Expression of Interest (EoI)
for
SSP and GIS Mapping and Monitoring

Name of the Project	: Host and Rohingya Enhancement of Lives Project (HELP)
Forestry Component in Cox's Bazar.	: Establishing Green Belt at Bhasan Char and Reforestation of Rohingya Affected Area
Name of the Package	: Consultancy firm (SSP and GIS Mapping and Monitoring)
Package No.	: HELP/S-06
Organization	:Bangladesh Forest Department (BFD)
Duration of the Contract	06 (Six) months
Duty Station	HQ (BFD-PIU) Dhaka, and Project Area

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Contents

1.0 Executive Summary

…… is registered under Bangladesh's Register of Joint Stock Companies and Firms (RJSC). ……, in association with …….. works for the Sustainable Development Goals (SDGs, conducting thematic assessment, action research, rural development, and innovation. We do conduct research and development in numerous sectors and fields like sustainable environmental management, disaster management, climate change and adaptation, the development field, ICT, Monitoring & Evaluation, etc. …… utilizes ICT-based tools, i.e, UAV(Drone), Remote Sensing (RS) technology & Geographic Information Systems (GIS), GPS survey, socioeconomic survey apps/ tools, for conducting landscape and environmental assessment. We do innovative work in various sectors, including Drone Image Analysis, Internet of Things (IoT), Impact-based Early Warning, Location-based Service, etc.

…….. strives for client satisfaction by providing state-of-the-art technologies in the fields of Consultancy, Research and development, Remote Sensing (RS) and geographic Information Systems (GIS), location-based Services, RSGIS Training, Surveying (GPS, Drone), Monitoring and Evaluation, Software Development, Disaster Management, and Climate Change and adaptation.

Our vision is to help our nation build a technology-oriented solutions and services culture in different sectors. We will eradicate digital barriers at the grassroots level, providing easy and usable solutions in various aspects. To bring everyone to their doorsteps, innovative and cheaper technology and methods for shaping a more livable nation.

2.0 Introduction:

Forests and protected areas in Cox's Bazar—particularly the Teknaf forest range and nearby sanctuaries/national parks (Himchhari, Inani, Fasiyakhali, and Medhacocchopia)—are rapidly degrading and at risk of severe biodiversity loss. Multiple, compounding pressures are driving this decline: climate-induced cyclones and storm surges, salinity intrusion, landslides, and broader environmental degradation, alongside intense human pressure from densely populated Rohingya settlements and host communities that depend on forest resources for energy and livelihoods.
Socioeconomic vulnerability, poverty, and limited livelihood options reinforce dependence on fuelwood and other forest products, accelerating overextraction and habitat destruction. Reported degradation includes approximately **8,000 acres of forest land**, increasing stress on already-fragmented wildlife habitats. Critically endangered **Asian elephants** are particularly threatened, with **only 38 individuals remaining** in the fragmented landscape.

Key risk factors

- Climate hazards: cyclones, sea storm surges, salinity intrusion
- Geophysical hazards: landslides
- Human pressure: resource extraction and overexploitation by refugee and host communities
- Socioeconomic drivers: poverty, limited livelihoods, energy and food security needs
- Resulting impacts: forest degradation, biodiversity and habitat loss, increased human–wildlife pressure/conflict risk

3.0 Understanding the assignment:

Protect and restore the Teknaf forest range and adjacent protected areas (including Himchhari, Inani, Fasiyakhali, and Medhacocchopia) through evidence-based assessment, targeted NbS interventions, and an ICT-enabled monitoring, patrol, and early warning system to reduce deforestation, illegal extraction, and biodiversity loss (including migratory shorebirds and other priority species).

Specific objectives

1. Quantify forest resources, forest cover change, and deforestation/degradation trends (spatially and temporally).

2. Identify and prioritize multi-factored risk drivers (climate-, nature-, and human-induced) and establish their causal pathways.
3. Conduct biodiversity baseline (gross stocktaking) for birds (including shorebirds) and other wildlife species and map critical habitats/corridors.
4. Develop site-specific planning (SSP) outputs: zonation, threat hotspots, patrol planning, restoration priorities.
5. Design and deploy an ICT-driven 24/7 oversight system (field sensors + ranger mobility + satellite/UAV intelligence) linked to a dashboard that supports detection, alerts, and incident management.

6. Recommend feasible NbS interventions and community-linked measures that reduce pressure on forests while improving resilience and livelihoods.

4.0 Objectives:

The main objective of the services is to provide an online web-based site-specific planning (SSP) solution for each plantation intervention site, which is considered a significant activity. Proper identification of the interventions, considering the prevailing natural and socio-economic conditions and site potentials and plants, can ensure success and monitoring. At the same time, the web-based SSP platform at the Bangladesh Forest Information System (BFIS) needs to be integrated.

5.0 Scope of the Services

In consultation with the BFD/DFD Central Office and Cox's Bazar Office, the overall mission design and methodology shall be finalized prior to field deployment. Under the direct supervision of the Project Director, the company shall provide technical services and facilitate the selected Forest Division(s) to develop Site-Specific Plans (SSPs). The assignment duration is six (6) months, with field deployment for five (5) months, and covers all potential plantation sites within Cox's Bazar South Forest Division.

1. SSP design finalization and coordination
1.1. Conduct inception consultations with BFD/DFD Central Office and Cox's Bazar Office to confirm: target beats/sites, SSP format, decision rules, data standards, workflow approvals, and reporting expectations.
1.2. Organize recurrent coordination and technical review meetings with BFD/DFD to refine ("vitalize") the SSP application format and ensure alignment with BFIS requirements.

2. Geospatial delineation and field data collection for SSPs
2.1. Using GIS technology, delineate SSP boundaries at selected Forest Beats through on-site verification and geospatial mapping.
2.2. Conduct field data collection using:

- Android-based **ODK** forms,
- **GPS surveys** for boundaries and reference points,
- **UAV/drone surveys** for plantation site delineation and site reconnaissance, as applicable.
- Produce the following geospatial and field outputs per Beat/site:
- Beat-level index mapping,
- Plantation site maps and geospatial layers,
- Regeneration survey results,
- Identification and mapping of deforested and degraded pockets,
- A schedule of required silvicultural operations (nursery and plantation).

3. Community consultation and ground validation
3.1. Organize focus group discussions (FGDs) and/or consultations with relevant community groups to validate site conditions, resource pressures, and feasibility considerations for interventions.
3.2. Integrate community consultation findings into SSP recommendations and site-specific safeguards/implementation considerations.

4. Technical team composition and staffing

4.1. The company shall deploy a core consultancy team comprised of, at minimum:

- Forest Specialist,
- GIS Mapping Specialist,
- Geospatial Application Developer,
- Web-based Database Management Specialist,
- IT Expert.

4.2. The company shall deploy full-time **GIS/GPS and field surveyors** at site level for **five (5) months** to support delineation, ground-truthing, and SSP data completion.

