. Currently, the catchment provides water to almost 237,223 peoples in Karamoja (UBOS, 2014). Specifically, the project will be inplemented in three (3) micro cachments of: Loyoro, Panyagara and Omaniman.

Loyoro micro-catchment

Loyoro micro-catchment (123,402.07 Ha) straddles the sub-counties of Sidok and Loyoro in Kaabong District and Rengen, Kotido, Nakapelimoru and Panyangara in Kotido District (Figure 3). The biggest area of the micro-catchment is contributed by Loyoro and Panyangara. The total population of the micro-catchment is estimated at 45,376 inhabitants.

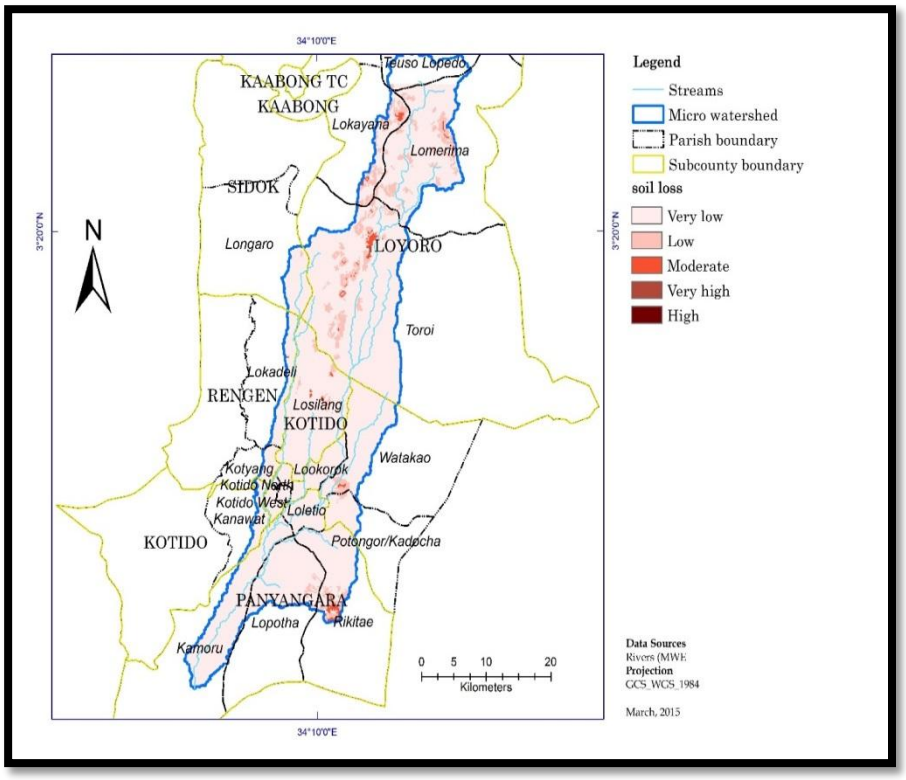

Figure 3: Loyoro micro-catchment

Panyangara micro-catchment

This micro-catchment covers Lokopo and Lopei Sub-counties in Napak District and Panyangara sub-county in Kotido District, with Lokopo being the biggest land contributor (Figure 4). The total population of the micro-catchment is estimated at 36,334 people.

