

TERMS OF REFERENCE (TOR)

Consultancy Services for Flood Risk Analysis

Project: Aandhikhola School of Bamboo Technology and River Restoration (ASBTRR)

Location: Waling Municipality–9, Syangja District, Gandaki Province, Nepal

1. Background

The Umbrella Organization Nepal (UON) is implementing the ASBTRR project, an integrated initiative to promote bamboo-based livelihoods, ecological river restoration, climate resilience, and sustainable watershed management. The project includes the construction of a Bamboo Treatment and Training Centre, sustainable bamboo plantations, and aquatic habitat restoration including spawning ground protection.

As the project site is located adjacent to the Aandhikhola River, a comprehensive flood hazard assessment is required to ensure that all infrastructure and ecological interventions (such as check-dams and plantations) are planned in a safe and climate-resilient manner.

2. Objectives

The primary objective is to assess the flood risk of the ASBTRR project site and provide actionable, site-specific recommendations for resilient development.

- Assess historical flood events and collect Local Ecological Knowledge (LEK) regarding high-flood marks.
- Analyze river characteristics and estimate inundation extents for 25, 50, and 100-year return periods.
- Map flood-prone zones affecting the proposed Bamboo Treatment Plant and restoration areas.
- Recommend structural and nature-based (bamboo bioengineering) flood mitigation measures.

3. Scope of Work

The consultant shall perform the following tasks:

A. Desk Review & Data Collection

- Review topographic maps, Digital Elevation Models (DEM), and satellite imagery.
- Analyze hydrological and meteorological data from relevant gauge stations.
- Model flood risks under future climate change scenarios (e.g., 2050 and 2100 projections) to ensure long-term resilience.

B. Field Investigation & Topographic Survey

- Perform site reconnaissance and assess riverbank erosion status.
- Conduct High-Resolution Drone (UAV) topographic mapping to create accurate contours for infrastructure siting.

- Consult with local communities to map historical flood extents and river behavior.

C. Hydrological and Hydraulic Analysis

- Estimate design flood discharges using standard hydrological methods.
- Conduct Sediment Transport Analysis to evaluate the impact of siltation on river restoration structures (e.g., check-dams and artificial reefs).
- Perform 1D/2D hydraulic modeling using software like HEC-RAS or equivalent to determine flood depths and velocities.

D. Flood Risk Assessment & Mapping

- Prepare detailed Flood Hazard and Risk Maps identifying vulnerable zones.
- Identify a "Safe Floor Elevation" for the Bamboo Treatment and Training Centre to protect specialized machinery.

E. Technical Recommendations

- Propose bamboo-based bioengineering for riverbank stabilization.
- Recommend specific structural protections where nature-based solutions are insufficient.
- Suggest early warning measures and site-level drainage improvements.

4. Deliverables

1. Inception Report: Detailed methodology and work plan (1 week).
2. Field Survey & Drone Mapping Report: Including raw and processed topographic data.
3. Hydrological, Hydraulic, and Sediment Analysis Report.
4. Flood Hazard and Risk Maps: High-resolution GIS-based maps.
5. Draft and Final Flood Risk Analysis Reports: Incorporating UON and stakeholder feedback.
6. GIS Database: All editable models and geospatial data layers.

5. Duration and Timeline

The assignment must be completed within **35 calendar days** from the date of contract signing.

6. Required Qualifications

For Consulting Firms/consultants:

- Consultant/legally registered in Nepal with at least two years of professional experience in river engineering and hydrological studies.
- Proven track record of completing at least three similar flood risk or watershed management assignments.
- Advanced proficiency in GIS and hydraulic modeling software.

Key Experts:

- Team Leader/River Engineer: Master's degree in Civil/River Engineering with 2+ years of experience.

- Hydrologist: Expertise in rainfall-runoff modeling and climate change analysis.
- Hydraulic Modeling Specialist: Demonstrated experience with HEC-RAS or similar platforms.
- GIS/Remote Sensing Expert: Experience in drone data processing and hazard mapping.

7. Evaluation and Payment

- **Method:** Quality and Cost Based Selection (QCBS).
- **Schedule:**
 - 40% upon approval of the Inception Report.
 - 40% upon submission of the Draft Report.
 - 20% upon acceptance of the Final Report and GIS deliverables.

8. Submission Instructions

Interested parties must submit a Technical and Financial Proposal, including firm registration, tax clearance, and CVs of proposed experts, to info@umbrellanepal.org within 7 days of the EOI publication