REVISION OF ECOSYSTEMS AND FOREST TYPES OF NEPAL

Terms of Reference for Agro-ecologist

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 an Agro-ecologist to carry out agro-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:**

The Agro-ecologist will work under the supervision and direction of the Technical Advisor (TA), Ecosystem Mapping Coordinator and the FRCT management. He/she will work together with
the Ecosystem Mapping Team to produce Agriculture Types and Agro-ecosystems maps of Nepal.

**Specific tasks**

**A. Desktop**
- Collect and compile the past studies and mapping of Agriculture typology and Agro-ecosystem in Nepal.
- Review the policy, literature and published documents of the international organizations on the definition and classification approach to Agriculture Types and Agro-ecosystems.
- Together with TA identify different agriculture typology encompassing all categories in Nepal and neighboring countries, and decide on the agriculture typology in the Nepalese context and specify any exclusion of any type agriculture typology for this mapping exercise.
- Review and finalize the field data and information collection form.
- Review and identify the relevant environmental parameters for mapping of Agriculture Types and Ecosystems in Nepal.

**B. Other tasks**
- Work with TA and RS/GIS Specialist to digitize the location data or geographic coordinates of the known agriculture types to use as training data points for reclassifying the imagery.
- Work with TA and RS/GIS Specialist to reclassify the relevant satellite imagery at the physiographic or eco-regions (Eastern, Central and Western eco-regions) using pixel-based classification and assist in the interpretation of the reclassified image.
- Together with TA and RS/GIS Specialist review the distribution of the agriculture types across Nepal and determine the minimum mapping unit for mapping agriculture types in Nepal.
- Work with TA and RS/GIS Specialist to identify the new training points and validation points, ensuring the sufficient sample points representing each physiographic and eco-regions.
- Together with TA and RS/GIS Specialist prepare an efficient field visit plan for field data and information collected at the point of interests and print out the relevant LRMP maps, Google Earth Maps or Rapid Eye Maps and travel itinerary.
- Undertake the fieldwork at the identified new training points and validation points.
 Compile the field data and information and classify the Agriculture Types across Nepal and prepare a draft of Agriculture Types together with TA and submit to the Expert Panel.

 Update the classification of Agriculture Types and assist RS/GIS Specialist to reclassify the Agriculture Types Map.

 Work with TA and RS/GIS Specialist to derive independent significant physical environmental parameters for Agro-ecosystem, and assist in generating the maps with ecological facets representing unique Agro-ecosystems of Nepal.

 Together with TA, share the ecological facets for Agro-ecosystems with the Expert Panel and facilitate the evaluation and consensus decision on the classification of the Agro-ecosystems of Nepal.

 Assist RS/GIS Specialist and apply the recommendations of the Expert Panel and generate Agro-ecosystems Map of Nepal.

 Together with TA and RS/GIS Specialist undertake a threat and vulnerability assessment and classify into three classes: endangered, critical and stable Agro-ecosystems.

 Together with TA and RS/GIS Specialist prepare a report on Wetland Types and Wetland Ecosystems Maps of Nepal and submit the report to an Expert for a review.

 4. **Duration:**

 The duration of this contract is 7 Months. The duty station is Kathmandu with frequent travel to the field.

 5. **Required Skills and Experience:**

- A Master degree in Agriculture.
- A minimum of three years of professional experience in Agro-ecology, assessment or impact studies or experience on agriculture management and implementation program.
- Experience on planning and collecting the field data and information, data compilation and analysis.
- A good understanding of the environmental, biotic and abiotic factors to determine the agro-ecosystems of Nepal.
- Good interpersonal skill with the ability to effectively interact with the team members and stakeholders.
- Demonstrated experience in working with a multidisciplinary team in different settings and environments and delivering outputs within the 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>
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<tr>
<td>2</td>
<td>A report on the review the literature and published documents on the classification approach to Agriculture Types and Ecosystems</td>
<td>July 2020</td>
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<tr>
<td>3</td>
<td>Documentation on the field visit plan, maps and travel itinerary.</td>
<td>July 2020</td>
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<tr>
<td>4</td>
<td>Compile the field data and information collection point with geographic coordinate and archive in a database system.</td>
<td>Aug-Dec 2020</td>
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<td>5</td>
<td>Together with the RS/GIS Specialist, validate and finalize Agriculture Types map, Agro-ecosystem Types map and threat and vulnerability Maps.</td>
<td>December 2020</td>
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<td>6</td>
<td>Prepare a report on Agriculture Types and Agro-ecosystem mapping of Nepal and submit to the TA and an Expert for a review</td>
<td>Jan 2021</td>
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<td>7</td>
<td>Finalize the report on Agriculture Types and Agro-ecosystem mapping of Nepal by incorporating the reviewer's comments.</td>
<td>Jan 2021</td>
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