

Terms of Reference

Pre-Feasibility Study for the Modernization of VNRSD Remote Sensing, Geospatial Data Infrastructure and AI-Enabled Climate Resilience Applications in Vietnam

FEXTE Digital for Development (D4D) Asia-Pacific Program

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Background

Vietnam is entering a new phase of public sector modernization in science, technology, innovation and digital transformation. In the agriculture and environment sector, this policy direction is being translated into operational needs for digital infrastructure, data systems, artificial intelligence and remote sensing capabilities.

The Vietnam National Remote Sensing Department (VNRSD), under the Ministry of Agriculture and Environment (MAE), has a central role in strengthening the use of remote sensing and artificial intelligence for environmental monitoring, climate resilience, agriculture, aquaculture, water management and decision support. The department is expected to move from a set of existing technical capacities toward a more integrated system linking data acquisition, storage, processing, analysis and operational use by decision-makers.

The proposed assignment is part of the FEXTE Digital for Development Asia-Pacific framework and will be contracted and supervised by Expertise France. It will support the preparation of a pre-feasibility study for MAE's VNRSD, with the objective of identifying technically credible, institutionally feasible and investment-oriented options for modernizing Vietnam's remote sensing and geospatial data capabilities.

A separate Terms of Reference will cover the specific use case of remote sensing for geology, mining and geoscience expertise, in cooperation with BRGM and the Department of Geology and Minerals of Vietnam (DGMV). The present assignment will not cover technical geology or mining expertise. However, the consultants shall ensure adequate coordination with the parallel BRGM/DGMV workstream where relevant, especially on shared data infrastructure, institutional interfaces and possible remote sensing use cases.

Contracting authority

Expertise France will be the contracting authority and sole authority responsible for final validation of deliverables. The deliverables are also expected to receive rounds of comments and intermediary validation from AFD and VNRSD.

Objective

The overall objective of the assignment is to prepare a pre-feasibility study that can serve as a basis for a subsequent feasibility study, pilot project, investment project or technical assistance operation for the modernization of VNRSD's remote sensing, data infrastructure and AI-enabled decision-support capacities.

The assignment shall provide enough detail to support follow-on investment preparation, while remaining at pre-feasibility level. It is not expected to produce detailed engineering design, final procurement specifications or a full feasibility study.

Specific objectives

The specific objectives are to:

1. Assess VNRSD's existing capacities in satellite imagery, remote sensing data management, geospatial data infrastructure, digital systems, analytical tools and institutional coordination.
2. Analyze the full remote sensing data chain, including reception and control stations, satellite data acquisition, storage, computing capacity, databases, processing software, AI-enabled image analysis, APIs, dashboards, dissemination mechanisms and decision-support layers.
3. Identify priority use cases where VNRSD can credibly lead through satellite imagery, remote sensing products, geospatial data infrastructure and AI-enabled analysis, while distinguishing clearly between VNRSD's role and the role of sector departments as operational users, policy owners or field-data providers.
4. Assess priority use-case families, with particular focus on:
 - a. satellite-derived monitoring layers for farm systems, including soil-based agriculture and aquaculture, where VNRSD provides remote sensing products and sector departments provide operational interpretation, field data and decision-making;
 - b. remote sensing support to flood and disaster-risk management, including flood extent mapping, flood-history layers, exposure layers and AI-enabled satellite image analysis, while integrated flood management remains under the relevant competent agencies;
 - c. remote sensing support to drought, saline intrusion, water stress, land/water-use change and environmental monitoring;
 - d. geology, minerals and mining-related environmental monitoring as an interface use case only, with detailed geoscience analysis to be covered under the separate BRGM/DGMV TOR;
 - e. other MAE-relevant remote sensing applications, including but not limited to forest monitoring, coastal and river erosion, land-cover change, carbon-related monitoring, environmental surveillance and more, subject to mandate clarity and feasibility.
5. Assess concrete AI and advanced analytics options for remote sensing data, including:
 - a. automated land-use and land-cover classification;
 - b. satellite-based change detection and anomaly detection;
 - c. SAR-based flood mapping and flood-history analysis;
 - d. crop-condition, vegetation-stress and surface-water monitoring layers;
 - e. water quality and aquaculture-relevant proxy indicators from optical, SAR, thermal or multi-source data where technically feasible;
 - f. drought, saline intrusion and environmental stress indicators;
 - g. high-level AI screening for geology/minerals-related satellite imagery layers, without detailed geological interpretation;
 - h. multi-sensor fusion using optical, SAR, hyperspectral, thermal, very-high-resolution, UAV or in-situ data where available from VNRSD or partner agencies;

- i. transfer learning, self-supervised learning, uncertainty estimation and explainable AI approaches where appropriate.
6. Propose a preliminary target architecture for a VNRSD-led AI-enabled remote sensing data infrastructure, including data flows, platform options, processing pipelines, AI model management, digital infrastructure, storage, computing, interoperability requirements, APIs, dashboards, data governance arrangements and operational workflows.
7. Identify the institutional, technical, financial, legal and operational conditions required for feasibility, including data access, ground-truth availability, validation datasets, hosting constraints, cybersecurity requirements, coordination with sector agencies and sustainability of operations.
8. Identify opportunities for French and European public, scientific and private-sector actors in satellite imagery, Earth observation, geospatial data platforms, AI, cloud or hybrid infrastructure, interoperability, IoT-enabled complementary data, connectivity, dashboards and decision-support tools.
9. Prepare a realistic implementation pathway from 2027 onward, including possible options for a follow-on feasibility study, pilot, demonstrator, technical assistance, public investment or blended cooperation, prioritizing applications that VNRSD can lead through its remote sensing and data infrastructure mandate.

