

	<b>TERMS OF REFERENCE – PRODUCT-BASED CONSULTANCY</b>	Página 1 de 8
		Versión: 1
		107/2022

## 1. SERVICE OR PRODUCT IDENTIFICATION

<b>Service or product name:</b>	REF: 112/2025 International Consultancy for the Water Vulnerability Analysis of the Amazon
<b>Functional Unit:</b>	Research and Knowledge Management Directorate
<b>Fecha:</b>	July 3th, 2025

## 2. BACKGROUND

The Amazon is the largest tropical forest on Earth and one of the world’s greatest freshwater reserves. It covers approximately 40% of South America, spanning 847 million hectares across nine countries: Brazil, Bolivia, Colombia, Ecuador, Peru, Venezuela, Guyana, French Guiana, and Suriname. This region plays a critical ecological role in regulating global climate and hydrology. However, it faces increasing threats due to climate change, deforestation, agricultural expansion, dams, mining, and other activities that disrupt its water balance.

In this context, there is an urgent need for a technical and multidimensional analysis of the Amazon’s water vulnerability to generate strategic information for sustainable and resilient water management. This task requires a multiscale, transboundary, ecosystem-based and evidence-driven approach.

Under this premise, the Fundación Amigos de la Naturaleza (FAN), a Bolivian civil society organization and member of the Amazon Geo-Referenced Socio-Environmental Information Network (RAISG), is leading the implementation of the project: “*Amazon water vulnerability to climate change effects and its risk of pollution degradation*” supported by the Swedish International Development Cooperation Agency (SIDA) through the Embassy of Sweden in Colombia, this initiative aims to contribute to regional water resilience through knowledge generation, technical monitoring, and cooperation among Amazonian countries.

RAISG is a civil society alliance from six countries that promotes an integrated vision of the Amazon. Its work is based on the generation, analysis, and dissemination of geospatial socio-environmental data to influence policies that support sustainability, biodiversity conservation, and ecosystem services, as well as to strengthen territorial governance.

In this context, RAISG and FAN will coordinate the development of a regional water vulnerability analysis that integrates multiple dimensions: from identifying critical zones under pressure from water resources (deforestation, fires, mining, agriculture, hydropower, among others), to current and projected climate exposure, and the evaluation of socio-environmental resilience indicators.

The analysis will be based on a robust and replicable methodology aligned with the updated conceptual framework of the IPCC Sixth Assessment Report (AR6). This approach expands the traditional assessment of vulnerability—understood as the exposure, sensitivity, and adaptive capacity of a

	<b>TERMS OF REFERENCE – PRODUCT-BASED CONSULTANCY</b>	Página 2 de 8
		Versión: 1
		107/2022

system—by integrating it into a broader climate risk analysis that considers the dynamic interaction between climate hazards, exposure, and vulnerability. Thus, multiple dimensions and scales are incorporated to better understand how Amazonian socio-environmental systems may be affected by and respond to climate threats. The methodology will include the use of geospatial tools, regional databases, and scientific criteria to establish baselines, future scenarios, and priority management areas.

In this context, a specialized consultancy is being commissioned to lead the technical development of this analysis in accordance with the guidelines set forth in these Terms of Reference.

### 3. OBJECTIVE:

Develop a comprehensive and replicable analysis of water vulnerability in the Amazon, based on the updated conceptual framework of the IPCC Sixth Assessment Report (AR6), integrating the dimensions of exposure, sensitivity, and adaptive capacity of the system. The analysis should identify priority areas, establish baselines and future scenarios, and deepen the understanding of both ecosystem and human vulnerability, supported by evidence and technical indicators.

### 4. EXPECTED RESULTS / DELIVERABLES

#### **R1. Formulation of the conceptual and methodological framework for the Water Vulnerability Analysis**

Activities:

- Document review of current conceptual approaches to water vulnerability and climate risk (including IPCC AR6).
- Analysis of existing methodologies in the region and within RAISG for technical articulation.
- Participatory development of the conceptual and methodological framework in coordination with the RAISG and FAN technical teams, through virtual and/or in-person workshops.

Deliverable:

- Schematic outline or brief document of the agreed-upon conceptual and methodological framework (analysis matrix), including logic of analysis, dimensions, scales, data sources and prioritization criteria (in Word, Excel, PowerPoint or PDF format).