5. SSP platform development and BFIS integration

5.1. Design, configure, and deploy a customized and interoperable geospatial platform—either **ESRI ArcGIS-based** or **open-source geospatial stack** (as agreed with BFD/DFD)—capable of:

- interacting/synchronizing with field-level data collection tools (ODK and related survey apps),
- interacting with online patrolling/surveillance applications (where applicable),
- integrating with BFIS as an SSP module within the BFD domain: **http://bfis.bforest.gov.bd/bfis/** (hosted by Bangladesh Computer Council, BCC).

5.2. Conduct a detailed technical discussion with BFD/DFD and obtain formal approval on:

- platform choice and architecture,
- SSP data model and formats,
- interoperability method (APIs, services, synchronization rules),
- BFIS module integration approach and access controls.

6. BFIS-aligned mapping interface and data export

6.1. Develop a mapping interface consistent with the **existing BFIS geoportal map client** to ensure usability and continuity.

6.2. The interface shall:

- display a fixed list of agreed layers with fixed symbolization (as approved by BFD/DFD),
- include a suitable selection of freely available base maps,
- support efficient export of GIS-ready datasets and standardized outputs for reporting and analysis.

7. Administrative boundaries interface and SSP workflow endorsement

7.1. Develop an interface to filter and visualize SSP data by **Forest Division, Range, and Beat**, and to view intervention progress/impact at an appropriate level (as defined by SSP indicators).

7.2. Implement a formal electronic workflow for SSP submission and endorsement, with role-based access and controls:

- Beat Officer (data entry and revision),
- Range Officer (review/endorsement),
- Divisional Forest Officer (DFO) (review/endorsement and approval),
- System Admin (final publishing controls and user management).

7.3. Ensure the Beat Officer can revise records in response to endorsement comments prior to final approval.

8. DFO electronic approval and dashboard publication

8.1. Develop a simple, structured "SSP Report Format" within the system to support Beat-level submission and DFO approval.

8.2. Upon DFO endorsement/approval, SSP data shall become available to authorized users through:

- the dashboard,
- standardized reports and exports.

9. Capacity building and orientations

9.1. Conduct **two (2) comprehensive orientations** for BFD/DFD officials on SSP processes, field protocols, and platform use.

9.2. Provide refresher support as needed during field deployment to ensure sustained adoption and data quality.

10. Reporting, workshops, and documentation
10.1. Prepare and submit:

- Inception Report (including detailed methodology and work plan),
- Interim Progress Report,
- Completion/Final Report at the end of the assignment.
  10.2. Organize **three (3) workshops in Dhaka (BFD)** with proceedings, covering:
- Workshop 1: Methodology and work plan validation,
- Workshop 2: Midline progress of SSP data collection and platform/interface development,
- Workshop 3: Final results presentation and handover.
  10.3. Develop technical guidance documents for:
- SSP field teams (data collection, QA/QC, SOPs),
- midline and end-line reporting templates and standards.

11. Geolocation-based plantation journal support
11.1. Support respective forest officers in establishing and maintaining a **geolocation-based plantation journal**, linked to SSP site IDs and the platform, including:

- activity logs (planting, maintenance, inspections),
- geotagged photos,
- survival and growth monitoring entries.

Deliverables Summary (as implied by the scope)

- SSP delineation outputs (Beat index maps, plantation site boundaries, regeneration survey results, degraded pocket maps)
- Field dataset (ODK forms, GPS tracks/points, UAV outputs where applicable)
- SSP platform (web-based) with BFIS-aligned map client and role-based endorsement workflow
- Data exports/report generator (SSP report format, GIS exports, dashboard views)
- Inception, interim, and final reports
- Three workshop proceedings and training/orientation materials
- SSP field guidance documents and reporting templates
- Geolocation-based plantation journal implementation support

The assignment will apply a mixed-methods approach combining (i) desk review and systems assessment, (ii) remote sensing and GIS analysis, (iii) GPS/UAV-enabled field surveys, and (iv) stakeholder consultations (FGD/KII) to generate evidence-based Site-Specific Plans (SSPs) and enable digital SSP workflows for integration with BFIS.

6.0 Scientific Methodology & tools

6.1 Desk Review and Systems Assessment

6.1.1 Review of literature, policies, and programme documents
The company will review relevant studies and documentation produced by the Forest Department/DFO and development partners (including USAID-supported initiatives, UN agencies such as FAO, WFP, UNDP, UNEP, and other credible sources), with emphasis on Cox's Bazar and Teknaf landscapes.
Key review areas include, but are not limited to:

- **BFIS and national datasets**
  - Review the **Bangladesh Forest Information System (BFIS)** database and geoportal, including available geospatial layers and metadata.

    - Review **Bangladesh forest ecosystem services valuation datasets** (where available), **Bangladesh forest inventory**, plant species lists, and identify data gaps relevant to SSP planning and monitoring.
- **Relevant project/programme documentation**
    - SUFAL (Sustainable Forests & Livelihoods) project documents.
    - USAID-supported zoning and tree/forest assessment documentation (including CREL-related materials where applicable).
    - BFIS-related technical notes and workflow documentation.
    - Reforestation Information Management System (RIMS) outputs (e.g., Nishorgo/co-management initiatives, where applicable).
    - UN-REDD Programme documents relevant to forest monitoring, safeguards, and degradation drivers.
    - Documents and evidence on encroachment and illegal extraction in reserve forests.
- **Regional portals and thematic reports**
    - Review relevant Bangladesh forest portals (including bd-forest resources, as available) and the Cox's Bazar South Forest Division portal (where accessible).
    - Review FAO Cox's Bazar Sub-Office documents on landslide management and slope stabilization.
    - Review landslide risk/warning system documentation (FAO-supported where applicable), including tree/forest-based slope stabilization guidance and relevant regional technical literature on rehabilitation of landslide-affected areas.
- **Policy and governance review**
    - Review applicable government policies, laws, and regulatory frameworks on forest conservation, protected area management, co-management, agroforestry development, regeneration, and enforcement mechanisms.
    - Review relevant protected area and sanctuary management plans (e.g., Chunati Wildlife Sanctuary management plan and other applicable plans).
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6.1.2 Review of forest-related MIS and baseline GIS preparation

The company will review and assess forest-related MIS platforms and risk systems, including BFIS and relevant early warning/landslide systems, with a focus on interoperability requirements for the SSP module.
Initial GIS preparation will include compilation and/or generation of baseline layers for analysis and survey planning, including:

- Existing vegetation/forest cover layers (BFIS and other sources),
- Land use/land cover (LULC) maps (historical and current),
- Multi-hazard exposure layers (cyclone/storm surge, salinity proxy layers, landslide susceptibility/hotspots),
- Administrative and forest management boundaries (division/range/beat/block and protected area boundaries where available).

Output of 6.1: Desk Review Summary + Data Inventory and Gap Analysis + Draft Baseline GIS Stack for Cox's Bazar South Forest Division.