Scope of work

The assignment is a pre-feasibility study. It shall screen options, identify priority investment pathways and prepare the basis for a possible follow-on feasibility study, pilot, demonstrator or investment project. It shall not produce detailed engineering design, final procurement specifications, software deployment or a full feasibility study.

The assignment shall cover the following workstreams.

1. Inception and methodological framing

The consultants shall prepare an inception phase to confirm the scope, methodology, work plan, stakeholder engagement approach and mission schedule.

This shall include:

- review of existing project documentation;
- review of VNRSD's institutional mandate, priorities and relevant policy context;
- identification of information gaps;
- preparation of interview guides and data collection tools;
- proposed criteria for prioritizing use cases;
- proposed structure of the pre-feasibility report;
- preparation of the inception/scoping mission.

2. Diagnostic of existing capacities

The consultants shall assess VNRSD's existing capacities across the full data chain, including:

- satellite data sources, access and reception capacities;
- ground, drone, in-situ and other complementary data sources (incl. IoT devices);
- data hosting and archiving systems;
- data cataloguing, metadata and standards;
- data governance, data management;
- processing tools and software environment (GIS platforms, remote sensing software, etc.);
- computing capacity (incl. AI/HPC), including local, cloud and hybrid options;
- databases and geospatial data platforms;
- current workflows from data acquisition to operational use;
- network and connectivity infrastructure (including cybersecurity);
- human resources, skills and organizational arrangements;
- current products, services, dashboards or reports;
- links with other MAE departments and other users of remote sensing data;
- operational bottlenecks and capacity gaps.

The diagnostic shall assess existing VNRSD assets, including national remote sensing image databases, satellite data sources, receiving and processing capacities, current products, data access arrangements, contracts inventory, operation & maintenance arrangements, and operational users. The current national remote sensing database contains nearly 100,000 satellite images from 16 sources, including VNREDSat-1, SPOT 6, WorldView and Landsat, with resolutions ranging from 0.55 m to 30 m and revisit intervals of 2.5-5 days.

3. Priority use cases assessments

The consultants shall screen the priority use-case families listed below and assess them against mandate clarity, operational demand, satellite-data availability, ground-truth availability, technical feasibility, climate and environmental impact, estimated cost, implementation time and potential French/EU added value. The study shall avoid becoming a broad catalogue of possible remote sensing applications.

The use cases shall be framed primarily around VNRSD's role as a provider of satellite imagery, remote sensing products, geospatial data infrastructure, AI-enabled image analysis and decision-support layers. For each use case, the consultants shall distinguish clearly between:

- VNRSD's role in satellite data acquisition, processing, analysis, infrastructure and dissemination, and the future AI-enabled infrastructure for remote sensing;
- the role of sector departments and other agencies as operational users, policy owners or field-data providers;
- the minimum institutional coordination needed for the use case to be feasible.

Potential priority use cases shall include

1. Farm systems monitoring, covering soil-based agriculture and aquaculture:

- a. production of satellite-derived monitoring layers for crop production areas, aquaculture zones, land/water-use dynamics and seasonal production patterns;
 - b. crop and land-cover classification using multi-temporal optical, SAR and, where relevant, very-high-resolution imagery, with UAV data considered only where provided by other actors or required for validation;
 - c. assessment of remote sensing indicators such as vegetation indices, leaf area index, chlorophyll/nitrogen proxy indicators, vegetation stress, soil moisture proxy indicators, evapotranspiration, water stress and productivity-related indicators;
 - d. use of SAR data for all-weather, day-and-night monitoring in cloudy regions, including potential estimation of crop structure, biomass proxy indicators, canopy condition and soil moisture proxy indicators;
 - e. assessment of emerging satellite-derived indicators such as solar-induced chlorophyll fluorescence, high-resolution optical time series and thermal imagery where they can improve crop-condition, drought-stress or productivity monitoring;
 - f. screening of crop production estimation and yield-forecasting potential as a future option, subject to access to reliable sector data, crop statistics, ground-truth information and validation datasets from relevant agriculture departments;
 - g. production of satellite-derived water and environmental indicators relevant to aquaculture areas, including turbidity, salinity proxy indicators, surface water dynamics, water temperature where technically feasible, and other water quality-related proxies;
 - h. identification of remote sensing-based risk indicators for drought, saline intrusion, environmental stress, harmful algal blooms, crop water stress, nutrient stress and other production-related risks, without assigning operational advisory responsibility to VNRSD;
 - i. assessment of how satellite-derived products could be combined with hydrometeorological, in-situ, field survey, farm-level or administrative data provided by relevant sector agencies;
 - j. assessment of possible VNRSD products, including crop-condition layers, aquaculture-zone monitoring layers, surface-water and water-quality proxy layers, production outlook layers, early-warning inputs, dashboards and data services for MAE departments and local authorities;
 - k. identification of realistic pilot options, distinguishing between applications VNRSD can support with existing satellite data and processing tools, applications requiring additional ground-truth or sector data, and applications requiring further research or feasibility assessment.
2. Remote sensing support to flood and disaster-risk management:

- a. monitoring and mapping of historical and recent flood events using multi-temporal satellite imagery, with priority use of SAR imagery where cloud cover, night-time conditions or storm conditions limit optical imagery;
 - b. use of optical satellite data, including NDWI/MNDWI-type water indices, for water extent mapping, flood inventory development, land-use analysis and change detection where cloud-free imagery is available;
 - c. integration of very-high-resolution imagery where relevant for urban inundation, localized damage assessment and exposure mapping, subject to data availability and cost;
 - d. production of satellite-derived flood extent, flood history and exposure layers that can be used by hydrometeorological, disaster-risk management and provincial authorities;
 - e. assessment of how VNRSD products could interface with hydrological and hydrometeorological datasets managed by other agencies, including water-level observations, rainfall records, river flow data, drainage information and terrain data;
 - f. screening of AI-based flood mapping, flood susceptibility analysis and flood forecasting as future options, using historical flood patterns from satellite image time series and complementary hydrological or rainfall data where available;
 - g. assessment of relevant AI approaches for satellite image analysis, including machine learning classifiers, ensemble models, SAR-based flood segmentation, change detection and uncertainty estimation;
 - h. assessment of IoT-enabled ground-sensing or water-level sensor data only as external complementary inputs, not as infrastructure to be owned or operated by VNRSD unless otherwise agreed by the relevant authorities;
 - i. assessment of possible VNRSD products, including flood inventory maps, near-real-time flood extent products, exposure layers, flood-history layers, risk-screening inputs and operational dashboards for competent agencies;
 - j. assessment of data readiness, including availability, quality, spatial and temporal coverage, access rights and validation datasets for historical flood extent, water levels, rainfall, river flow, DEM, land use and field observations;
 - k. identification of realistic pilot options, distinguishing between satellite-image products that VNRSD can lead, integrated flood-management functions that require other agencies, and advanced AI forecasting functions that require further feasibility assessment.
3. Geology, minerals and mining-related environmental monitoring (as interface use case):
 - a. high-level assessment of how VNRSD satellite imagery, remote sensing infrastructure and AI-enabled image analysis could support geology and mineral-related applications, including lithological mapping, structural

- lineament detection, hydrothermal alteration mapping, mineral prospectivity screening and mining-related environmental monitoring;
- b. assessment of relevant satellite and remote sensing data sources at interface level, including multispectral imagery, hyperspectral imagery, SAR, DEM and, where relevant, UAV data provided by other actors;
 - c. identification of potential AI and analytics approaches at screening level, including machine learning classification, deep learning for lithology or alteration mapping, multi-sensor data fusion, uncertainty estimation and knowledge-informed AI approaches;
 - d. identification of shared data-infrastructure needs between VNRSD and DGMV, including interoperability, metadata, data governance, APIs, storage, processing capacity and possible links between satellite imagery and geological datasets;
 - e. assessment of potential VNRSD-supported outputs at a high level, such as satellite imagery layers, geological remote sensing layers, environmental monitoring layers for mining areas, land-cover change around mining sites and geohazard-relevant indicators;
 - f. identification of coordination points with the separate BRGM/DGMV workstream, especially for geoscientific data infrastructure, remote sensing inputs, AI methods and possible shared platform requirements;
 - g. clear exclusion of detailed geological interpretation, mineral resource assessment, mineral prospectivity modelling, mining project analysis, geochemical interpretation and geoscience technical design from this TOR.

Note: this use case shall be treated only as an interface and coherence item under the VNRSD pre-feasibility study. The detailed geology, minerals, mining and geoscience use cases shall be developed under the separate BRGM/DGMV TOR.

4. Remote sensing support to drought, saline intrusion and environmental monitoring:
 - a. production of satellite-derived indicators for vegetation stress, evapotranspiration, soil moisture proxies, surface water dynamics, land-cover change and water-related stress;
 - b. screening of saline intrusion risk-mapping potential where remote sensing data can be combined with hydrological, salinity, river-flow or field data provided by competent agencies;
 - c. assessment of how satellite-derived indicators could support climate-resilience, agriculture, water management, aquaculture, environment and other MAE-related decision processes;
 - d. identification of possible VNRSD products, including drought monitoring layers, surface-water monitoring layers, vegetation-stress maps, land/water-use change maps, saline-intrusion risk inputs and dashboard-ready geospatial layers;

- e. identification of data and institutional dependencies, including weather, hydrology, salinity, agricultural, aquaculture, water-resource, environmental and field-validation datasets managed by other agencies;
- f. identification of realistic pilot options, distinguishing between satellite-derived products that VNRSD can lead and integrated sector decision-support systems that require other institutional owners.

The consultants may assess other related use cases where relevant, including but not limited to forest monitoring, land-cover change, coastal and river erosion, environmental surveillance, carbon-related monitoring and other MAE-relevant applications. However, the study shall not become a broad catalogue. **It shall prioritize the most actionable and investment-relevant use cases where VNRSD can credibly lead through satellite imagery, remote sensing products, AI-enabled analysis and data infrastructure.**

For each use case, the consultants shall identify the institutional owner, operational user, decision-making pathway and expected decision-support product. The study shall distinguish between VNRSD's role as a remote sensing and data infrastructure provider and the role of sector departments as operational users, field-data providers or policy owners.

4. AI and analytics assessment

The consultants shall assess AI and advanced analytics options relevant to VNRSD's needs and capacities.