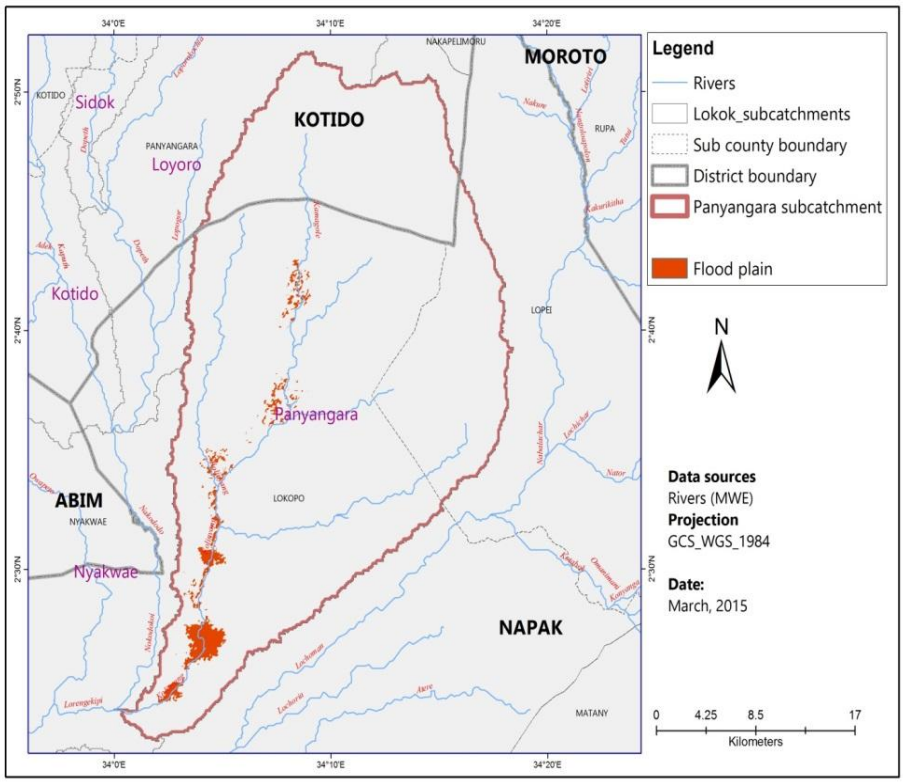

Figure 4: Panyangara micro-catchment

Omaniman Micro-catchment

This micro-catchment covers Lorengedwat Sub-county in Nakapiripirit District, Tapac, Nadunget and Katikekile Sub-counties in Moroto District and, Lotome, Lopei, Lokopo and Ngolereit Sub-counties in Napak District (Figure 5).

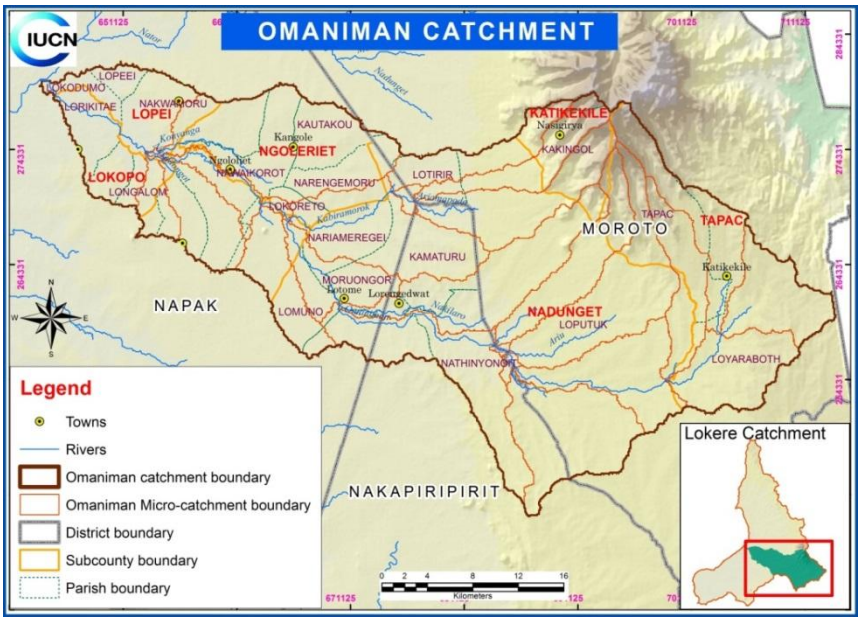

Figure 5: Omaniman micro-catchment

4 Objectives

The overall of objective of this assignment is to rehabilitate and restore degraded watershed ecosystems the 3 Micro-catchments of Loyoro, Panyangara and Omaniman of Lokok and Lokere catchments. The specific objectives are to:

A. Improve and stabilize annual water flows in one (1) stream in each of the three (3) micro-catchments;

B. Improve and stabilize dry season base flows in one (1) stream in each of the three (3) micro-catchments;

C. Reduce flash flood velocity through vegetation measures in upstream watersheds in a one (1) km2 area in each of 3 micro-catchments;

D. Restore river corridors, including the establishment or ecological restoration of riparian zones of six (6) kilometre stretches in each of 3 micro-catchments;

E. Carry out soil conservation measures through vegetative and mechanical measures in one (1) identified hotspot in each of 3 micro-catchments; and

F. Rehabilitate one (1) km2 of degraded watershed areas in each of 3 micro-catchments.

5 General approach and methodology

This assignment involves employing both engineering works and nature based solutions to address the challenges above in selected sites in each of the 3 micro-catchments and achieve the objectives indicated above. Both engineering and nature based restoration measures will be applied concurrently in each case in order to maximize the impacts of the interventions and restore both the productive and hydrological functions and ecosystems services of the selected watersheds.

