TERMS OF REFERENCE

CALL FOR CONSULTANCY SERVICES

Development of an Impact-Based Forecasting and Trigger Mechanism for Flood Anticipatory Action in Bangladesh

Table of contents

1. Context

a. Contracting organization

Humanity & Inclusion - Handicap International (HI) is an independent and impartial aid organization created in 1982 working in situations of poverty and exclusion, conflict and disaster. The organization works alongside persons with disabilities and vulnerable populations, taking action and bearing witness in order to respond to their essential needs, improve their living conditions and promote respect for their dignity and fundamental rights. HI is presently active in about sixty countries. HI Bangladesh Programme (locally known as Handicap International) is requesting the services described in these Terms of Reference (ToR).

b. Programme context

HI has been working in Bangladesh since 1997 to improve the protection and quality of life of vulnerable individuals, including persons with disabilities, to promote their rights, and to support their participation in society. Since 2017, HI has also been providing assistance to thousands of Forcibly Displaced Myanmar Nationals (Rohingya) fleeing neighbouring Myanmar. HI's current operations are primarily centred in the northern (Kurigram) and southern (Cox's Bazar) parts of the country.

Our teams deliver services and support across several thematic areas, including Health and Rehabilitation, Protection and MHPSS (Mental Health and Psychosocial Support), Inclusive Humanitarian Action, Humanitarian Logistics, Inclusive Education, and Livelihoods. HI also engages in Disaster Risk Reduction and Climate Change Adaptation, empowering vulnerable communities in disaster-prone and environmentally fragile areas to manage disaster risks, strengthen their adaptive capacities, and influence disaster and climate governance. HI Bangladesh is funded by a range of institutional and private donors.

c. Rationale for the service requested

Bangladesh has made significant progress in flood forecasting and early warning through the Flood Forecasting and Warning Centre (FFWC), the Department of Disaster Management (DDM), and the development of Anticipatory Action Protocols (AAPs) under established legal and institutional frameworks. The country also benefits from an active Anticipatory Action Technical Working Group under the Humanitarian Coordination Task Team (HCTT). Despite these advancements, existing flood forecasting systems have limited capacity to translate hazard information into locally relevant, impact-based forecasts, and local Disaster Management Committees often face challenges in interpreting forecast information for timely decision-making. Gaps also remain in ensuring inclusive early warning and anticipatory action, particularly for persons with disabilities and last-mile populations.

In this context, HI Bangladesh is implementing the project *"Inclusive and locally led action on climate-induced disasters in Bangladesh"* (October 2025–November 2027), funded by the L'Oréal Foundation. The project aims to strengthen inclusive Anticipatory Action across 3 Unions in Kurigram district, by integrating impact-based flood forecasting with Early Warning Systems and local preparedness planning. To support this objective, HI seeks to engage a qualified consultant or team of consultants to develop a locally led, impact-based flood forecasting model and trigger mechanism that will inform the design of anticipatory action protocols in the project locations.

2. Description of the required service provision

a. Overall and specific objectives

The main objective of this consultancy is to develop a technically robust Impact-Based Flood Forecasting (IBF) model and an associated forecast-based trigger mechanism to support anticipatory action in the project locations. The consultancy will translate flood hazard forecasts into probabilistic estimates of impacts on people and livelihoods and define impact thresholds, probability thresholds, and trigger logic to support evidence-based, pre-agreed activation of anticipatory action.

The consultancy will focus on the technical design, testing, and documentation of the IBF model and trigger mechanism. Final feasibility, Action selection and full AAP development will be coordinated by HI and validated with partners and communities.

Specific objectives

1. To translate flood forecasts into expected impacts on people and livelihoods by developing a locally relevant impact-based flood forecasting model.
2. To define and test impact and probability thresholds that indicate when forecasted flood impacts are severe and likely enough to justify the activation of anticipatory action.
3. To design clear and objective trigger rules that link forecasted impacts and probabilities to the activation of anticipatory action, supported by testing and documentation of uncertainty.

b. Scope of Work

In consultation with HI and its implementing partner, the assignment will include the following work:

Activity 1: Technical review and stocktake of flood forecasting systems and triggers
The consultant will conduct a technical review to inform IBF model design, including:

- Identification of relevant technical data providers (forecasting and hydrological institutions);

- Review of existing flood forecasts (seasonal and short-term), including spatial and temporal resolution, lead times, update frequency, uncertainty, and data gaps relevant to IBF and trigger design, as well as existing flood warning products in relation with trigger timing, thresholds, and forecast–warning alignment.
- Review of historical flood data (extent, depth, duration, frequency) for Kurigram District and the nine target wards over the past 20 years, including forecast performance where available. Ward-level differentiation may rely on grouped or typological approaches where data granularity is insufficient.
- Stocktake of existing flood AAPs and trigger methodologies used by other AA actors in Bangladesh, with a focus on technical trigger design approaches.