This shall include:

- machine learning and deep learning options for the priority use cases;
- multi-sensor data fusion approaches;
- use of optical, radar, hyperspectral, drone and ground data;
- potential cloud-based and local processing options;
- explainable AI and model transparency requirements;
- requirements for training data, labelled datasets and validation;
- model governance, monitoring and quality control;
- risks related to data bias, limited ground truth, model transferability and operational reliability;
- realistic options for piloting AI tools under Vietnamese institutional and technical conditions.

The assessment shall distinguish between:

- applications that can be implemented quickly with existing data and tools;
- applications requiring additional data, infrastructure or skills;
- applications requiring further research, pilots or feasibility analysis.

The consultants shall assess data readiness for each AI option, including availability, quality, ownership, spatial and temporal coverage, accessibility and update frequency

of training and validation datasets. AI options shall be classified as: ready for near-term piloting, feasible with additional data or infrastructure, or requiring further research.

5. Data infrastructure and target architecture

The consultants shall propose a preliminary target architecture for an integrated remote sensing and geospatial data system for VNRSD, and more globally to serve sector-specific needs from different departments, ministries or institutions in Vietnam related to remote sensing.

The consultants will propose a model and recommendations for a remote sensing system that will develop shared national capabilities (satellite imagery, data lake, data catalog, cloud infrastructure, storage systems, AI/HPC resources, APIs, security framework, etc.) and will enable each department/ministry to develop sector-specific applications.

The objective is to maximize shared infrastructures, avoid duplication of investments, promotes data sharing and ensure consistency across governments institutions.

The architecture shall address:

- data acquisition and reception;
- integration of free, commercial and national satellite data;
- integration of ground, drone, IoT, hydrometeorological and field data;
- data lake, data warehouse or data cube options;
- storage, backup and archiving;
- network requirements;
- computing requirements;
- processing pipelines;
- AI and analytics layer;
- Data sharing and interoperability;
- APIs and interoperability;
- metadata, standards and data governance;
- dashboards and visualization;
- dissemination to decision-makers;
- cybersecurity, access control and continuity of service;
- scalability and sustainability.

The architecture (high level design) shall remain at pre-feasibility level but must be sufficiently structured to inform a follow-on feasibility study or investment concept.

The proposed architecture shall be vendor-neutral, modular and scalable. It shall rely where possible on open standards, interoperability principles and clear data-governance arrangements. It shall avoid unnecessary proprietary lock-in and shall distinguish between local, cloud and hybrid hosting options, taking account of Vietnamese data, cybersecurity and public-sector requirements.

The consultants will also:

- Propose an investment plan, with estimated initial investment, operational, and maintenance costs of the proposed target infrastructure;
- Analyse expected benefits and identify potential risks (e.g. data misuse, cybersecurity, privacy, technological obsolescence, etc.).

6. Institutional and governance assessment

The consultants shall assess institutional and operational requirements for implementation.

This shall include:

- VNRSD's role and responsibilities;
- interfaces with MAE departments and other data users;
- coordination needs with hydrometeorology, agriculture, environment, aquaculture and disaster-risk actors;
- data-sharing arrangements;
- human resource and capacity-building needs;
- operational management model;
- sustainability and maintenance requirements;
- possible legal, regulatory or administrative constraints;
- procurement, hosting and ownership considerations;
- risks and mitigation measures.

The desk-review phase should at least include the following review:

- Resolution 57-NQ/TW on science, technology, innovation and digital transformation.
- Resolution 193/2025/QH15.
- Decree 35/2025/ND-CP establishing MAE.
- Decision 149/QD-TTg on national remote sensing development strategy to 2030, vision to 2040.
- MAE/VNRSD implementation documents mentioned in the concept note.
- Relevant data, cybersecurity, personal data, data-sharing and cloud-hosting requirements.

For data issues, Vietnam's Law on Data took effect on 1 July 2025 and created a national data framework including the National Data Center and national data-sharing infrastructure; Vietnam also has personal data protection rules under Decree 13/2023/ND-CP and cybersecurity/data-localization obligations under Decree 53/2022/ND-CP. These should be reviewed before recommending cloud or cross-border data-processing options.

For AI infrastructure, Vietnam's Law on AI in 2025 (134/2025/QH15) and its subsequent decree on AI (142/2026/ND-CP) shall be taken into account. The infrastructure regulations are to be studied before suggesting a remote-sensing enabled AI infrastructure for MAE under VNRSD, or suggesting an AI-enabled infrastructure for agriculture and environment for MAE that includes a remote-sensing component.

7. French and European cooperation and market opportunities

The consultants shall identify opportunities for French and European actors, including public agencies, research institutions, companies and technology providers.

This shall include:

- relevant French and European expertise in Earth observation, satellite data, geospatial platforms, AI, IoT, connectivity, cloud and decision-support systems;
- possible areas for technical cooperation;
- possible private-sector positioning;
- possible demonstration or pilot opportunities;
- potential links with European financing, research or cooperation instruments;
- opportunities for structuring a pipeline of future activities from 2027 onward.

The analysis shall be realistic, needs-based and aligned with VNRSD priorities.

The consultants shall map relevant AFD, EU and other partner initiatives, including WARM and GEMMES, to identify synergies, avoid duplication and position possible follow-on activities.