6.2 Survey Tools Preparation and Field Data Collection

6.2.1 Survey base map and GIS field packages

The company will prepare GIS field maps and survey packages to enable consistent data capture across all target areas.
Key tasks include:

- Prepare **GIS base maps** for all Unions of Teknaf Upazila (Union shapefiles already available), including Mouza layers and other available reference layers.
- Compile and overlay relevant layers from:
    - BFIS forest shapefiles/layers,
    - Forest Department field maps,
    - Forest zonation maps (FD),
    - USAID CREL (or similar) zonation layers where available,
    - LGED reference maps,

    - FAO Cox's Bazar Sub-Office landslide-related maps and slope stabilization layers where available.
- Generate survey-ready map books (printed and offline mobile basemaps) showing:
    - Forest cover and degradation pockets,
    - Access routes and key landmarks,
    - Priority risk zones (landslide hotspots, coastal influence, etc.).

6.2.2 Remote sensing analysis for trend interpretation

The company will produce remote sensing-based maps and analytics to interpret historical and recent trends in land cover and land use change, including:

- LULC classification and change detection (multi-year comparison),
- Forest loss/degradation hotspot mapping (as feasible with available imagery and time),
- Fragmentation and edge effects (where applicable),
- Risk overlays to inform SSP suitability and intervention prioritization.

6.2.3 Union/Mouza and forest management boundary mapping for survey strategy

The company will prepare Union- and Mouza-level GIS maps (collecting additional layers from LGED, DLRS, Survey of Bangladesh/SoB as feasible) to support survey strategy, mobilization, and SSP delineation. Maps will delineate:

- Core zone, buffer zone, and impact zone (where defined/approved),
- Forest Division, Range, Beat, and Block boundaries (with identifiers),
- Protected Area (PA) boundaries and zoning (where applicable).

These maps will be used to finalize:

- Survey strategy and sampling approach,
- Team composition and deployment schedule,
- Site prioritization and field route planning.

6.2.4 Field survey instruments, technology stack, and protocols

The company will deploy structured field survey tools using a combination of mobile apps, GPS logging, and UAV reconnaissance (where permitted and feasible).

Field data collection will include:

- **Mobile data collection (ODK/Kobo)** for standardized SSP attribute datasets,
- **GPS logging** and georeferenced photo/video capture (e.g., GPS Essentials or equivalent),
- Capture of geospatial features as:
    - points (e.g., infrastructure, key reference points, disturbance indicators),
    - polylines (e.g., trails, extraction paths, drainage lines),
    - polygons (e.g., plantation site boundaries, degraded pockets, intervention zones).
- **Drone surveys** (site-specific) for:
    - high-resolution orthomosaic maps,
    - canopy/vegetation structure proxies where feasible,
    - photogrammetry outputs to support SSP mapping and evidence documentation.
- **Tree stock-taking and regeneration surveys** (site-dependent scope), including:
    - indicative counts, size class estimation, and species identification (as feasible),
    - regeneration condition assessment,
    - disturbance and extraction evidence mapping.

6.2.5 Socioeconomic and risk driver templates

The company will prepare structured templates (digital and, where necessary, hardcopy backups) to capture:

- Socioeconomic and livelihood dependence indicators (e.g., fuelwood dependence, resource-use patterns),
- Human pressure and governance indicators (e.g., access points, observed extraction activities, encroachment evidence),
- Multi-hazard and climate risk observations (e.g., salinity exposure, cyclone impacts, landslide indicators).

6.2.6 FGD/KII instruments and stakeholder consultations

The company will design and administer FGD/KII tools to engage:

- DFO/BFD frontline staff (Beat, Range, Division level),
- Forest-dependent households and community groups (host communities),
- Relevant displaced/settlement-interface stakeholders as considered appropriate under BFD guidance and safeguards,
- Local service providers, CSOs, and relevant regional institutions.

Consultations will capture:

- Risk and vulnerability perceptions,
- Resource pressure drivers and seasonal trends,
- Feasibility constraints for interventions and monitoring,
- Stakeholder roles and coordination gaps.

Output of 6.2: Survey toolset (ODK/Kobo forms, templates, field map packages) + Field datasets (GPS tracks, forms, photos, drone outputs as applicable) + Consultation dataset (FGD/KII notes and coded findings).

6.3 Data Processing, Validation, and Spatial Analysis

The company will clean, validate, and integrate field and remote sensing datasets into a unified geodatabase:

- Data cleaning and QA/QC (range checks, geometry validation, duplication checks),
- Field-to-GIS integration (point/line/polygon reconciliation),
- Cross-validation between field evidence and remote sensing outputs,
- Production of final SSP-ready layers (sites, degradation pockets, interventions, risk overlays).

Output of 6.3: Validated geodatabase + analytical maps and summary statistics for SSP decision-making.

6.4 SSP Preparation and Site-Level Recommendations

Using the validated dataset, The company will develop SSP packages for each plantation intervention site, including:

- Site profile (condition, risks, constraints, access),
- Intervention selection and rationale (aligned to site potential and risk drivers),
- Species suitability recommendations (as per FD guidance and site ecology),
- Implementation schedule and operational notes,
- Monitoring indicators and geo-referenced monitoring plan.

Output of 6.4: SSP package per site (maps + standardized report output).

6.5 BFIS Integration and Web-Based SSP Module Development

The company will configure/develop the SSP platform and ensure interoperability with BFIS as agreed with BFD, including:

- Data model and layer publishing aligned with BFIS conventions,
- BFIS-consistent map client interface (fixed layers and agreed symbolization),
- Role-based submission, review, endorsement, and approval workflow (Beat → Range → DFO → Admin),
- Export and reporting functions for dashboard and GIS use.

Output of 6.5: Operational SSP web module integrated with BFIS workflows and datasets (as approved).

6.6 Capacity Building and Knowledge Products

The company will conduct orientations and develop technical guidance documents for field teams and BFD officials, covering:

- SSP workflow and decision logic,
- Field protocols and QA/QC,
- Platform use and endorsement workflow,
- Midline and end-line reporting formats.

Output of 6.6: Training/orientation materials + technical guidance documents.

6.7 Survey team preparation for data collection :

Team	Member	Activity Aera	Tools
The core consultancy team	Teamed with a Forest Specialist, a Geospatial application developer, a web-based database management specialist, a GIS mapping specialist, and an IT expert.	In consultation with DFO, develop an assessment strategy, guidelines, methodology, tools development, and survey team deployment with the context of the Beat area and number. Block area and number, Protected Area (PA) and number	Maps, Strategy, Mission scope, and mission planning tools
Team for conducting the site-specific survey(SSP)	• Students • Community Member • Ethnic community member • Local Disaster Management Committee (UDMC, Ward DMC) • Member of the forest patrol/Ranger group • Ethnic community member • Expert livelihood group member (lead farmer) • Local Land Surveyor/local NGO survey • Local Farmers/owners of horticulture/nurseries/livestock herders, etc • Member of Village Conservation Forum (VCF) • Member of People's Forum (PF) • Social actors/social workers • Member of the Co-management Council • Member of Women CPGs • Member of Forest Conservation Club / People's Club • Member of the resource user group • Member of the forest curator/ police	• Core zone area & number • Buffer zone area & number • Impact zone area & number • Beat area and number, • Block area and number, • Protected Area (PA) and number	Android app for GIS/ GPS survey apps, Koto-toolbox, forest apps, etc., for determining tree species, endangered species, canopies, forest types, vegetation type, land cover, land use type, etc.
Team for conducting socioeconomic /livelihood survey	• Students • Community Member • Ethnic community member • Local Disaster Management Committee (UDMC, Ward DMC) • Member of the forest patrol/Ranger group • Ethnic community member • Expert livelihood group member (lead farmer) • Local Land Surveyor/local NGO survey • Local Farmers/owners of horticulture/nurseries/livestock herders, etc.	• Mouza/Village/Para (administrative layer), community settlements, etc. • Core zone area & number • Buffer area & number • Impact zone area & number • Beat area and number, • Block area and number, • Protected Area (PA) and number, social forestry area, • Sanctuaries, ecologically critical areas, wetland areas, coastal areas, saline prone areas, storm surge areas.	Android app for GIS/ GPS survey apps, Koto-toolbox, forest apps, etc.

