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Guiana Shield Facility

I. Project-identifying Information:

Applicant Organization:

Secretary of Rural Production of the State of Amazonas - SEPROR - AM

Contact Persons & Designation:

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Project Title :

DIGITAL HYDRO - GEOMORPHOLOGICAL MAP OF THE GUYANA SHIELD – SUPPORT FOR SUSTAINABLE MANAGEMENT OF NATURAL RESOURCES

Location:

The area to be mapped includes the central portion of the area of the eco-region named Guiana Shield (see highlighted area on the map below) and includes parts of the Brazilian states of Amazonas and Roraima, and part of the territories of Venezuela and Guyana.



Map of the Eco-region of the Guiana Shield

Project Duration:

Twelve (12) months

Proposed Start Date:

November 2013

Project Cost:

Amount Requested from Donor: **U\$150.000,00 (one hundred and fifty thousand dollars)**

Applicant Contribution: **U\$ 50.000,00 (fifty thousand dollars)**

Total Project Cost: **U\$ 200.000,00 (two hundred thousand dollars)**

II. Organizational Profile:

- *Date of establishment, vision and mission statements of the organization*
- *Brief narrative of the organization's programs and services, including information on experience in implementing other donor - funded projects, emphasizing the results of outputs and outcomes*
- *Management structure and systems (include information on the organization's decision-making processes)*

This proposal will be carried out by SEPROR - AM with its partners, notably the Federal University of Amazonas (UFAM) through its Potamology Laboratory Amazon (LAPA), infrastructure of education, research and extension of the the University's Dept. of Geography, in the coordination and implementation of the proposal, as well as by ASSAI, an association for the support to research in administration and management of resources.

Brief History

The State's Secretary of Rural Production - SEPROR is responsible for the formulation, coordination and implementation of the state policy of integrated rural development of the Amazon. Founded in March 2003 by Law 2.783/03, the Secretary takes action in rural production planning for the fostering of production chains in all their scopes.

To fulfill its mission SEPROR has sought to restructure a sector that was literally destroyed in previous governments.

Among the many factors contributing to the slow development of rural areas in the Amazon (such as the substantial distances in the Amazon), is the lack of legal tenure of land (most producers do not hold title to their land - which hinders access to credit), the low level of technology access and knowledge of the natural environment, production systems unsuited to local conditions, poor transport infrastructure (notably fluvial), storage, processing and marketing; costly basic inputs, inadequate rural credit, low organizational capacity of producers and insufficient technical assistance to meet demand.

Over the last six years a number of projects have been implemented in the State of Amazonas, all geared to raise the level of income of countryside men and women and to offer higher cultural, social, health and educational levels to around 270,000 people scattered across the rural zones of the state.

Mission and Vision

The Secretary of Rural Production, SEPROR, is in charge of the formulation, coordination and implementation of the state policy of integrated rural development.

This agricultural policy is based on the principle of sustainability, i.e. that "there is no development without sustainability and no sustainability without development."

The foundations of the new policy for sustainable development of the primary sector are polyculture, environmental sustainability, economic viability, contemporaneity in science and technology and the pursuit of social equity.

Structure

The SEPROR System is composed of all government agencies that relate to actions essential to the development of rural production. It includes areas such as land/material space, environmental licensing, development (credit, fingerlings, seeds, vaccines, implements etc.), technical assistance and rural extension, production haulage, storage and processing (agro-industries) and marketing. Thus, besides SEPROR itself there are its related entities: the Permanent Executive Committee of Animal and Plant Sanitary Defense of the State of Amazonas (Codesav), the Institute of Sustainable Development for Agriculture and Forestry of Amazonas (Idam) and the Executive Secretariat of Fishery and Aquaculture (Sepa). Also composing this system are ITEAM (Land Institute of Amazonas), IPAAM (Environmental Protection Institute of the Amazon), AFEAM (Development Agency of the State of Amazonas), Bank of Amazônia (BASA), Bank of Brazil and ADS (Sustainable Development Agency).

Management and administration

SEPROR is an office of the government structure of the state of Amazonas. Besides the above structure of the SEPROR system, the department has working partnerships with numerous governmental and national / international non-governmental organisms to execute projects to the interest of the Secretary. In this proposal, ASSAI - the Association of Friends of INPA - will be in charge of the administrative and financial management and budget execution. This association, privately incorporated as a non-profit entity, was founded in April 9, 2003 by researchers at the National Institute for Amazon Research, whose initial intention was to facilitate the development of their research projects. Over the years and throughout the buildup of experience, the institution began to manage projects of other institutions, such as the State Secretary of Rural Production and State Secretary of Environment and Sustainable Development.