#### **R2. Characterization of the dimensions of water vulnerability: exposure, sensitivity, and adaptive capacity**

Activities:

- Collection and analysis of climatic (WorldClim, AR6, others), hydrological, ecological, and socio-environmental data from validated sources and regional platforms such as AMA 2.0 (<https://ama.raisg.org/>).
- Identification of key variables and indicators that influence water vulnerability at both the ecosystem and human approach.
- Systematization of information for the technical characterization of vulnerability dimensions:

	<b>TERMS OF REFERENCE – PRODUCT-BASED CONSULTANCY</b>	Página 3 de 8
		Versión: 1
		107/2022

- Current and future climate exposure, using present and projected scenarios from the IPCC Sixth Assessment Report (AR6), with a projection horizon to the year 2050.
- Sensitivity of Amazonian ecosystems, considering signs of degradation, fragmentation, hydrological alterations, and other relevant disturbances, based on cartography and monitoring from RAISG or other sources.
- Adaptive capacity of populations and/or territories, through proxy indices such as population density, poverty levels, infrastructure presence, territorial protection regimes, or other factors.

**Deliverables:**

- Summary document characterizing the dimensions of water vulnerability in the Amazon (format: PPT, Word, or other).
- Thematic maps by dimension, with geospatial analysis and interpretive summary (GIS formats).
- Database of variables used (Excel/CSV format) and preliminary thematic map(s) by dimension.

### **R3. Identification and Multicriteria Mapping of Priority Water Vulnerability Zones**

**Activities:**

- Processing and analysis of geospatial data using Geographic Information Systems (GIS) techniques.
  - Standardization of thematic layers (climatic, hydrological, socio-environmental, etc.) according to priority levels.
  - Application of Multicriteria Analysis (MCA) methods to categorize areas into three levels of vulnerability: high, moderate, and low.
- Integration of climatic, ecosystem, and socio-environmental variables to delineate critical zones of water vulnerability.
- Preliminary technical validation with the RAISG and FAN technical teams.
- Recommendation to prioritize the use of data and resources available on the AMA 2.0 platform as a common reference to ensure regional consistency.

**Deliverables:**

- Set of geospatial maps showing the results of the water vulnerability analysis (vector and raster formats compatible with GIS).
- Summary document explaining the methodology and results (Word format and PowerPoint presentation).

### **R4. Development of a Possible Future Scenario of Water Risk under Climate Change and Anthropogenic Pressure**

**Activities:**

- Formulation of a prospective scenario for the year 2050 on water risk in the Amazon, integrating climatic variables (IPCC projections, e.g., SSP-RCP scenarios) and anthropogenic pressures (deforestation, mining, urban expansion, hydropower infrastructure, among others).

	<b>TERMS OF REFERENCE – PRODUCT-BASED CONSULTANCY</b>	Página 4 de 8
		Versión: 1
		107/2022

- Application of spatial models and geospatial analysis to project the evolution of water risk at regional and subregional levels.
- Comparative analysis between the current baseline and the future scenario, identifying trends, areas of greatest vulnerability and potential critical points.

Deliverables:

- Technical summary of future water risk scenarios, including interpretation of projected impacts, thematic maps and estimates based on probability indicators.
- Complementary visualizations: synthesis maps, infographics and comparative tables to facilitate communication of results to both technical and non-technical audiences.

### **R5. Review of Technical Indicators and Synthesis of Key Findings from the Vulnerability Analysis**

Activities:


- Selection of key indicators to measure the dimensions of water vulnerability (exposure, sensitivity and adaptive capacity), based on the results of the technical analysis.
- Organization and prioritization of indicators according to: data sources, scalability, frequency of updates, units of measurement and validation mechanisms.
- Review and validation of indicators with the RAISG technical team, incorporating feedback for adjustments.
- Identification of priority action lines for integrated and resilient water management in the Amazon.
- Preliminary sharing of results and proposals with key stakeholders for validation and strengthening.

Deliverables:

- Technical datasheets of water vulnerability indicators (Excel/Word format).
- Summary of technical and strategic recommendations for territorial planning and climate adaptation (Word/PDF format).
- Executive presentation with key results, indicators and proposals (PPT format).