Team	Member	Activity Aera	Tools
	• Member of Village Conservation Forum (VCF) • Member of People's Forum (PF) • Social actors/social workers • Member of the Co-management Council • Member of Women CPGs • Member of Forest Conservation Club / People's Club • Member of the resource user group • Member of the forest curator/ police		
GIS Mapping, GPS Survey, Aerial Drone survey team	• GIS Mapping field surveyor, • GPS app-based surveyor, • Drone surveyor	•Village/Mouza/Para (administrative layer), community settlements, etc. •Core zone area & number •Buffer area & number •Impact zone area & number •Beat area and number, •Block area and number, •Protected Area (PA) and number, social forestry area, •Sanctuaries, ecologically critical areas, wetland areas, coastal areas, saline prone areas, storm surge areas.	•Drone, GPS, and Mapping survey apps will delineate the SSP at selected Forest Beats on-site. •Determining tree species, endangered species, canopies, forest types, vegetation type, land cover, land use type, etc. •Android-based ODK, GPS survey, and drone survey for delineating plantation sites, •Index mapping of the Beat and regeneration survey. Organize focus groups for community consultation and identify deforested and degraded pockets to schedule all silvicultural operations in the nursery and plantation sites.
Community risk (multi-hazard) assessment and socioeconomic survey at the community level	• Students • Community Member • Ethnic community member • Local Disaster Management Committee (UDMC, Ward DMC) • Member of the forest patrol/Ranger group • Ethnic community member • Expert livelihood group member (lead farmer) • Local Land Surveyor/local NGO survey	•Village/Mouza/Para (administrative layer), community settlements, etc. •Core zone area & number •Impact zone area & number •Beat area and number •Protected Area (PA) and number, social forestry area, •Sanctuaries, ecologically critical areas, wetland areas, coastal areas, saline prone areas, storm surge areas.	• GIS / RS / Topographical/ Forest map, social map • Hardcopy FGD/KII template, field book, inventory book • Mobile apps

Team	Member	Activity Aera	Tools
	• Local Farmers/owners of horticulture/nurseries/livestock herders, etc. • Member of Village Conservation Forum (VCF) • Member of People's Forum (PF) • Social actors/social workers • Member of the Co-management Council • Member of Women CPGs • Member of Forest Conservation Club / People's Club • Member of the resource user group • Member of the forest curator/ police		

6.8 Development of SSP Data Collection Mechanism/Application (Customized Online/Offline Tools)

The company will design, customize, and deploy a **mechanism/application for SSP data collection at Forest Beat level**, enabling both **offline and online operation**, and supporting a structured **electronic review and approval workflow** culminating in **DFO endorsement**. The application will be aligned with the BFD-approved SSP data format and will feed validated records to the SSP platform/BFIS module for visualization through dashboards and standardized reports.

6.8.1 Requirements analysis and tool selection

a) Conduct a rapid assessment in consultation with BFD/DFD to confirm:

- SSP data elements and mandatory fields (demand-driven format),
- site typologies and intervention categories,
- connectivity conditions and offline needs at Beat level,
- user roles (Beat Officer, Range Officer, DFO, Admin) and approval steps,
- integration requirements with BFIS/SSP dashboard and geodatabase.

b) Explore and finalize appropriate survey instruments and technology stack, which may include:

- **UAV/Drone** surveys for site delineation, high-resolution mapping, and evidence capture (where feasible and permitted),
- **Mobile data collection applications** (customized ODK/Kobo/Android-based apps) for capturing SSP attributes and geospatial features,
- **GPS logging and geotagged photo/video capture** tools integrated into the field workflow.

6.8.2 Application customization and offline-first deployment

a) Configure/customize online/offline mobile forms and workflows to capture:

- geospatial features (points, lines, polygons) for plantation site boundaries, degraded pockets, access routes, and incident observations,
- standardized SSP attributes (site conditions, risk drivers, intervention options, species suitability inputs),
- geotagged photos and evidence records,
- automatic metadata (date/time, device, enumerator ID, coordinates, accuracy).

b) Ensure the tools support:

- **offline data capture and storage** with later synchronization when connectivity is available,
- validation checks (mandatory fields, range constraints, skip logic) to improve data quality,
- unique site identifiers and version control for updates/revisions.

6.8.3 Electronic review, endorsement, and approval workflow

a) Implement a tiered electronic workflow consistent with BFD requirements:

1. **Beat Officer submission** (data entry and initial validation)
2. **Range Officer review/endorsement** (comments, corrections, return-for-revision as needed)
3. **DFO review and electronic approval** (final endorsement for publication)

4. **Admin publish controls** (final release to wider dashboard visibility, as applicable)

b) Enable revision and resubmission:

- Beat Officer must be able to revise SSP entries based on reviewer feedback and resubmit for approval.
- All changes must be traceable through an audit trail (who changed what, when, and why).

6.8.4 Data synchronization, dashboards, and reporting outputs

a) Upon DFO endorsement/approval, validated SSP records will be synchronized to the central SSP/BFIS module and made visible through:

- online dashboard views (maps, summaries, progress trackers),
- downloadable standardized reports (SSP report format),
- GIS export formats for further analysis and archiving.

b) The dashboard will display, at minimum:

- site boundaries and intervention status,
- key risk drivers and site suitability outputs,
- evidence media (photos/drone outputs where applicable),
- approval status and version history.

6.8.5 Methodology finalization and documentation

a) Based on pilot testing and BFD feedback, The company will finalize:

- field survey methodology (including drone flight plans where applicable),
- app configuration and form logic,
- QA/QC protocols for field-to-database workflows,
- endorsement/approval SOPs.

b) The finalized tools and methodology shall be formally endorsed by the DFO and documented for replication and scale-up.

Deliverables under 6.4

- Customized online/offline SSP data collection application (mobile forms + geospatial capture workflow)
- Drone/UAV survey protocol package (where applicable)
- Electronic review/endorsement/approval workflow (Beat → Range → DFO → Admin)
- Synchronization and dashboard visibility rules aligned to demand-driven SSP formats
- User guide/SOP and QA/QC checklist for field teams and approving authorities
- Pilot test report and finalized methodology endorsed by DFO

6.9 Data collection: Conduct Field Survey :

The company will conduct structured field surveys to capture geospatial, ecological, and socio-economic evidence required for Site-Specific Planning (SSP), including UAV-based aerial reconnaissance and participatory consultations to identify on-site causal drivers of deforestation and degradation.

