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 technical advisor to lead a team of experts 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 data base 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 key 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 of the Technical Advisor**
The Technical Advisor (TA) will work closely with the Ecosystem Mapping Coordinator and in
the direction of FRTC management. TA will lead and manage the Ecosystem Mapping Team and provide guidance to thematic specialists ensuring the delivery of the program outputs. Besides, TA will work as a forestry specialist for ecosystem and forest types mapping of Nepal.

Specific tasks

A. Desktop

- Analyze the forest types based on the existing FRA data and from other credible sources.
- Collate data and information from credible sources to enhance knowledge on the current ecosystem and forest types across Nepal.
- Design or review and update (if necessary) the existing field data and data/information collection forms for forest, rangeland, agriculture and wetland ecosystems.
- Prepare Standard Operating Procedure (SOP), design and facilitate a training package to the team.
- Prepare a framework for fieldwork planning, communication and field team safety protocol.

B. Other tasks

- Lead the ecosystem and forest type Mapping program and the team by providing timely and appropriate guidance.
- Work closely with RS/GIS Specialists to identify training and validations sample points for field data and information collection.
- Assist IT Consultant to create a database system for Ecosystem Mapping of Nepal.
- Assist Data Analyst in preparing an SOP on the statistical analysis and interpretation of the field data and information.
- Work closely with RS/GIS Specialist and the Thematic Specialists (Agro-ecologist (AE), Rangeland Specialist (RS) and Wetland Specialist (WS)) to define and classify rangeland, agriculture and wetland, respectively.
- Together with RS/GIS Specialist, assist the thematic experts in designing and planning for field data and information collection and validation across all physiographic and eco-regions.
- Review and validate field data and information from the Agriculture and Wetland field team, and also review the classification of Agriculture and Wetland Types.
- Together with the thematic experts organize and facilitate consultations with the Expert Panel for consensus on classifications of Forest, Rangeland, Agriculture and Wetland.
• Assist RS/GIS Specialist and thematic experts to derive independent significant physical environmental parameters for the different ecosystem and forest types and generate an individual map for each parameter.

• Work with RS/GIS Specialists and the thematic experts to integrate the environmental maps and the typology maps for ecosystems and forest types and generate ecological facets.

• Prepare and share the ecological facets for the forest with the Expert Panel and facilitate the evaluation and consensus decision on the classification of the ecosystems and forest types of Nepal.

• Together with RS/GIS Specialist, incorporate recommendations of the Expert Panel and generate a Forest Ecosystems Map of Nepal.

• Review the ecological facets of rangeland, agriculture and wetland and assist the respective thematic specialists in organizing consultation with the Expert Panel.

• Undertake a threat and vulnerability assessment and prepare a report on the individual ecosystem and forest types and share the document with an Expert for a review.

• Review the thematic reports on rangeland, agriculture and wetland ecosystems and submit to the relevant Expert for a final review.

• Compile all the reports on ecosystem mapping of Nepal and submit to MOFE-FRTC for review and subsequently, incorporate their feedback.

• Organize and facilitate the final workshop to share outputs on the Ecosystems Mapping of Nepal, incorporate the feedback and submit the final report to MOFE-FRTC.

• Contribute to disseminate the findings of the Ecosystem and Forest Types mapping of Nepal by publishing reports and scientific papers in national and international peer-reviewed journals.

4. **Duration of the contract:**

This is a full time job for 24 months with 10% field visit. His/her working station will be based in MOFE-FRTC, Babarmahal.

5. **Required Degree, Skills and Experience:**

• Minimum of a Master’s degree in Forestry or Forest Ecology or Natural Resource Management

• A minimum of 15 years’ experiences in the following areas:
o Forestry sector focusing on the natural resource assessment, vegetation studies, ecosystem mapping and assessment.

o Vegetation types assessment and analysis.

o Mapping of ecosystems and the related ecosystem services

- Advanced knowledge and skill on Remote Sensing and Geographic Information System (GIS) with experience in Land Use and Land Cover Classification, spatial analysis and interpretation of RS/GIS data.

- Experience in collating relevant data from credible sources, analysis and interpretation of the data.

- Good interpersonal skill with the ability to effectively interact with all stakeholders.

- Demonstrated experience on managing a multidisciplinary team, and deliver outputs within budget and timeframe.

6. Reporting Requirements:

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<tr>
<th>S.N.</th>
<th>Output and deliverables</th>
<th>Delivery date</th>
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<tbody>
<tr>
<td>1</td>
<td>Inception report</td>
<td>July 2020</td>
</tr>
<tr>
<td>2</td>
<td>Approach and design for field data/ information collection for classification of ecosystems and forest types</td>
<td>July 2020</td>
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<tr>
<td>3</td>
<td>Submit Standard Operating Procedure (SOP) and conduct a training package to the Ecosystem Mapping Team</td>
<td>July-August 2020</td>
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<tr>
<td>4</td>
<td>Report on the analysis of the Forest Types based on the existing FRA data and from other credible sources.</td>
<td>Sept 2020</td>
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<td>5</td>
<td>Submit a progress report on the analysis of the field data and information from forestry field team</td>
<td>Every six month after start of the field work</td>
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<td>6</td>
<td>Review of the reports on Forest, Rangeland, Agriculture and Wetland ecosystem types and forest types of Nepal including Maps</td>
<td>March 2022</td>
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<td>Task Description</td>
<td>Date</td>
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<td>7</td>
<td>Consolidate and submit a draft report to FRTC/MOFE for a review</td>
<td>May 2022</td>
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<tr>
<td>8</td>
<td>Finalize the report after addressing comments from FRTC/MOEF and disseminate the results via organizing workshops, publishing reports and scientific papers in national and international peer reviewed journals.</td>
<td>Jun 2022</td>
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