The consultants shall identify French and European cooperation and private-sector opportunities in a needs-based and vendor-neutral manner. Consultants shall disclose any commercial affiliation or relationship with potential technology suppliers. The study shall not be used to pre-select suppliers or write specifications favoring a specific product, platform or company.

8. Coordination with BRGM/DGMV workstream

A separate TOR will cover the specific use case of remote sensing for geology, mining and geoscience expertise, in cooperation with the BRGM/DGMV

The present consultants shall:

- coordinate with Expertise France on interfaces with the separate BRGM/DGMV workstream;
- identify shared data-infrastructure, interoperability or institutional interface issues where relevant;
- ensure that proposed VNRSD data infrastructure options do not prevent future geoscience data interoperability;
- include only high-level references to geology, mining or geoscience use cases where needed for coherence;
- exclude detailed geology, mining, mineral mapping and geoscience technical analysis from this assignment.

9. Restitution and consolidation workshop

The consultants shall prepare and support a technical restitution and consolidation workshop in November.

The workshop shall aim to:

- present the diagnostic findings;

- discuss priority use cases;
- validate or refine the proposed target architecture;
- discuss AI and data infrastructure options;
- identify institutional and investment conditions;
- consolidate possible next steps;
- identify opportunities for French and European cooperation.

The consultants shall prepare the agenda, presentation materials, technical notes and workshop report in English. Vietnamese translation and interpretation will be handled separately.

Methodology

The consultants shall use a pragmatic pre-feasibility methodology combining:

- desk review;
- technical interviews;
- institutional consultations;
- review of existing systems and workflows;
- data-chain analysis;
- use-case prioritization;
- architecture mapping;
- AI and analytics option screening;
- risk and feasibility assessment;
- investment pathway development;
- workshop-based validation.

The study shall be operational and decision-oriented, not limited to literature review or high-level recommendations.

Deliverables

All deliverables shall be submitted in English only. Vietnamese translation will be handled separately.

Deliverable	Description	Timeline (2026)
Inception report and detailed work plan	understanding of the assignment; confirmed methodology; stakeholder list; interview guides; data collection needs; mission plan; use-case prioritization criteria; detailed work plan; proposed structure of the pre-feasibility report	Within 12 working days of contract signature
Mission brief	Debrief of the scoping mission	Within 5 working days after the scoping mission
Diagnostic note on existing	institutional and technical baseline; current data chain and workflows; infrastructure, software, data and human resource assessment; gaps and	Middle of October

capacities and needs	bottlenecks; preliminary identification of priority needs; interface points with other MAE departments and the BRGM/DGMV workstream.	
Technical options note on use cases, AI and data architecture	prioritization of use cases; assessment of AI and analytics options; data requirements; preliminary target architecture; infrastructure and interoperability requirements; feasibility conditions; preliminary risks and mitigation measures; possible pilot or demonstrator options.	Late October
Workshop package	agenda; presentation slides; summary note for participants; technical discussion points; proposed decision points; workshop facilitation materials.	At least 10 working days before workshop date in November
Draft pre-feasibility report and investment concept outline	consolidated diagnostic; priority use cases; target architecture; AI and analytics options; institutional and governance arrangements; capacity-building needs; investment pathway; French and European cooperation opportunities; implementation sequencing from 2027 onward; risk matrix; proposed next steps.	Late November 2026
Final pre-feasibility report, executive summary and final presentation	revised final report incorporating comments from AFD, Expertise France and relevant stakeholders; executive summary; final slide deck; annexes, including stakeholder list, interview list, use-case matrix, architecture diagrams and proposed follow-on actions.	December 2026, after one consolidated round of comments

Table 1. Expected deliverables

Expected outputs

The assignment is expected to produce:

1. A shared and operational diagnostic of VNRS's remote sensing and geospatial data modernization needs.
2. A prioritized set of use cases focused on aquaculture, water quality, coastal and river erosion, drought and saline intrusion, and climate resilience decision support.
3. A preliminary technical architecture for an integrated remote sensing, data infrastructure and AI-enabled decision-support system.
4. A clear assessment of institutional, technical, data, human resource and operational feasibility conditions.
5. A realistic pathway for a follow-on feasibility study, pilot project, technical assistance operation or investment concept.
6. A mapping of relevant French and European cooperation and private-sector opportunities.
7. A clear interface note with the separate BRGM/DGMV workstream, without duplicating geology or mining expertise.

Duration and indicative calendar

The assignment is expected to start in July and be completed by December 2026.

Indicative calendar

- September
 - consultant mobilization;
 - inception report;
 - inception/scoping mission to Vietnam;
 - initial consultations with VNRSD and relevant stakeholders.
- September - October:
 - desk review;
 - stakeholder interviews;
 - diagnostic of existing capacities;
 - data-chain and infrastructure assessment;
 - preparation of diagnostic note.
- October - November:
 - use-case assessment;
 - AI and analytics option screening;
 - target architecture development;
 - institutional and governance assessment;
 - preparation of technical options note.
- November:
 - restitution and consolidation workshop;
 - preparation of workshop report;
 - preparation of draft pre-feasibility report and investment concept outline.
- December:
 - final consolidation;
 - integration of comments;
 - submission of final report, executive summary and final presentation.

Mission requirements

The assignment shall include one inception/scoping mission to Vietnam, expected to be carried out in the same timeframe as the mission from the related BRGM/DGMV TOR (potentially August or September 2026) .