→ ***Deliverable:*** *Technical Review & Stocktake Report*

Activity 2 : Impact-based flood risk analysis to support modelling

Using secondary datasets and/or outputs from Community Risk Assessments (CRA) provided by HI, the consultant will:

- Conduct impact-based flood risk analysis and mapping for the nine target wards; Ward-level differentiation may rely on grouped or typological approaches where data granularity is insufficient.
- Develop technical risk and impact indices to support spatial differentiation and model calibration.
- Cross-analyse historical flood impacts and vulnerability data to define ward-level impact thresholds ("danger levels") for modelling purposes, drawing on available disability, gender, and age-relevant data where feasible, and clearly documenting data gaps and limitations.
- Document assumptions, data limitations, and uncertainty.

→ ***Deliverable:*** *Flood Risk and Impact Analysis Report (technical, modelling-focused)*

Activity 3: Development of an Impact-Based Flood Forecasting (IBF) model

The consultant will:

- Develop an IBF model that translates forecasted flood hazards into probabilistic estimates of agreed impact indicators, based on exposure and vulnerability data, including disability, gender, and age relevant considerations where supported by available data.
- Define severity categories suitable for trigger calibration.
- Clearly document model structure, assumptions, uncertainties, limitations, and false-alarm risks.

→ ***Deliverable:*** *Technical IBF Model Documentation*

Activity 4: Definition and testing of impact and probability thresholds

The consultant will:

- Define impact thresholds and probability thresholds indicating when forecasted impacts are sufficiently severe and likely to justify anticipatory action, based on parameters agreed with HI;

- Test thresholds by applying them to past flood events (hindcasting) and conducting sensitivity analyses to assess false alarm and missed event risks.

→ ***Deliverable:*** *Threshold Definition & Performance Analysis Report*

Activity 5: Design of trigger logic and decision rules

The consultant will:

- Define the methodology and tools used for ward-level trigger design, including modelling approach, statistical or hydrological methods, validation techniques, and data processing steps;
- Develop clear and objective trigger logic and decision rules (e.g. IF–THEN statements) linking forecast probabilities and impact thresholds to trigger activation;
- Provide technical recommendations on trigger performance and uncertainty.
- Identify and document indicative categories of early actions that are technically compatible with the proposed trigger thresholds and forecasting lead times, based on nationally endorsed anticipatory action standards and historical flood impact evidence in Bangladesh, with a focus on alignment between trigger activation timing and feasible windows for action. This will complement HI-led decision-making processes and CRA outputs, including in cases where CRA findings are pending or incomplete.

→ ***Deliverable:*** *Forecast-Based Trigger Matrix (ward-level, SOP-ready)*

Activity 6: Validation and final documentation

The consultant will:

- Support technical validation of the IBF model and trigger mechanism through consultations with relevant stakeholders and a presentation workshop.
- Consolidate all outputs into a final technical report documenting methodology, assumptions, limitations, uncertainty, indicative categories of early actions and validation feedback.

→ ***Deliverable:*** *Final Consolidated Technical Report*

c. Assumptions and Out-of-Scope Boundaries

This consultancy focuses on the technical development of an impact-based flood forecasting model and trigger mechanism.

The following elements are explicitly outside the scope of this assignment and remain the responsibility of Handicap International and its partners:

- Operational feasibility analysis and delivery planning
- Selection, design, or costing of anticipatory actions
- Market assessments and delivery modalities
- Cost-effectiveness or cost–benefit analysis
- Institutional readiness, governance arrangements, and implementation planning

The consultant will base the IBF model and trigger design on secondary datasets as well as programmatic parameters, priority impacts, geographic scope, and Community Risk Assessment findings defined and provided by HI where available.

d. Expected Outputs & Deliverables

The consultant will deliver the following outputs during the assignment. All deliverables shall be submitted in English and in formats agreed with HI.