These measures include but are not limited to:

5.1. Nature based solutions: Nature-based solutions encompass use of natural measures to address the above identified environmental problems. Measures in this regard include: Demarcation of river/stream banks to create buffer zones and allowing natural regeneration and/or planting of indigenous trees on both sides in order to restore degraded river/stream banks so as to reduce siltation, promote recharge of water for domestic use and livestock and provide pasture to livestock during the dry season.

5.2 Mechanical stabilization techniques: Applicable here is use of rock, gabion baskets, concrete, geosynthetics, and steel pins to reinforce slopes and provide stability to both cut and fill slopes. Mechanical stabilization techniques may include retaining walls, mechanically stabilized earth, geosynthetically reinforced soil, and other in-situ reinforcement techniques.

5.3 Earthwork techniques: Earthwork techniques may be used to control surface runoff. This involves the physical movement of soil, rock, and/or vegetation for the purpose of erosion control and slope stabilization. This also includes reshaping the surface slope by creating terraces or benches, flattening over steepened slopes, soil roughening, or land forming. Land grading may be used at sites with uneven or steep topography or on easily eroded soils to stabilize slopes, and terraces can be used to reduce sediment-laden runoff by slowing water flow down the slope, collecting and redistributing surface runoff into designed drainage channels.

5.4 Soil bioengineering techniques: Biotechnical stabilization applies to retaining structures, revetments, and ground cover systems. These measures utilize plant parts such as roots and stems to serve as structural and mechanical elements in slope protection systems. The plants act as soil reinforcement, aid in water drainage, or serve as barriers to earth movement. Biotechnical stabilization utilizes structures in combination with plants to arrest and prevent slope failures and erosion with biological and mechanical elements functioning together in an integrated and complementary manner.

The consultant will decide which technology will be best suited once the sites have been visited and assessed.

6 Tasks

The specific tasks to be performed under this assignment include and are not limited to:

1) Carrying out participatory and basic scientific Flood Risk Assessment in the 3 micro-catchments and mapping out flood zones;

2) Carrying out participatory and basic scientific Soil Erosion Risk Assessment in the 3 micro-catchments and mapping out degraded/gullied zones;

3) Analyzing, ranking and prioritizing the mapped out **Flood and Soil Erosion Risk Zones** in order to identify;
   A. One (1) stream in each of the three (3) micro-catchments to be worked to in order to improve and stabilize annual water flows,

B. One (1) stream in each of the three (3) micro-catchments to be worked to in order to improve and stabilize dry season base flows,
C. One (1) stream in each of the three (3) micro-catchments to be worked to in order to reduce flash flood velocity through vegetation measures in upstream watersheds,
D. Six (6) kilometre stretches in each of 3 micro-catchments for river corridors restoration, including the establishment or ecological restoration of riparian zones in each of 3 micro-catchments,
E. One (1) hotspot in each of 3 micro-catchments for carrying out soil conservation measures through vegetative and mechanical measures, and
F. One (1) km2 of degraded watershed areas in each of 3 micro-catchments for rehabilitation.

4) Define the most appropriate rehabilitation measure for each sub-activity in No.3 above, based on the participatory and basic field assessment and prioritization above, that could include but not limited to:
   A. Vegetation restoration measures in upstream and degraded watersheds;
   B. Soil conservation measures through vegetative and mechanical measures;
   C. Construction of check dams (size and type will be arrived at based on hydrological set up of the micro catchments feeding to these streams);
   D. Stabilization of embankments of major streams that seem to threaten the riparian areas and the nearby settlements;
   E. Construction of diversion channels; and
   F. Construction of sediment traps to avoid soil loss and control sheet erosion;

5) Based on the above processes, develop;
   A. Scope of work and specifications for each site,
   B. Working drawings of each proposed site, and
   C. Bills of Quantities (BoQs) for the prescribed restoration measures at each site.

6) Undertake the following restoration activities using a combination of both nature based solutions and engineering works based on the processes in 1-5 above:
   A. Restoration of one (1) stream in each of the three (3) micro-catchments in order to improve and stabilize annual water flows,
   B. Restoration of one (1) stream in each of the three (3) micro-catchments in order to improve and stabilize dry season base flows,
   C. Restoration of one (1) stream in each of the three (3) micro-catchments in order to reduce flash flood velocity through vegetation measures in upstream watersheds,
   D. Restoration of six (6) kilometre stretches in each of 3 micro-catchments through river corridors restoration, including the establishment or ecological restoration of riparian zones in each of 3 micro-catchments,
   E. Restoration of one (1) hotspot in each of 3 micro-catchments through soil conservation measures through vegetative and mechanical measures, and
   F. Rehabilitation and restoration of one (1) km2 of degraded watershed areas in each of 3 micro-catchments for rehabilitation.