The mission shall include meetings with MAE departments (VNRSD, ...), AFD, and relevant institutional and technical stakeholders. The team leader shall participate in the mission. Other experts shall participate depending on the final work plan and availability.

The November workshop will be organized in person, with possible hybrid/online participation, subject to logistical decisions by Expertise France. The consultants shall be responsible for technical preparation and facilitation support. Logistical organization, translation and interpretation may be handled separately.

The Consultants will be remunerated at negotiated daily rate, in accordance with Expertise France and AFD regulations.

Required team composition

The assignment shall be carried out by a team of individual consultants coordinated by one lead expert.

The proposed team must include, at minimum, the following expertise. Consultants may cover more than one role if they demonstrate the required qualifications.

Team Leader / Remote Sensing Systems Expert

Responsibilities:

- overall coordination and quality assurance;
- methodology and work planning;
- lead technical dialogue with Expertise France and VNRSD;
- oversee diagnostic, architecture and final recommendations;
- ensure coherence between technical, institutional and investment dimensions;
- lead preparation of the final pre-feasibility report.

Minimum qualifications:

- at least 10 years of experience in remote sensing, Earth observation, geospatial systems or digital infrastructure;
- demonstrated experience with government or public-sector remote sensing systems;
- experience in feasibility or pre-feasibility studies;
- strong understanding of data chains from acquisition to decision support;
- experience in Southeast Asia or comparable contexts is an asset;
- excellent English writing and presentation skills.

Geospatial Data Infrastructure Architect

Responsibilities:

- assess existing data infrastructure;
- analyze storage, computing, database, platform, API and dashboard needs;
- propose preliminary target architecture;
- assess cloud, local and hybrid infrastructure options;
- address interoperability, standards, metadata and scalability.

Minimum qualifications:

- at least 8 years of experience in geospatial data platforms, data architecture or digital infrastructure;
- experience with remote sensing data systems, data cubes, geospatial databases or cloud processing;
- knowledge of interoperability standards and geospatial APIs;
- experience with public-sector data systems is an asset.

AI/ML for Earth Observation Expert

Responsibilities:

- assess AI and advanced analytics options;
- identify feasible AI use cases;
- assess data and model requirements;
- advise on training data, validation, explainability and operational risks;
- contribute to AI roadmap and pilot design.

Minimum qualifications:

- at least 5 years of experience in AI, machine learning or data science applied to remote sensing or geospatial data;
- experience with optical, radar or multi-sensor data;
- knowledge of supervised learning, deep learning, transfer learning and model validation;
- experience with explainable AI or operational AI deployment is an asset.

Climate-Resilience Use-Case Specialist (depends on chosen use-case)

Responsibilities:

- lead assessment of climate-resilience use cases;
- identify operational decision-support needs;
- assess data availability and institutional relevance;
- support use-case prioritization and pilot options.

Minimum qualifications:

- at least 8 years of experience in climate resilience or related fields;
- experience using geospatial or remote sensing data for applied environmental decision-making;
- knowledge of Vietnam or Southeast Asian coastal and water systems is an asset.

Institutional and Digital Governance Expert

Responsibilities:

- assess institutional arrangements and governance requirements;
- analyze data-sharing, ownership and sustainability issues;
- analyze coordination mechanisms and identify overlaps, gaps or inefficiencies;
- review policies, standards, and procedures related to data management, sharing, access, quality, security, and archiving;
- recommend governance mechanisms;
- assess capacity-building needs;
- support identification of French and European cooperation opportunities.

Minimum qualifications:

- at least 8 years of experience in public-sector digital transformation, data governance, institutional analysis;

- experience preparing project concepts, feasibility studies or investment pipelines;
- knowledge of donor-funded technical assistance or public investment processes;
- experience in Vietnam or Southeast Asia is an asset.

Local Vietnam Coordinator / Policy and Stakeholder Expert

Responsibilities:

- support stakeholder mapping and consultation planning;
- facilitate meetings and institutional coordination;
- support local context analysis;
- assist with follow-up and information collection;
- ensure continuity between missions and remote work.

Minimum qualifications:

- strong knowledge of Vietnam's public sector, environment, agriculture, water or digital transformation context;
- experience coordinating technical assistance or consultancy assignments in Vietnam;
- professional fluency in English and Vietnamese;
- strong stakeholder engagement skills.

Workshop facilitator and reporting support

The team shall include sufficient capacity for workshop preparation, facilitation, note-taking, synthesis and editorial production of high-quality English deliverables.

Level of effort

The bidders shall propose the level of effort required to deliver the assignment within the July-December timeframe.

At minimum:

- the Team Leader must remain engaged throughout the full assignment;
- the local coordinator must be available throughout the consultation period;
- all core expertise listed above must be mobilized for the diagnostic, options analysis and final reporting phases;
- the AI/ML, infrastructure and use-case experts must contribute substantively to the target architecture and investment pathway;
- the team must allocate sufficient time for preparation and follow-up of the November workshop.

The proposed level of effort shall be assessed against the realism of the methodology, the tight timeline and the expected quality of deliverables.

Management and reporting arrangements

The consultants will report to Expertise France. The consultants will take advices from AFD and VNRSD.

Expertise France will:

- validate the inception report;
- facilitate institutional coordination where appropriate;
- review and comment on deliverables;
- approve final outputs.

The consultants shall maintain regular communication with Expertise France, including short progress updates during implementation. The exact rhythm of coordination meetings will be confirmed during inception.