## **5. KEY ACTIVITIES**

<b>Result / Activity</b>	<b>Month 1</b>	<b>Month 2</b>	<b>Month 3</b>	<b>Month 4</b>	<b>Month 5</b>	<b>Month 6</b>	<b>Required Resources</b>
R1. Formulation of the conceptual and methodological framework	X	X					Access to technical bibliography, AMA platform, virtual meeting software, workshop facilitators.
- Documentary review of conceptual frameworks and methodologies	X						Digital library, scientific databases, AMA platform.
- Participatory workshop(s) for methodological consensus	X	X					Videoconferencing platform, physical space (optional), support materials, translator (if needed).

	<b>TERMS OF REFERENCE – PRODUCT-BASED CONSULTANCY</b>	Página 5 de 8
		Versión: 1
		107/2022

<b>Result / Activity</b>	<b>Month 1</b>	<b>Month 2</b>	<b>Month 3</b>	<b>Month 4</b>	<b>Month 5</b>	<b>Month 6</b>	<b>Required Resources</b>
- Adjustments and finalization of methodological document		X					Text editing software, technical support for collaborative review.
R2. Characterization of water vulnerability dimensions		X	X				Access to climate, hydrological, and socio-environmental data; GIS software; statistical analysis team.
- Collection and analysis of climate, hydrological, and socio-environmental data		X					Data platforms, AMA databases, data analysis software (R, Python, Excel).
- Identificación y sistematización de variables e indicadores		X	X				GIS software, technical personnel for data processing.
R3. Identification and multicriteria mapping of priority areas			X	X			Advanced GIS software (QGIS, ArcGIS), access to AMA databases, adequately equipped computers.
- Geospatial processing and analysis with GIS			X				GIS software, updated geospatial data, technical training.
- Application of multicriteria analysis for categorization				X			Multicriteria analysis tools, expert support in GIS..
- Preliminary validation with technical team				X			Virtual meeting platform, presentation materials.
R4. Development of future water risk scenarios				X	X		Climate and socio-environmental models, simulation software, access to IPCC scenarios, modeling software.
- Formulation of climate and socio-environmental scenarios				X			Historical and projected data, climate modeling platforms.
- Spatial modeling and comparative analysis					X		GIS and modeling software, computing capacity, specialized personnel.
R5. Review of indicators and formulation of recommendations					X	X	Databases, tools for document preparation, platform for stakeholder workshops
- Selection and prioritization of key indicators					X		Access to data, analysis software, expert consultations.
- Review and validation of indicators with feedback					X		Communication channels, virtual meeting and survey platform.

	<b>TERMS OF REFERENCE – PRODUCT-BASED CONSULTANCY</b>	Página 6 de 8
		Versión: 1
		107/2022

Result / Activity	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Required Resources
- Formulation of strategic and differentiated recommendations						X	Resources for drafting and technical review, consultation with key stakeholders.
- Sharing and feedback with key stakeholders						X	Virtual or physical space, communication materials.

## 6. CONTRACT DURATION

The consultancy will last for 6 months from the date of contract signing.

## 7. WORK METODOLOGY

### 7.1. TOOLS / METHODS FOR IMPLEMENTATION

The consultant will have access to processed documents and information (Word, PDF, or other formats) provided by FAN, as well as geodatabases (Excel, DBF, CSV) delivered in GIS formats (Shapefile, Grid, Tiff). They will also be granted access to relevant data from FAN's database.

### 7.2. COORDINATION / INTERACTION

The consultant must coordinate their work with the Research and Knowledge Management Directorate and the Forests and Biodiversity Program, maintaining regular communication via email, Microsoft Teams, Zoom, and/or phone. They will report periodically on progress and the achievement of consultancy outcomes.

## 8. WORK LOCATION

To fulfill the expected outputs, the consultancy will be carried out through remote work, with virtual meetings. When necessary, the consultant will be notified in advance to attend in-person meetings if deemed essential. In general, virtual meetings will be held with FAN and RAISG according to the agreed schedule to ensure effective coordination and results.