7 Time frame

The entire work is expected to take a total of 90 billable working days spread over a period of 4 months from 15th August to 14th December, 2016. This period includes desk work, field assessment work, restoration activities and reporting. IUCN, FAO and other partners will participate in the assessment, as well as providing logistical support to the process.

8 Expected outputs

A. Inception report outlining the assessment methodology, tools and plans for the consultancy (including community consultation processes);
B. A comprehensive assessment status report that details all the aspects in 1-5 above, including but not limited to; (i) Scope of work and specifications for each site, (ii) Working drawings of each proposed site, and (iii) Bills of Quantities (BoQs) for the prescribed restoration measures at each site and recommendations for implementation by the consultant for approval by IUCN and FAO.
C. Draft technical status report of activity execution for input and comments IUCN and FAO;
D. Final technical status report of activity execution that incorporates input and comments from IUCN and FAO for their final approval

9 Qualifications

A. University degree or Diploma in relevant subjects that cover elements of hydrology including but not limited to: civil and environmental engineering; ecology; environmental management; environmental sciences; geography (with a physical science base); geology; soil science; aquatic resource management; environmental engineering; environmental management; flood risk management; hydrology and water quality; water management; and water resources management.

B. Technical experience in: Preparation of water scheme designs; Design and development of water schemes and structure plans; Community engagement, feasibility and option analysis; Hydrological and hydraulic analysis and modelling; Economic appraisal and business case preparation; Environmental enhancement and mitigation; Technical and commercial reporting; Preparing tender documents; Public consultation and presentation; Cost estimates and profiling; Project programming; Risk management; Contract management; Root cause analysis and problem solving.

C. Skills: You will need to show evidence of: sound technical knowledge; strong oral and written communication skills; numeracy and a good understanding of mathematical modelling and IT programming skills; analytical skills; people skills, in order to engage with a range of different groups, e.g. water and environment officers and planners; project-management skills; a high level of commitment and self-motivation; a logical, methodical approach and good organizational skills; and a flexible approach to work and the ability to adapt to change and deal effectively with varying situations.

D. Karamoja work experience: Experience of similar works in Karamora is a MUST.

10 How to apply

Interested Firms/Individuals are requested to submit separate technical and financial proposals stating the assignment applied for, along with an application letter outlining knowledge, competencies, skills and past experience in undertaking the tasks mentioned above to IUCN office during office hours at the email address below. The technical proposal should give all details of the methodology/approach to be used in each task, as well as, the timing and/or scheduling for each task. The financial proposal should indicate how much the entire assignment will cost in terms of professional fees, reimbursable costs and transport costs. The letter of expression of interest should be accompanied with:

A. Samples of previous similar works;
B. Firm/Organization track record (profile); and
C. Signed and dated Curriculum Vitae of proposed assigment team.

Please send your full proposal electronically to IUCN Uganda Country Office (uco@iucn.org) by 14 August 2016

Quality and cost basis selection will be employed to evaluate and select the consulting firm. Technical proposal carries 80% marks and financial proposal carries 20% marks.

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[i] *IUCN, International Union for Conservation of Nature, helps the world find pragmatic solutions to our most pressing environment and development challenges. IUCN's work focuses on valuing and conserving nature, ensuring effective and equitable governance of its use, and deploying nature-based solutions to global challenges in climate, food and development. IUCN supports scientific research, manages field projects all over the world, and brings governments, NGOs, the UN and companies together to develop policy, laws and best practice. IUCN is the world's oldest and largest global environmental organization, with almost 1,300 government and NGO Members and more than 15,000 volunteer experts in 185 countries. IUCN's work is supported by almost 1,000 staff in 45 offices and hundreds of partners in public, NGO and private sectors around the world. IUCN's Eastern and Southern African (ESARO) region comprises 24 countries in the Horn of Africa, eastern and southern Africa and the western Indian Ocean namely: Angola, Botswana, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, Somalia, South Africa, South Sudan, Sudan, Swaziland, Rwanda, Tanzania, Uganda, Zambia and Zimbabwe.*
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