6.9.1 Aerial Survey (UAV/Drone) and High-Resolution Mapping

a) UAV data acquisition

- Deploy UAV/drone surveys over selected plantation intervention sites and priority degraded pockets (as approved by BFD) to capture high-resolution imagery and video for mapping and evidence documentation.
- Ensure flights comply with applicable national regulations and local operational safety requirements, and follow BFD-approved protocols.

b) Tree stock-taking and site condition assessment (as feasible)

- Use UAV outputs, complemented by ground verification where required, to support indicative tree stock-taking, including:
    - tree counts (where canopy conditions allow reliable detection),
    - canopy structure proxies and size-class estimation (e.g., crown size; height proxies where supported),
    - species-type identification to the extent feasible from imagery, supplemented by field identification for key species.
- Record visible signs of disturbance (e.g., clearings, encroachment, trails, logging signs, fuelwood extraction corridors).

c) Photogrammetry, modeling, and mapping outputs

- Produce high-resolution mapping products as applicable, including:
    - orthomosaic maps,
    - digital surface model (DSM) and/or terrain-related products where required for slope/erosion interpretation,
    - site boundary delineations and map layers for SSP.
- Capture georeferenced photos/videos to support SSP evidence packs, baseline documentation, and monitoring.

d) Quality assurance and metadata

- Maintain standard metadata for each UAV mission (date, time, location, altitude, overlap settings, sensor type, operator, weather notes).
- Conduct basic QA/QC checks (coverage completeness, geo-referencing accuracy, image quality, and file naming conventions) before uploading to the central system.

Outputs (UAV Survey)

- High-resolution orthomosaic maps and/or imagery tiles (as applicable)
- Photogrammetry outputs (where applicable)
- Site boundary layers (polygon) and key features (points/lines)
- Photo/video evidence pack per site
- UAV mission metadata log and QA/QC checklist

6.9.2 Ground Verification and Observation (Complementary)

a) Conduct GPS-based ground verification to:

- validate UAV and remote sensing interpretations,
- confirm site boundaries, access routes, degraded pockets, and intervention suitability,
- document regeneration status and plantation feasibility constraints (e.g., soil condition, slope, drainage, salinity influence).

b) Capture georeferenced photo points and field notes aligned to SSP attributes and monitoring indicators.

Outputs (Ground Verification)

- GPS tracks/points and site verification notes
- Geotagged photo points and field observation records
- Updated SSP attribute dataset (validated)

6.9.3 Focus Group Discussions (FGD) to Identify Causal Drivers and Site-Specific Constraints

a) Organize FGDs to identify and validate on-site causal factors and trends related to:

- deforestation and forest degradation (direct drivers and enabling conditions),
- regeneration constraints and opportunities,
- afforestation/social forestry feasibility and risks,
- community dependence, seasonal extraction patterns, and governance/enforcement gaps,
- conflict sensitivity and practical implementation barriers.

b) FGDs will be conducted with the following target groups (to be finalized with BFD/DFD):

- [Insert Group 1: e.g., forest-dependent households/collectors]
- [Insert Group 2: e.g., community leaders/co-management committee members]
- [Insert Group 3: e.g., local women's groups / youth groups, as relevant]
- [Insert Group 4: e.g., local service providers/market actors, as relevant]
- [Insert Group 5: e.g., BFD frontline staff at Beat/Range level for operational insights]

c) Ensure FGD procedures follow agreed safeguards and ethical standards (informed participation, confidentiality, do-no-harm).

d) Document and code FGD findings in a structured format, and spatially reference insights where possible (e.g., mapping hotspots of extraction, access routes, and conflict points).

Outputs (FGD)

- FGD tools (checklist/question guide) and participant lists (as permitted)
- FGD proceedings/notes and coded findings matrix
- Driver ranking and site-specific constraint/opportunity summaries
- Spatial annotations (hotspot points/areas identified by participants, where feasible)

6.9.4 Integration of Field Findings into SSP and BFIS Module

The company will integrate UAV outputs, ground verification, and FGD findings into:

- the SSP database and site-specific SSP reports,
- the BFIS-aligned mapping interface and dashboard views,
- site prioritization and intervention recommendations.

Team	Target FGD group	Purposes
FGD Team 1	FGD Co-management of social forestry, Management of horticulture, nurseries,	• Identify members/individuals who depend on the forest for livelihood, including wood/timber collectors, bamboo and cane collectors, timber collectors, grass collectors, house broom grass collectors, grazing, livestock herding, fuel wood collectors, honey collectors, etc. • Local livelihood groups residing along the buffer/impact zone and their livelihood activities, i.e., paddy cultivation, fruit tree gardening, vegetable gardening, betel leaf cultivation, and pisciculture.
FGD Team 2	Forest encroacher /resource dependency stakeholders/entrepreneurs	• Identify members/individuals of forest land encroachers, fuel-wood collectors, illicit loggers, forest produce collectors, hunters, farmers, fruit collectors, and tourists. Secondary stakeholders include timber merchants, brickfield owners, hotel/motel owners, furniture businesses, sawmill owners, and others linked indirectly with forest-based activities. • Identify Institutional stakeholders, including the Forest Department, NGOs, Union Parishes, and Police. • Identify CMC, Co-management organization (CMO), Co Management Committee (CMC), Co-management council, Peoples forum (PF) , Village conservation forum (VCF)
FGD Team 3	Forest resource dependency, Local Community/ethnic community, livelihood groups etc.	• Identify members/individuals who depend on forest resources, such as forests, waterbodies, canals, fountains, springs, and water. • Fuel-wood collectors, illicit loggers, forest produce collectors, hunters, farmers, fruit collectors, and tourists.
FGD Team 4	Community risk (multi-hazard) assessment and socioeconomic survey at the community level	• The level of Localized multi-hazards & triggers (cyclone, tropical storm, localized storms, storm surges, salinity intrusion, soil salinity, heavy rainfall induced landslide, tree falls, mudslide, debris fall)

6.9.5 On-site index mapping of the detail component of site-specific planning (SSP)

Type of Survey	Objective	Area
Conducting a drone Survey (Aerial) and ground truthing survey :	For delineating the block, each forest type of block boundary delineation is as follows: core zone, buffer zone, impact zone, beat area, forest blocks, compartments, etc.	Zone, Beat, blocks, compartments
Conducting a drone **survey for stock taking of trees**	count, size, and species types), and high-resolution maps. Tree inspections and surveys, photogrammetry and modeling, picture and video capture)	Zone, Beat, blocks, compartments
Conducting a field survey with a transect walk	for spot verification, ground truthing for boundary delineation, placemark tracking, location tracking, hotspot tracking, etc., with GPS survey apps, Kobo Toolbox apps	Zone, Beat, blocks, compartments, para, Mohallah, Village, etc.

