REVISION OF ECOSYSTEMS AND FOREST TYPES OF NEPAL

Terms of Reference for GIS and Remote Sensing Programmer

1. Background
In 2019, the Government of Nepal - Ministry of Forests and Environment (MoFE) initiated Ecosystem and Forest Type Mapping as a priority program and assigned the Forest Research and Training Centre (FRTC) to manage this. The program's overarching goal is to enhance the sustainable management and conservation of Nepal’s ecosystems and thus support local as well as national economies. The program also supports a timely response to the Aichi Targets # 14 of the Convention on Biological Diversity’s (CBD) ensures international commitments of ground action and reporting. This target primarily focuses on the restoration and protection of ecosystems by 2020 that provide essential services that contribute to the health, livelihood and well-being of women, and indigenous and vulnerable people.

To date, the vegetation maps drawn by Dobremez and his colleagues in the 1980s have been used as the basis of knowledge and classification of Nepal’s ecosystems and vegetation types. They identified 198 vegetation communities in seven ecological maps covering the entire area of Nepal. In 1995, the Biodiversity Profile Project (BPP 1995) digitized these maps and synthesized 118 unique ecosystem types by merging the vegetation types into one class despite their difference in the structures or conditions. Since the Nepalese Government commissioned the BPP and accepted the report, 118 ecosystem types were officially recognized for Nepal.

A comprehensive and systematic study of ecosystem and forest types of Nepal is long overdue, as the existing classifications made before the 1980s were based on limited expeditions, field studies and ground verification. Hence, the MoFE’s present initiative is a significant milestone, which aims to deliver a national-level ecosystem mapping effort using the standardized
methodology developed by the Global Earth Observation System of Systems (GEOSS) under the global ecosystem mapping initiative.

The standardized methodology for ecosystem mapping entails the integration of vegetation types and the creation of a composite map of environmental parameters. The macroclimate, lithology and landforms are the commonly used spatial parameters for the vegetation type. The vegetation type is considered to be a proxy for a specific biological community. The homogeneity of the environmental parameters with relatively stable condition delineates the iso-potential zone with a unique habitat and represents an ecological facet. Each ecological facet is considered as a distinct ecosystem type.

A national-level classification of forest, rangeland, agriculture and wetland ecosystem types will apply medium resolution satellite images in combination with extensive field data to validate the resulting map. Assessment threats and vulnerabilities to individual ecosystems and forest types will also be assessed using standard methods. Hence, the Ecosystem Mapping Program will contribute to devising national-level policies and strategies to protect and manage these life-supporting systems.

This ToR is developed and shared to seek a GIS and Remote Sensing Programmer to carry out ecosystem mapping in Nepal.

2. Objectives
The objectives of the Ecosystem Mapping Program are as follows:

- To review the existing knowledge and database relevant to the terrestrial and aquatic ecosystems of Nepal.
- To reclassify and delineate forest, rangeland, agriculture and wetland ecosystem types by applying a standardized methodology and generate appropriate maps.
- To assess critical threats and vulnerabilities to the ecosystems and provide management prescription.
- To improve institutional capacity for future monitoring and updating ecosystems of Nepal.

3. Roles and Responsibilities
GIS and Remote Sensing Programmer will work under the supervision and direction of the
Technical Advisor (TA), Ecosystem Mapping Coordinator and the FRTC management. He/she will work closely with RS/GIS Specialist to design and develop specific RS/GIS applications for reclassification, integration and mapping of ecosystems.

**Specific tasks (Desktop)**
- Work closely with RS/GIS Specialist to design and develop RS/GIS application for reclassification, integration and visualization of ecosystems in Google Earth Engine platform.
- Develop a Standard Operating Procedure (SoP) for the RS/GIS Specialist to use these applications in the Google Earth Engine platform.
- Assist RS/GIS Specialist to use these applications for reclassification, integration and visualization of ecosystems in Google Earth Engine platform.

4. **Duration of contract:**
The duration of the contract is 4 Months and the duty station is Kathmandu.

5. **Required Skills and Experience:**
- Master degree in Forestry or Forest Ecology or Natural Resource Management or Geoinformatics.
- A minimum of five years of professional experience in geospatial analysis using the Google Earth Engine platform.
- Demonstrated experience in JavaScript programming and developing an application in Google Earth Engine.
- A good understanding of Agro-ecosystem and Wetland Ecosystem and the relevant environmental parameters, biotic and abiotic factors for ecosystems.
- Excellent interpersonal skill with the ability to effectively interact with all team members and stakeholders.
- A demonstrated experience in working with a multidisciplinary team in different settings and environments and delivering outputs within the timeframe.
6. Reporting Requirements

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Output and deliverables</th>
<th>Delivery date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Inception report</td>
<td>August 2020</td>
</tr>
<tr>
<td>2</td>
<td>Design and develop RS/GIS application for reclassification, integration and visualization of ecosystems in Google Earth Engine platform.</td>
<td>August/Sept 2020</td>
</tr>
<tr>
<td>3</td>
<td>Prepare Standard Operating Procedure (SOP) for the RS/GIS Specialist to use these applications in Google Earth Engine platform</td>
<td>Nov 2020</td>
</tr>
</tbody>
</table>

WWF Nepal, Hariyo Ban Program  
PO Box: 7660, Pavitra Pyara Marg, Baluwatar, Kathmandu, Nepal  
https://www.wwfnepal.org/hariyobanprogram/