Quality requirements

The deliverables shall be:

- technically credible;
- concise but sufficiently detailed for follow-on feasibility or investment preparation;
- based on evidence from documents, interviews and technical assessment;
- realistic under Vietnamese institutional and operational conditions;
- clear on assumptions, limitations and risks;
- usable by Expertise France and VNRSD for decision-making;
- written in professional English;
- delivered in editable formats.

The final report shall include diagrams, tables and matrices where useful, including:

- remote sensing data-chain diagram;
- use-case prioritization matrix;
- preliminary target architecture;
- institutional workflow;
- implementation roadmap;
- risk matrix;
- possible pilot or investment options.

The study shall provide preliminary order-of-magnitude cost ranges for the proposed implementation pathway, distinguishing between capital expenditure, operating expenditure, data acquisition, software/licensing, cloud or hosting, maintenance, training and technical assistance.

Exclusions from scope

The assignment shall not include:

- detailed engineering design;
- final technical specifications for procurement;

- full feasibility study;
- detailed cost-benefit analysis;
- geology, mining or mineral resource technical assessment;
- BRGM/DGMV geoscience workflow design;
- Vietnamese translation of deliverables;
- software development or deployment;
- procurement of hardware, software or satellite data.

Evaluation criteria for consultant selection

Proposals may be assessed using the following criteria:

- Understanding of the assignment and relevance of methodology.
- Quality and completeness of the proposed team.
- Demonstrated experience in remote sensing, geospatial data infrastructure and AI.
- Demonstrated experience in climate resilience, water, aquaculture or environmental monitoring use cases.
- Experience with public-sector in digital systems, digital infrastructure, data governance
- Knowledge of Vietnam or comparable institutional contexts.
- Realism of work plan and level of effort under the July-December timeline.
- Quality of writing and ability to produce decision-ready deliverables in English.
- Ability to identify practical French and European cooperation and private-sector opportunities without losing focus on VNRSD's needs.

Indicative annexes to be prepared by the consultants

The consultants shall prepare annexes as needed, including:

- list of documents reviewed;
- list of stakeholders consulted;
- interview guide;
- data-chain assessment table;
- use-case prioritization matrix;
- architecture diagram;
- capacity-building needs table;
- French and European opportunity mapping;
- risk matrix;
- proposed roadmap for next steps from 2027 onward.

Confidentiality

The Consultant shall maintain strict confidentiality regarding all information obtained during the course of this assignment and shall not use, disclose, or publish such information without prior written authorization from Expertise France. All documents, data, interview notes, draft reports and final deliverables produced under this

assignment shall be treated as confidential unless otherwise agreed by Expertise France.

All deliverables produced under this assignment shall be the property of Expertise France, subject to the contractual provisions agreed with the consultants, and may not be used for any purpose beyond the scope of this assignment without prior written authorization.

Annex 1

Internal use only

Indicative Market-Sounding and Stakeholder Mapping for French and European Expertise

This annex provides an indicative mapping of French, European and Vietnam-based actors that may be relevant for the implementation or consultation process of the pre-feasibility study on remote sensing, geospatial data infrastructure and AI-enabled climate resilience applications for VNRSR.

The list is not exhaustive. It does not constitute a shortlist, endorsement, pre-selection or procurement recommendation. The availability, interest, eligibility and potential conflict-of-interest position of each actor must be verified through market sounding and in accordance with Expertise France procurement rules.

This annex should be used for internal planning, stakeholder engagement and market intelligence. It should not be used to favor a specific supplier, platform, product or company.

Classification of actors

Actors may be classified into four categories:

- Potential lead or core technical contributors: Actors with the capacity to contribute to, or potentially coordinate, a pre-feasibility assignment involving remote sensing systems, geospatial infrastructure, institutional analysis and operational use cases.
- Specialist technical contributors: Actors with strong expertise in one or more specific technical areas, such as water quality, coastal monitoring, aquaculture, AI, data platforms, satellite processing or environmental analytics.
- Scientific, academic and institutional resource actors: Actors that may provide technical insight, peer review, local knowledge, research links or institutional legitimacy, but are not necessarily expected to lead the consultancy.
- Strategic stakeholders to consult, but not necessarily to contract: Actors with strong relevance to the broader France-Vietnam or EU-Vietnam Earth observation ecosystem, but whose potential future supplier role may make them less suitable as neutral pre-feasibility consultants.

Potential lead or core technical contributors

CLS

Potential relevance: CLS is a French satellite-based Earth observation and monitoring company with experience in environmental monitoring, fisheries, maritime surveillance, satellite data processing, digital platforms and decision-support services. It may be relevant for remote sensing applications linked to fisheries, aquaculture, marine and coastal monitoring, environmental surveillance and operational data services.

Possible role:

- Core remote sensing and operational monitoring expert.
- Contributor on aquaculture, fisheries, maritime, coastal and environmental use cases.
- Contributor on satellite data processing chains and decision-support platforms.

Magellium

Potential relevance: Magellium has strong Earth observation expertise, including satellite image processing, algorithm development, prototyping, data processing chains, environmental applications and climate-related services. It may be relevant for the technical assessment of AI/ML, remote sensing processing chains and environmental monitoring products.

Possible role:

- Earth observation processing chain expert.
- AI/algorithm and environmental applications contributor.
- Contributor to technical architecture and feasibility of operational data products.