Inception Report	An inception report outlining: • Detailed technical methodology for IBF model and trigger development. • Workplan and timeline ; • Data requirements and proposed secondary data sources. • Key assumptions and risks.
Technical Review and Stocktake Report (Activity 1)	A report documenting: • Review of available flood forecasting products (seasonal and short-term), including spatial and temporal resolution, lead times, update frequency, uncertainty, and data gaps relevant to IBF and trigger design. • Review of historical flood data (extent, depth, duration, frequency) for Kurigram District and the nine target wards. • Stocktake of existing flood-related trigger mechanisms and Anticipatory Action Protocols (AAPs) in Bangladesh, with a focus on technical trigger design approaches. • Identification of relevant technical data providers and institutions involved in producing forecast information used by the model.
Flood Risk and Impact Analysis Report (Activity 2)	A technical report presenting: • Impact-based flood risk analysis and mapping for the nine target wards, using secondary data and outputs from Community Risk Assessments provided by HI. • Description of risk and impact indices developed to support model calibration and spatial differentiation. • Analysis of historical flood impacts and vulnerability data used to inform ward-level impact thresholds. • Documentation of assumptions, data limitations, and uncertainty.
Impact-Based Flood Forecasting (IBF) Model Documentation	Comprehensive technical documentation describing: • The structure and functioning of the IBF model. • Impact indicators used and severity categories produced by the model. • Model inputs, data processing steps, and analytical methods.

(Activity 3)	• Model assumptions, uncertainties, limitations, and false-alarm risks.
Impact and Probability Threshold Definition and Testing Report (Activity 4)	A report detailing: • Defined impact thresholds and probability thresholds used to inform trigger activation. • Results of hindcasting and sensitivity analysis, including assessment of false alarms and missed events. • Interpretation of trigger performance and uncertainty.
Forecast-Based Trigger Matrix (Ward Level) (Activity (5)	A practical, SOP-ready trigger matrix presenting: • Ward-specific trigger thresholds and associated lead times. • Clear and objective trigger logic linking forecast probabilities and impact thresholds to trigger activation. • Indicative categories of early action options as an annex • Technical notes on trigger performance and uncertainty.
Technical Validation Workshop and Summary Note (Activity 6)	• Facilitation of a technical validation workshop with relevant stakeholders (e.g. Anticipatory Action technical and institutional partners); • A short summary note documenting feedback received and how it was addressed in the final model and trigger design.
Final Consolidated Technical Report	A final report consolidating all analytical and modelling outputs, including: • Summary of the IBF model and trigger mechanism. • Description of methodology, assumptions, limitations, and uncertainty. • Indicative categories of early action options • Summary of validation feedback and final refinements.
Data and Technical Annexes	Submission of all relevant technical annexes, including: • Data inventories and metadata ; • Analytical notes and supporting tables. • References to datasets and models used.

3. Methodology

The consultancy will apply a mixed-methods approach combining desk-based technical analysis, targeted consultations, and model testing, with a primary focus on the development and validation of an impact-based flood forecasting model and trigger mechanism.

- **Desk-based technical review and analysis:**
  Quantitative analysis of historical and real-time flood, hydrological, and forecast data obtained from relevant national and international sources (e.g. Bangladesh Water Development Board, Flood Forecasting and Warning Centre, Bangladesh Meteorological Department, Institute of Water Modelling, and other validated secondary datasets). This review will inform model calibration, threshold definition, and uncertainty analysis.

- **Use of existing community and programmatic data and secondary datasets:**
  The consultant will utilise relevant secondary datasets, findings from Community Risk Assessments and programmatic analyses conducted by HI and partners as inputs to exposure, vulnerability, and impact modelling, without conducting new primary risk assessments.

- **Targeted technical consultations (inclusive and accessible):**
  Consultations will be conducted with selected Anticipatory Action practitioners, technical institutions, and relevant stakeholders to validate assumptions, data sources, and modelling choices. The consultation process will be designed to ensure inclusive and accessible participation.

- **Field visits for model grounding and validation:**
  Targeted field visits to project locations will be undertaken to support contextual understanding, validate modelling assumptions, and understand how forecast information is interpreted at local level. These visits will not involve new feasibility studies or action selection processes.

- **Model development, simulation, and hindcasting:**
  The consultant will develop the impact-based flood forecasting model and associated trigger mechanism, including **desk-based simulation and back-testing using historical forecast and impact data** (hindcasting) to assess accuracy, lead time, false alarm risk, and uncertainty.