## 9. CONSULTANT PROFILE

### Consulting Firm Profile

- An international consulting firm is required, with extensive technical experience in the design and implementation of water vulnerability analyses, climate change adaptation, scenario modeling and environmental monitoring, with a focus on sensitive regions such as the Amazon.
- The firm must have a multidisciplinary team and proven capacity to carry out regional-scale studies in complex and transboundary contexts, integrating up-to-date methodologies and geospatial tools.

	<b>TERMS OF REFERENCE – PRODUCT-BASED CONSULTANCY</b>	Página 7 de 8
		Versión: 1
		107/2022

#### Experience and Sector Knowledge

- At least 7 years of proven experience in technical studies related to climate change, water vulnerability or integrated water resource management.
- Must be a legally established entity with valid legal status and the ability to operate on international projects.
- Experience in water vulnerability, climate change, adaptive capacity, natural resources, conservation, etc.
- Demonstrated experience in projects implemented in Latin America, preferably in the Amazon region or tropical biomes (Desirable).

#### Specific Requirements

- Proficiency in methodologies to determine vulnerability.
- Broad knowledge of hydrology and watershed characterization.
- Experience in climate change vulnerability analysis.
- Ability to work in multicultural contexts, interinstitutional coordination, and participatory processes with multiple stakeholders.
- Familiarity with international approaches and methodological frameworks (e.g., IPCC AR6, multicriteria analysis, climate modeling).
- Technical and human infrastructure for managing geospatial data, developing thematic cartography, GIS analysis and environmental modeling.
- Experience in producing technical communication materials for diverse audiences (decision-makers, scientific community, social organizations) (Desirable).

#### Minimum Technical Team

- The consulting firm must propose an interdisciplinary technical team that includes, at minimum, the following key profiles:

##### **Lead Technical Coordinator**

- Academic background in environmental sciences, geography, environmental engineering, climate change, or related fields.
- At least **10 years of professional experience**, including coordination of regional vulnerability or climate risk studies.
- Experience in coordinating international teams and working with regional networks (such as RAISG or similar) or public institutions.

##### **Vulnerability and Climate Change Analysis Specialist**

- Proven experience applying the IPCC framework (preferably AR6).
- Ability to integrate climate, socioeconomic, and ecosystem data.

##### **GIS / Geospatial Specialist**

- Expert in spatial analysis tools (QGIS, ArcGIS, Google Earth Engine).
- Experience in multicriteria analysis and environmental scenario modeling.

##### **Environmental Indicators and Monitoring Specialist (desirable)**

	<b>TERMS OF REFERENCE – PRODUCT-BASED CONSULTANCY</b>	Página 8 de 8
		Versión: 1
		107/2022

- Experience in designing and validating environmental and climate indicators.
- Ability to build replicable and scalable monitoring systems.

#### Computer Tools

- Proficiency in GIS software, R, Python (desirable but not mandatory)
- Windows environment, Office: Excel, Word and PowerPoint

#### Language Proficiency

- Spanish (required)
- Knowledge of English will be valued, though not mandatory.
- Understanding of Portuguese is desirable.

## 10. APPLICATION INSTRUCTIONS

**Fundación Amigos de la Naturaleza (FAN)** offers a professional and collaborative environment characterized by innovation, dynamism, and respect, promoting continuous learning and capacity development. In line with our institutional principles, this recruitment process is open to international consulting firms, consortia or multidisciplinary teams, with no discrimination based on gender, age, disability, sexual orientation, religion, nationality or ethnic origin.

Interested firms must submit a **technical and financial proposal**, including the **Curriculum Vitae of the minimum required technical team** (maximum 3 pages per profile, without supporting documentation at this stage), highlighting both general and specific experience related to the objective of the consultancy.

Proposals must be submitted via email to: [contrataciones@fan-bo.org](mailto:contrataciones@fan-bo.org) with the subject:

**“INTERNATIONAL CONSULTANCY FOR THE WATER VULNERABILITY ANALYSIS OF THE AMAZON”**, including the reference number of this call.

The submission **deadline** is **Thursday, July 31, 2025 at 5:00 p.m. (Bolivia time)**. Proposals received after this deadline will not be considered. Only shortlisted firms will be contacted for the next phase of the selection process.

Proposals will be evaluated based on the following criteria:

- **40%** Quality of the technical proposal
- **30%** Experience of the Consulting team
- **30%** Financial proposal