6.9.6 KII/FGD with local user groups (forest resources) :

Consultation	Objective	Area	Local facilitation
KII/FGD with local user groups (forest resource dependency)	Identify the root causes of exploitation & extraction of forest resources - • Organize consultation with land encroachers, fuel-wood collectors, illicit loggers, forest produce collectors, hunters, farmers, fruit collectors, and tourists. Secondary stakeholders include timber merchants, brickfield owners, hotel/motel owners, furniture businesses, sawmill owners, and others linked indirectly with forest-based activities. • Dependency on forest for livelihood, i.e., pisciculture, fuel wood collection, bamboo and cane collection, timber collection, sungrass collection, house broom grass collection, grazing, etc. • Institutional stakeholders include: Forest Department, NGOs, Union Parishes, and Police.	Zone, Beat, blocks, compartments	• Village Conservation Forum (VCF) • People's Forum (PF) • Co-Management Committee (CMC) • Elected representative from villages and local communities within the Protected Area landscape. • Local Disaster Management Committee (UDMC, Ward DMC) • Women, the youth, lower-income households, and essential resource user groups.
KII/FGD with local buffer group	Buffer zone annexed livelihood groups of paddy cultivation, betel leaf cultivation, agroforestry owners, pisciculture owners, etc., to identify the gaps in implementing tree plantation, reforestation, habitat restoration, nature tourism activities, and other management activities of the protected area	Zone, Beat, blocks, compartments	

6.9.7 Putting digital surveillance in the main encroachment pockets:

The company will establish and operationalize incident tracking support at BFD local units through a **field surveillance package** comprising (i) a special-purpose UAV/drone capability, (ii) standardized incident recording and verification workflows, and (iii) geospatial products to detect, document, and deter forest/resource degradation and illegal activities.

1) Deployment of BFD Local Surveillance Units

The company will support selected BFD local units (Range/Beat level as agreed) to function as surveillance nodes by providing:

- A defined surveillance coverage plan (priority beats, hotspots, corridor/interface zones),
- Standard operating procedures (SOPs) for detection, verification, escalation, and closure of incidents,
- A structured incident registry aligned to SSP/BFIS data models (incident type, location, time, evidence, response action, status).

2) Special-Purpose Drone Operations for Incident Detection and Evidence

The company will deploy UAV/drone surveys (as permitted and operationally feasible) to generate high-resolution evidence for both forest monitoring and incident verification, including:

3) UAV outputs

- High-resolution imagery and video capture for documenting illegal extraction, encroachment, and site disturbances,
- Photogrammetry processing to produce:
    - orthomosaic maps (high-resolution base maps),
    - 3D surface models/terrain proxies where relevant (e.g., slope failure, erosion features),
    - change documentation across repeat flights for verified hotspots.

4) Tree stock-taking support (indicative)

Drone imagery will be used to support **indicative tree stock-taking** (count/size proxies), and species typing where feasible. Where canopy complexity or sensor limitations make species identification unreliable, The company will apply a hybrid approach:

- UAV-derived canopy/stand structure proxies + targeted ground verification plots,
- Standardized sampling rules for minimum ground truth per site.

5) Evidence package for incident cases

Each verified incident will include an evidence package consisting of:

- geotagged photo/video,
- mapped incident polygon/point,
- time-stamped flight metadata and processing notes,
- a short incident narrative and recommended action.

6) Mapping and Identification of Wildlife Movement and Corridors

The company will identify and map:

- **Elephant corridors** and movement pathways,
- wildlife exit/entry routes (elephant, deer, monkey, and other priority wildlife),
- sensitive crossing points, pinch points, and habitat fragmentation zones relevant to conservation and patrol planning.

Methods (triangulated to reduce error)

- UAV reconnaissance in likely corridors and interface zones,
- ground sign surveys (tracks, dung, browse, trails) using GPS-referenced observation forms,
- camera trapping at selected chokepoints (where feasible and approved),
- participatory mapping with BFD staff and local stakeholders (validated against field evidence).

Outputs

- Corridor and movement route maps with confidence grading (high/medium/low certainty),
- corridor risk overlays (encroachment pressure, road crossings, conflict hotspots),
- recommended protection/patrol priorities.

7) Identification of Livestock Entry/Exit Routes for Illegal Grazing and Fodder Collection

The company will map livestock movement and illegal grazing/fodder collection pathways and hotspots, including:

- routes used for entry/exit into reserve forests and sanctuaries,
- grazing pockets, fodder extraction points, watering points,
- seasonal patterns (where reported/observed).

Methods

- Field observation and GPS tracking during patrols/surveys,
- UAV verification in known grazing areas and suspected access routes,
- stakeholder consultations to understand seasonality and route usage.

Outputs

- Livestock route network and grazing hotspot maps,
- priority control points for enforcement and deterrence measures,
- recommendations for targeted patrol scheduling and signage/physical barriers where applicable.

8) Integration with Dashboard and SSP/BFIS Workflows

All surveillance outputs will be structured to support digital workflows:

- Incidents recorded at Beat/Range level using standardized forms (offline-first if needed),
- Evidence attached (photos/video/UAV products),
- Review and approval workflow aligned to BFD roles (Beat → Range → DFO → Admin, as applicable),
- Publication rules so only verified/approved incidents appear on the dashboard.

9) Deliverables

- Surveillance deployment plan for selected BFD local units (coverage, routes, frequency, roles)
- UAV flight plan templates, SOPs, and metadata standards
- High-resolution orthomosaics and evidence maps for priority areas and verified incidents
- Incident registry (geospatial) with evidence packages and status tracking
- Wildlife corridor/entry-exit maps with risk overlays and patrol recommendations
- Livestock route and illegal grazing hotspot maps with recommended control points
- Training/orientation for BFD staff on UAV evidence capture, incident recording, and dashboard use

10) Safeguards and Operational Controls (Minimum Requirements)

- Compliance with applicable UAV flight permissions and safety rules
- Role-based access to surveillance outputs and incident evidence (to prevent misuse)
- Clear verification protocols to minimize false accusations and escalation risks

- Data security (controlled sharing, audit logs, retention rules) aligned with BFIS governance

6.10 Develop a geospatial online dashboard:

1) Objective

To design, deploy, and operate an **online geospatial portal (open-source stack or ESRI ArcGIS Enterprise/Online)** with an integrated database that can:

- display maps, layers, and events/incidents in near real time,
- receive **direct field updates** from mobile apps and messaging channels (with geo-referenced evidence),
- enable verification, escalation, and closure workflows by BFD authorities,
- support continuous monitoring of threats, degradation trends, regeneration, and planting/restoration progress.

2) Core System Components

2.1 Geospatial Web Portal

A web-based portal that provides:

- interactive map viewer (map tiles + layers + legend),
- event/incident layer visualization with filters by type, time, beat/range/division, severity, and status,
- dashboards with summary indicators and trends,
- standardized exports (PDF map, CSV, shapefile/GeoJSON where permitted).

Technology options

- **ESRI option:** ArcGIS Portal/Enterprise (or ArcGIS Online) + ArcGIS Server services + feature layers + dashboards.
- **Open-source option:** PostGIS + GeoServer (or similar) + tile service + web client (OpenLayers/Leaflet/MapLibre) + dashboard layer.