- **Participatory technical validation:**
  One technical validation workshop will be organised to present the draft IBF model and trigger logic to relevant stakeholders, collect feedback, and finalise the technical design. Validation will focus on methodological soundness and operational clarity, rather than programmatic decision-making.

4. Duration and place of performance of the service

- **Indicative Start date:** 1 April 2026
- **Indicative Mission end date:** 30 August 2026

The total duration of the consultancy is estimated at **approximately 55–60 working days**, spread over the assignment period.

The consultant or team of consultants should propose a detailed work plan, clearly showing the different phases of the study.

The place of performance is **Bangladesh** and is expected to combine desk-based technical work as well as field work in **Kurigram** and adjacent unions and wards.

5. Timeline & payment milestone structure

The total level of effort for this assignment is estimated at **approximately 60 working days**. This includes time allocated to:

Type of work	Days
Desk-based technical analysis and modelling	approximately **30–35 days**
Field/mission and stakeholder consultations days (meetings, validation)	approximately **12–15 days**, including facilitation/participation in one technical validation workshop
Briefing, debriefing & reporting	approximately **8–10 days**
Total	**approximately 60 days**

Field missions may span calendar days (including weekends or public holidays) for logistical reasons; however, **only working days are counted toward the total consultancy level of effort**. The final allocation of days will be agreed during inception. .

On the basis of the proposed timetable laid down in these Terms of Reference, the Consultant must set up a work schedule for the performance of the service. The work schedule must clearly specify the manner in which the Consultant will approach the activities required to perform the service. The detailed and final mission timetable will be agreed with Handicap International during the inception phase, based on the approved methodology and workplan.

The proposed **payment milestone structure** is as follows:

Milestone	Deliverables Linked to Payment	Indicative Timing	Payment (%)
Milestone 1 – Inception and technical review	• Inception Report (methodology and workplan) • Technical Review & Stocktake Report	End of Month 1	**30%**
Milestone 2 – Risk analysis, IBF model and trigger design	• Flood Risk and Impact Analysis Report • IBF Model Technical Documentation • Impact & Probability Threshold Definition and Testing Report • Draft Forecast-Based Trigger Matrix (ward level)	End of Month 3	**45%**
Milestone 3 – Validation and finalisation	• Final Forecast-Based Trigger Matrix (ward level) • Technical Validation Workshop & Summary Note • Final Consolidated Technical Report • Data and Technical Annexes	End of Month 5	**25%**

The proposed number of days and associated budget shall not exceed the maximum amount allocated for this consultancy. Payments will be made upon submission and written acceptance of deliverables by HI. Partial acceptance or requests for revision may delay payment until deliverables meet agreed standards.

6. Coordination between HI and the consultant

HI will establish a committee to oversee the assignment and undertake the following responsibilities:

- Lead the **selection and contracting of the consultant**.
- Provide **initial orientation and briefing** on the project and assignment scope.
- Facilitate **contact and coordination** with relevant government, non-governmental, Disaster Risk Reduction (DRR), and Anticipatory Action (AA) stakeholders, as required.
- Provide relevant background materials, including the **project document and national and district Anticipatory Action Protocols**.
- Facilitate **logistical arrangements and introductions** for ward visits and meetings with district- and union-level stakeholders, including accompaniment by project staff where appropriate.
- **Monitor progress** of the assignment and review key milestones and deliverables.

7. Consultant's profile

Education and professional experience

- At least a **Bachelor's degree**, preferably a **Master's degree**, in disaster risk management, meteorology, hydrology, geosciences, climate science, or a related field;
- **At least 10 years of professional experience** in flood forecasting, impact-based forecasting, hydrological or statistical modelling, GIS-based analysis, and/or anticipatory action;
- Demonstrated expertise in **predictive analysis, data modelling, and use of quantitative methods** for hazard and impact analysis;
- Proven experience in developing or applying **impact-based forecasting models and/or forecast-based trigger mechanisms**;
- Experience working with **government disaster management and forecasting systems in Bangladesh**, including institutions such as DDM and/or FFWC;
- Demonstrated experience (minimum **5 years**) in **inclusive Disaster Risk Reduction (DRR) and/or Anticipatory Action (AA)**, including consideration of vulnerability and social inclusion;
- At least **5 years of experience** working in humanitarian, DRR, and/or climate risk management contexts.