Geomatys

Potential relevance: Geomatys is relevant for geospatial data infrastructure, spatial data platforms, cloud-native geospatial systems, datalakes, APIs, interoperability, metadata, data visualization and geospatial data science. It may be particularly relevant for the target architecture and data infrastructure components of the study.

Possible role:

- Geospatial data infrastructure architect.
- Contributor on data lakes, APIs, interoperability, metadata and platform architecture.
- Contributor on coastal data intelligence, environmental data services and geospatial visualization.

IGN FI / GEOFIT

Potential relevance: IGN FI / GEOFIT may be relevant for government geospatial systems, national spatial data infrastructures, cartography, geospatial databases, institutional capacity building, project management assistance and technical support to public authorities.

Possible role:

- Public-sector geospatial systems and institutional architecture expert.
- Contributor on spatial data infrastructure, governance, capacity building and public-sector workflows.
- Possible lead profile if paired with EO/AI and water/aquaculture specialists.

Artelia Vietnam / Artelia France

Potential relevance: Artelia has a permanent presence in Vietnam and expertise in water, environment, infrastructure, energy, urban development, engineering and project management. It may be relevant for the water, coastal resilience, erosion, infrastructure and Vietnam implementation dimensions of the assignment.

Possible role:

- Vietnam-based water, environment and infrastructure contributor.
- Contributor on coastal erosion, riverbank erosion, water management and climate-resilience investment pathways.
- Local implementation and stakeholder coordination support.

Specialist technical contributors

EOMAP / Fugro

Potential relevance: EOMAP, now part of Fugro, is highly relevant for satellite-derived water applications, including water quality, bathymetry, environmental mapping, aquaculture, fisheries and coastal management.

Possible role:

- Specialist contributor on water quality monitoring, aquaculture, coastal waters and satellite-derived aquatic indicators.
- Peer reviewer or technical expert for water-related use cases.
- Contributor to pilot design for water quality and aquaculture monitoring

VITO Remote Sensing

Potential relevance: VITO Remote Sensing is relevant for water quality, coastal monitoring, satellite and drone data, in-water optics, atmospheric correction, spectral image processing, AI and operational environmental monitoring tools.

Possible role:

- Specialist contributor or peer reviewer on water quality, coastal monitoring and AI-enabled aquatic remote sensing.
- Technical reference for in-situ calibration, validation and operational water monitoring workflows.

Mercator Ocean International

Potential relevance: Mercator Ocean may be relevant as a reference actor for ocean data services, marine environment monitoring, Copernicus Marine services and regional oceanographic data use.

Possible role:

- Resource actor for marine and coastal data systems.
- Consultation or peer-review role for coastal and marine data integration.

IFREMER

Potential relevance: IFREMER may be relevant for marine environment, coastal systems, fisheries, aquaculture, oceanographic data and applied research.

Possible role:

- Scientific resource actor for aquaculture, coastal and marine monitoring.
- Peer-review or technical consultation role.

USTH - University of Science and Technology of Hanoi

Potential relevance: USTH has a France-Vietnam academic profile and training activities linked to space, Earth observation, remote sensing and satellite technology.

Possible role:

- Local academic resource.
- Support for identifying Vietnamese experts and young professionals.
- Possible participant in consultations or workshop discussions.

VAST / Vietnam National Space Center

Potential relevance: VAST and VNSC are key Vietnamese actors in space and Earth observation, including links to VNREDSat and cooperation with French actors.

Possible role:

- Institutional and technical stakeholder to consult.
- Source of information on national Earth observation capacity, satellite data and scientific cooperation.
- Possible participant in workshop discussions.

CIRAD

Potential relevance: CIRAD is relevant for agriculture, agroecology, rural development, climate resilience and applied research in tropical contexts, including Southeast Asia.

Possible role:

- Scientific resource for agriculture, land use, climate-resilient production systems and possibly aquaculture-adjacent rural systems.
- Peer-review or consultation role.

IRD

Potential relevance: IRD may be relevant for environmental research, climate resilience, hydrology, coastal systems, remote sensing applications and Vietnam research cooperation.

Possible role:

- Scientific resource or peer reviewer.
- Contributor to environmental and climate-resilience framing.

Strategic stakeholders to consult, but not recommended as neutral lead consultants

Airbus

Potential relevance: Airbus is a strategic actor in France-Vietnam Earth observation cooperation, including VNREDSat-related cooperation and possible future satellite capability development.

Possible role:

- Strategic stakeholder to consult on satellite data sources, continuity of Earth observation cooperation, commercial imagery and possible future infrastructure options.

CNES

Potential relevance: CNES is central to French space cooperation and may provide strategic, technical and institutional insight on Earth observation systems, satellite cooperation and capacity building.

Possible role:

- Strategic public-sector stakeholder.
- Technical reference for France-Vietnam space cooperation and capacity-building pathways.

Thales / Thales Alenia Space

Potential relevance: Thales and Thales Alenia Space are relevant to the broader European space, satellite, data, cybersecurity and Earth observation ecosystem.

Possible role:

- Strategic market stakeholder to consult if relevant to infrastructure, cybersecurity, satellite systems or downstream services.

Kayrros

Potential relevance: Kayrros is relevant to geospatial analytics, climate intelligence, environmental monitoring and AI-enabled Earth observation products.

Possible role:

- Specialist market actor to consult on geospatial analytics and climate intelligence.