2.2 Central Database and Services

A central data store (preferably **PostGIS** or ESRI geodatabase) containing:

- base layers (admin and forest management boundaries),
- SSP site boundaries and attributes (where applicable),
- surveillance/incident/event records with media attachments,
- patrol tracks and observation logs,
- indicator tables (annual regeneration, degradation, planting, etc.).

2.3 Field-Level Mobile Apps (Online/Offline)

Mobile tools that allow field teams and community patrols to:

- capture incident observations (point/line/polygon),
- attach geo-referenced photos/videos and notes,
- capture patrol tracks and time-stamped checkpoints,
- work **offline-first** and synchronize when connectivity is available.

Minimum capabilities

- GPS capture and accuracy logging,
- mandatory field validation (type, date/time, location, severity),
- photo capture with metadata,
- user authentication (role-based).

2.4 Messaging-Based Rapid Reporting (Approved Channels)

A structured mechanism for receiving incident reports via **instant messaging services** (as approved by BFD), including:

- submission templates (required fields),
- automated parsing or manual triage into the incident registry,
- mandatory geo-reference rules (location pin/coordinates + photo).

This acts as a "fast lane" for early alerts, while the mobile app remains the authoritative field data tool.

3) Incident and Event Tracking Scope

3.1 Direct Threat Categories (Minimum Incident Taxonomy)

The system will track and map, at minimum:

- illegal encroachment / land grabbing,
- hill cutting / slope disturbance,
- tree cutting / illicit felling,
- illicit logging / timber extraction and transport,
- forest fire (where applicable),
- landslide and treefall events,
- hunting and wildlife poaching (including elephant-related incidents),
- damage to trees/seedlings/saplings,
- illegal resource extraction (fuelwood, bamboo, NTFPs where relevant).

3.2 Pressure/Driver Tracking Layers (Facilities and Encroachments)

The portal should include tracking layers for:

- brickfields,
- illegal/informal settlements inside forest land,
- illegal housing inside forest,
- sawmills,
- furniture shops (where relevant),
- livestock grazing inside forest,
- grazing routes and fodder collection pathways (where feasible).

4) Monitoring Indicators and Analytics

The system must support periodic calculation and visualization of:

1. **Annual regeneration rate** (definition to be agreed; derived from field plots and/or remote sensing proxies)
2. **Annual forest degradation rate** (remote sensing change metrics + verified incident overlays)
3. **Annual planting rate** (area planted, number of sites, species categories, survival monitoring entries)
4. **Degraded areas inventory** (mapped degraded pockets, severity class, restoration status)
5. **Illegal extraction pressure** (incident frequency, hotspot persistence, repeat offender patterns where permitted)
6. **Edge-point degradation snapshots** (repeat photo-point monitoring for the most degraded edges)

Note: Remote sensing analytics can be updated on a defined schedule (e.g., monthly/quarterly) while incidents update in near real time.

5) Workflows and Governance

5.1 Role-Based Workflow (Minimum)

- **Reporter (Community Patrol / Stakeholder):** submits observation/alert with geo-tagged evidence
- **Beat Officer:** initial validation, classification, and field verification request
- **Range Officer:** review/endorsement, assigns response/patrol action
- **DFO:** approval/verification of major incidents, authorizes escalation and formal record closure
- **Admin:** user management, publishing rules, layer governance, audit review

5.2 Incident Lifecycle

- New → Under Review → Verified / Not Verified → Action Assigned → Resolved/Closed → Archived
  Each step must be time-stamped and auditable.

5.3 Data Quality and Verification Rules

- Mandatory minimum evidence: location + timestamp + photo/video (where safe/feasible)
- Confidence rating: High/Medium/Low until verified
- Duplicate detection: same location/time/type flagged for review
- Controlled publishing: only verified/approved incidents appear on public-facing or broader dashboards (if any)

6) Key User Interfaces

6.1 Portal Map Interface

- fixed layer list and symbolization (agreed with BFD),
- filtering panel (type, date, status, admin unit),
- incident detail pane (photos, notes, history, assigned actions),

- heatmaps and hotspot layers.

6.2 Dashboards

- summary cards: incidents by type, open cases, response time, hotspot beats, degradation trends
- charts: time series by month/quarter; patrol effort vs incidents
- map widget: hotspots and corridor/interface zones

6.3 Mobile App Interfaces

- "Report Incident" form (guided)
- "Patrol Mode" (track recording + checkpoints)
- "Photo-point Monitoring" (repeat photo capture from fixed points)
- "Sync Center" (upload status, offline queue)

7) Deliverables (System-Facing)

1. Deployed geospatial portal (ESRI or open-source) with database and map services
2. Configured field apps (online/offline) with standardized incident forms and geospatial capture
3. Messaging intake protocol + triage workflow into incident registry
4. Incident taxonomy, SOPs, and role-based approval workflow
5. Dashboards and reporting templates (weekly/monthly summaries, hotspot reports)
6. Indicator calculation method notes (regeneration, degradation, planting, degraded area tracking)
7. User guides and training for BFD and community patrol teams
8. Security and audit controls (access roles, logs, backup and recovery procedures)

8) Minimum Acceptance Criteria (Practical and Testable)

- Field users can submit incidents offline and synchronize successfully with geometry + media attachments.
- Web portal displays new verified incidents within the agreed sync window.
- Role-based endorsement/approval works end-to-end with audit logs.
- Dashboards produce consistent counts and can filter by division/range/beat and time period.
- Export functions generate standardized reports and GIS-ready outputs.
- System includes backups and recovery procedures, and enforces access control.

6.11 Review and propose to improve smart patrolling :

Petrol group	Types of equipment	Apps for tracking	Activities
Community Patrol Group (CPG)	• Roaming IP Surveillance camera, • Drone • Android phone / GPS Place mark logger, Kobo Toolbox apps • Crowdsource pictures/event situation updates (georeferenced picture/snapshot) for tracking incidents and sending information to an online dashboard	Kobo toolbox (GPS logger apps) for tracking instant updates/hot spot event directory to a web-based platform for visualization of events.	Tracking forest land encroachers, fuel-wood collectors, illegal loggers, forest produce collectors, hunters, farmers, fruit collectors, honey collectors, local tourists, etc., is directly associated with forest resource extraction activities.
Plant growth and status monitoring	• Roaming IP Surveillance camera, • Drone captured image/video • Android phone / GPS Place mark logger, Kobo Toolbox apps	Kobo toolbox(GPS logger apps) for tracking instant updates/hot spot event directory to a web-based platform for visualization of events.	Co-management committee of south forest division, with ten transect sites, including site-1 (Teknaf), Site-2 (Dumdumiya), Site-3 (Ledha), Site-4 (Hnila-south), Site-5 (Hnila-north), Site-6 (Raingkhali), Site-7 (Saplapur), Site-8 (Shilkhali),

