

Terms of Reference: GIS Consultant for GEE and Remote Sensing Training

Introduction

The Tonle Sap Great Lake and its Floodplain is a complex landscape with significant biodiversity in the Kingdom of Cambodia. It was established as Tonle Sap Biosphere Reserved (TSBR) by Royal Decree in 2001, after the Royal Government of Cambodia reviewed and recognized the international irreplaceable value of wetlands of great biological value as well as the social and economic value of this area. The Biosphere Reserve consists of three core zones including the Prek Toal, Boeung Tonle Chmar, and Stueng Sen Core Areas. These core areas were later designated as Ramsar Sites.

WCS supports the Ministry of Environment (MoE) and Fisheries Administration (FA) in protecting key species and their habitats in across the landscape. **The Tonle Sap Grassland** is the stronghold habitat for the critically endangered Bengal Florican (*Houbaropsis bengalensis*). It is native to India, Nepal, Cambodia, and Vietnam. Cambodia's grasslands are now a critical habitat supporting this rare bustard.

A consultant is required to help identify the remaining extent of grasslands around the Tonle Sap Great Lake and its Floodplain.

Duties:

The Consultant shall work with the WCS GIS team to train the team on the application of Google Earth Engine, associated algorithms, and other imagery sources so as to produce an up-to-date map of the grassland extent. The Consultant will conduct the following activities:

Conduct a series of workshops to address the following points:

1. Review the basics of the Google Earth Engine Code Editor and Developer Guides.
2. Explore and Interact with Remote Sensing and GIS Data in Google Earth Engine.
3. Basic JavaScript Programming for GEE
4. Reading feature data from external sources
5. Pre-processing methods for raster data and images
6. Pre-processing methods for vector data
7. Implement GIS techniques in Google Earth Engine
8. Create a Land Cover Map using Modern Supervised Classification Techniques.
9. Discuss and Test Methods for Improving Classification Accuracy.
10. Document Results and Spatial Data.

Provide associated documentation, maps, and supplemental information.

1. Detailed information on suggested trainings, itemized by day with complete information on topics and discussion points.
2. Suggested timeline and corresponding budget.
3. Output/ deliverables set below.

Outputs/Deliverables

1. Workshop:
 - a. At least four workshop training sessions
 - b. Prepared material submitted prior to the workshop for the participants to review
 - c. End-of training summary review and quizzes
 - d. Work with the WCS GIS team to produce the (2) and (3) documentation

2. Documentation (upon completion of the workshops):
 - a. Two satellite imagery mosaics (2007-2010- and 2018-2023-time frames) of the Tonle Sap Great Lake and its Floodplain.
 - b. Four total land cover maps and accompanying accuracy assessments. Suggested dates 2007, 2010, 2018, 2023)
 - c. Data organization/management guide.
 - d. A basic land cover mask for the 2nd mapping year (e.g., Forest vs Non-forest or Water vs Land).
 - e. Change Detection Map and Statistics.
 - f. Summary Document draft.
3. Documentation (upon completion of the workshops):
 - a. Final report, with summary explanation of change in grasslands and maps, methodology, technical challenges, and annex of definitions, explanation of spectral signatures, etc.

Qualifications and experience

- Knowledge of GEE, ArcGIS, remote sensing, and associated platforms.
- Previous experience training teams on GEE, ArcGIS, remote sensing, and associated platforms.
- Previous experience mapping ecosystems in Cambodia using remotely sensed imagery is preferred