Technical and analytical competencies

- Strong capacity to design and implement **quantitative and qualitative analytical methods** relevant to flood risk and impact analysis;
- Experience assessing **socio-economic impacts of disasters** using secondary data and modelling approaches;
- Familiarity with **GIS tools and spatial analysis** for flood risk and impact mapping;
- Ability to clearly document **methodologies, assumptions, limitations, and uncertainty** in technical work

Knowledge requirements

- Good knowledge of **national disaster management and anticipatory action stakeholders** in Bangladesh;
- Understanding of the **humanitarian and development sectors**, particularly in relation to disaster risk management and climate adaptation;
- Familiarity with the **geographic and hazard context** of the project intervention areas.

Cross-cutting skills

- Strong computer literacy, including proficiency in **MS Word, Excel, and PowerPoint**;
- **Excellent command of written and spoken English**;

- Strong communication skills, with the ability to engage clearly and respectfully with technical stakeholders and partners.

8. Application process

HI encourages applications from **qualified women and persons with disabilities or chronic illnesses**. HI is committed to equal opportunities for all qualified applicants, regardless of nationality, gender, religion, ethnicity, or disability status.

Interested candidates shall submit their application **no later than 29 March, 2026 (11:59 PM)** to: logistics@bangladesh.hi.org.

with the subject line:
"Development of a Locally Led Forecast-Based Flood Early Warning Trigger System for Anticipatory Action", Ref: PD-DHAK-00670.

a. Documents to include

Applicants shall submit the following documents:

Technical proposal (maximum 5 pages), including:
- Understanding of the Terms of Reference.
- Proposed methodological approach for IBF model and trigger development.
- Indicative workplan and timeline.

Curriculum Vitae (CV) of the consultant or proposed key expert(s), highlighting relevant qualifications and experience.

Cover letter summarising suitability for the assignment.

Financial proposal, including:
- Total **lump-sum amount** for the assignment (inclusive of all costs and taxes);
- A **detailed cost breakdown**, including consultant fees (daily rate × number of days) and estimated operational costs (travel, communication, etc.).

Supporting documents, such as:
- References or certificates of completion for similar assignments (where available).

Additional requirements
- The proposed budget must be **inclusive of all costs**, including professional fees, accommodation, travel, taxes, and other expenses;
- Payments will be made **by bank transfer only**, upon acceptance of deliverables;

- **Advance payments will not be provided**;
- At contracting stage, the selected consultant will be required to comply with all applicable **professional, tax, and social obligations**;
- The consultant is responsible for **their own logistics and security** during the assignment.

Incomplete applications will be considered **administratively non-compliant** and will not be evaluated further.

b. Submission of Applications

- If the applicant is a company, they must also provide the following documents: Company profile(s), Documentation of legal status, including registration as a company (Updated Trade License, Bin, TIN). Individual also need submit these documents where those are applicable.
- Last TAX Submission Copy (Mandatory for Both Individual and Firm)
- Bank Solvency Certificate (optional for both individuals and companies)
- Insurance certificate (optional for both individuals and companies)
- Quoted price should include VAT and TAX following government rules. If any amount is excluding VAT and TAX, it should be shown with a necessary breakdown.
- Payment conditions should be clearly mentioned in the financial offer.
- Bank details, including the name of the account, bank name, branch, swift code, etc., must be provided.
- Proposals must be submitted in BDT.

c. Comparative Evaluation

Applications meeting administrative and technical requirements will be evaluated based on the following criteria:

Criteria	**Weight**
Financial proposal	30%
Technical qualifications and experience	70%

Technical evaluation (70%)

- Educational qualifications relevant to disaster risk management, hydrology, meteorology, or related fields – **20%**
- Experience in flood forecasting, impact-based forecasting, GIS, and anticipatory action (minimum 10 years) – **25%**
- Expertise in predictive analysis and data modelling – **10%**
- Experience in inclusive DRR / Anticipatory Action – **10%**
- Knowledge of Bangladesh's disaster management stakeholders and context – **5%**

Only applications achieving the minimum technical score will be considered for financial evaluation.

Safeguarding

HI is committed to protecting children and vulnerable adults from harm. All consultants will be expected to comply with HI's safeguarding, child protection, and related policies. Applicants will be assessed on their suitability to work with children and vulnerable adults.

Disclaimer: Consultant have to declare conflict of interest if any one/more of the member involved with this procurement have personal or business relation them.