Petrol group	Types of equipment	Apps for tracking	Activities
	• Crowdsource pictures/event situation updates (georeferenced picture/snapshot) for tracking incidents and sending information to an online dashboard		Site-9 (Mathabanga) and Site-10 (Rajarchara) etc. to montiir growths of main tress e.g, **Garjan, Jam, Akashmoni, Mehogony, Shegun, Chikrassi, Chapalish, Chatian Jolpai, Dumor, Bohera, Gamar, Sheora, Kat badam, Amloki, Horotoki, Kathal, Lotkon, Bell, Jambura, and Kotbel.**
Establish a Photo point	• Roaming IP Surveillance camera, • Drone captured image/video • Android phone / GPS Place mark logger, Kobo Toolbox apps • Crowdsource pictures/event situation updates (georeferenced picture/snapshot) for tracking incidents and sending information to an online dashboard	Kobo toolbox(GPS logger apps) for tracking instant updates/hot spot event directory to a web-based platform for visualization of events.	Along the block boundary, establish a geofenced photo point for regularly capturing georeferenced photos and sending them to the server to get to know the weekly/bi-monthly/monthly status of encroachment, periphery area livelihood actions (agriculture and farming), creating alert messages to the SSP team for punitive action. Control of forest grazing through patrolling
Monitor soil topography	• Roaming IP Surveillance camera, • Drone captured image/video • Android phone / GPS Place mark logger, Kobo Toolbox apps • Crowdsource pictures/event situation updates (georeferenced picture/snapshot) for tracking incidents and sending information to an online dashboard	Kobo toolbox(GPS logger apps) for tracking instant updates/hot spot event directory to a web-based platform for visualization of events.	**Collect soil samples and research on land degradation potentials**
Oversight of Landscape Transformation	• Roaming IP Surveillance camera, • Drone • Android phone / GPS Place mark logger, Kobo Toolbox apps • Crowdsource pictures/event situation updates (georeferenced picture/snapshot) for tracking incidents and sending information to an online dashboard	Kobo toolbox(GPS logger apps) for tracking instant updates/hot spot event directory to a web-based platform for visualization of events.	Tracking incidence and hotspot, event situation reporting to main server

Petrol group	Types of equipment	Apps for tracking	Activities
The FAO developed a landslide early warning system for the co-management of forests from degradation	• Roaming IP Surveillance camera, • Drone • Android phone / GPS Place mark logger, Kobo Toolbox apps Crowdsource pictures/event situation updates (georeferenced picture/snapshot) for tracking incidents and sending information to an online dashboard	Kobo toolbox(GPS logger apps) for tracking instant updates/hot spot event directory to a web-based platform for visualization of events.	Develop a strategy and a mechanism for a weather forecast-based forest/sanctuary protection early warning system.

6.12 Data integration and comparison

All GPS placemarks and Kobo-Toolbox collected data were verified with Google Maps to check data quality, design survey areas, and identify non-survey areas for next-level surveying. All the data collected were integrated and compared. Both alignment and data content were checked. All the GIS data were displayed; otherwise, the accuracy was compared with the reference layer. Accuracy was also compared among the sources.

6.13 Online dashboard for Site Management:

a) Develop geospatial platform (Open source/ ESRI ArcGIS / Map tiles/ Map Layer, etc) :

To facilitate ICT-driven, evidence-based geospatial services-enabled facilities, The company intends to install and operationalize a Geospatial platform (ArcGIS Platform), interfacing with ArcGIS/QGIS software, and uploading delineating and tracking impacts over the following zones.

Site	Core zone	Buffer zone	Impact zone	Support Service	
site-Teknaf	• Identify the forest degradation pocket, deforested pockets, , and vulnerabilities (salinity intrusion areas, ground water polluted areas, water logging areas, degradation pockets, degradation and regeneration rates, gaps	• Delineation of buffer boundary, conduct aerial surveys, conduct a transect walk by the s, etc., damage of socioeconomic infrastructure, systemic loss and damages (L&Ds) elements of impact areas for encroachment, entry points for theft resources, other and residual effects of human activity in the adjacent areas, and the sanctuary environment • Identify elephant corridors, exit/entry routes of wildlife, elephant, deer, and other wildlife • Identify exit/entry routes of livestock (cattle, buffalos,	Delineation of the impact boundary and tracking the residual impacts from the livelihood activity group exerting threats to the forest	Beat offices, Range offices, NSP offices, Guest houses, and Police stations have apps that monitor and track incidents.	Applying GIS techniques, the spatial boundaries are analyzed to determine the impact level

Site	Core zone	Buffer zone	Impact zone	Support Service	
		goats) for illegal grazing /fodder collection.			

6.14 Analysis of hydrometeorological factors for forest delegation and regeneration:

Monitoring local extreme weather events (heavy rainfall, heatwave, dry spells, coastal surges, salinity intrusion, etc.), quantifying climate-induced loss and damage(L&Ds), and proposing adaptive measures. Access the FAO developed Slope map, Land Degradation map, landslide early warning system, and capacity building for SSP -FD for adaptive planning/actions.

6.15 Prepare a hydrometeorological multi-hazard map:

Develop a multi-hazard exposure, risks, and vulnerability risk atlas and analyze the impacts on the forest elements.

6.16 Feeding local level Impending multi-hazard exposure, risk, and vulnerability by the Uapzila, Union & Ward Disaster Management Committee to the geospatial platform:

A mobile phone (Android)- based WhatsApp group and GPS apps will be installed, oriented to the Beat offices, Range offices, NSP offices, Police stations, Village Conservation Forum (VCF) , People's Forum (PF), Co-Management Committee (CMC), Elected representative from villages and local communities within the Protected Area landscape, Local Disaster Management committee (UDMC, Ward DMC), Women & youth-led group with apps based monitoring and tracking incidences to provide the forest site-specific petrol and incidence report to the central server etc. to provide the forest site specific petrol, incidence report to central sever for visualization.

7.0 Timeline with key Milestones:

Activities	Timeline																															
	June 2025				July 2025				Aug 2025				Sep 2025				Oct 2025				Nov 2025				Dec 2025				Jan 2026			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
1) Inception Report, in consultation with PIU and RIMS Unit of BFD; 2) A sharing workshop at BFD.																																
Finalizing the approaches of a) development of a web-based Site-Specific Planning application operational at the Field and National level. b) development of SSP application.																																
Development of Site-Specific Plans (SSPs); module at BFIS																																
Reporting interface demonstration to BFD for SSP database management for Reporting.																																
Functional SSP Interface by Database, Server and GIS experts, with Operational Acceptance Testing (OAT) and User Acceptance Testing ng (UAT) at PMU and 3 sample Field Divisions																																
Orientation of RIMS Unit (BFD) team members																																
GIS Support for SSP Mapping																																
Technical supervision and support by PIU																																
Finalizes on SSP development with functional interface and Comple on report																																

8.0 Name, designation, and a brief about the key team member of the Consultants:

Name & Proposed Position	Professional Qualification	Remarks
Team leader		Detailed CV attached
Deputy team leader		Detailed CV attached
Software/Database Engineer (Head of IT) **B.Sc. in Electrical & Electronic Engineering**		Detailed CV attached
GIS Expert MA & BA in Geography		Detailed CV attached
IT expert		Detailed CV attached
Surveyors (5 Groups, 6 Surveyors)		Detailed CV attached