In all these years, the Association has developed projects and contributed to the enrichment of science in Amazonas through the resource management of

entities fostering research who provided for the construction of laboratories, the purchase of high-tech equipment, and the modernization of institutes benefited by it.

Among other statutory objectives, ASSAI promotes the protection, preservation and conservation of Amazonian environment favoring sustainable development, fosters studies and research aimed at the development of alternative technologies, produces and disseminates information and technical and scientific knowledge, holds congresses, courses, seminars, debates and exhibitions, provides services to third parties, especially at local and regional communities.

Thus, in its ten-year existence, ASSAI has captured, managed and enabled the use of tens of millions of dollars in partnerships with several other regional, state and federal entities, executing investments in infrastructure, research, courses and disseminating science and technology, and publications, always focused on environmental issues.

III. Project Description:

a. Background:

- *Describe linkage of proposed project to national priorities*
- *Describe the problem / issue the proposed project will address*
- *State context / rationale of the project*
- *Target communities (if any) where the project will be implemented*

This project proposal of the Hydrogeomorphological Map of the Guyana Shield is within the context given by benchmarks of the Guiana Shield Facility. That documentation highlights the ecosystem of the Guiana Shield region of South America (referred to as Guiana Shield eco-region) as a large mountainous system of forests which hosts the important springs of water bodies that are among the most significant in the globe.

More specifically, these areas cover 250 million hectares, mostly virgin rainforests, bounded to the south / southwest respectively by rivers Amazon and Japurá, to the east by the Atlantic Ocean (coast of Amapá / Brazil) and to the north / northeast by rivers Orinoco and Vichada, and by also the shores of Guyana, Suriname and French Guiana.

In ecological terms the eco-region of the Guiana Shield is extremely important in a global scale because it is formed by several unique ecosystems that:

- store approximately 10-15 % of the world's water;
- store 50 billion tons of carbon;

- have more than 20,000 species of vascular plants, 35 % of them being endemic;
- are home to a rich biodiversity that includes 975 species of birds, 282 species of mammals, 280 species of reptiles, 272 species of amphibians and 2,200 species of fish.

Despite the well known threats that loom above the uniqueness of these ecosystems - illegal timber trade, mining, construction of large infrastructure projects and large-scale agricultural activities to name a few, the region's countries are looking for alternative forms of development that increasingly focus on optimizing the use of the value of its natural resources and for the minimization of losses and degradation.

However, there has to be a process of comprehensive regional planning for conservation and sustainable development of the Guiana Shield to complement the efforts of individual countries in the management of common problems and in the search for regional human development.

The presentation and exchange of current information on the Guiana Shield is an essential tool both for shaping the regional planning for the agricultural development process, as well as to set priorities for conservation and sustainable development. Thus, although there is already a good base of knowledge about the importance of the natural ecosystems of the Guiana Shield, there still are details lacking on the geomorphological and hydrological context. These are important issues for the evaluation of the natural vulnerabilities of a region that is extremely rich in landscapes surrounding mountains and rivers (its flat lands). This adds up to other forms of relief associated with the evolution of those two entities of the physical environment that are fundamental in defining the current relief of the Guiana Shield.

Moreover, there still is a lack of tools for the exchange of information at the level of national and international cooperation so that the threats to the ecosystems of the region can be faced.

This proposal is presented in a context that can articulate itself not only with the GSF community, but also with the policies of water/natural resource management of the respective countries of the Guyana Shield.

b. Project Summary: *Describe the action / strategy the proposed project will take to address the problem or issue described above*

The methodology here proposed will make intensive use of satellite images and geographic information system (GIS) processing, as well as specific knowledge of technical analysis of the ground and of specific data of which the methodological references are:

- For geomorphological mapping: Iriondo (1986) and Latrubesse (1998); a methodology that was successfully used in the preparation of the

Geomorphological Map of the State of Goias and the Federal District currently used by state agencies as a support to their environmental policies for the management of water and minerals resources.

- For the map of the watersheds, determining flow and hydrological regimes: the methodology of Otto Pfafstetter, (1989), recommended by ANA (National Water Agency), and Verdin & Verdin (1999) ratified by the U.S. Geological Survey, Molinier et al. (1986) and the Guide to Hydrological Practices, 6th. Edition (WMO, 2009 - Pub. 168), used in the Water Balance of the Amazon Region.

These methodologies have been recommended by ANA (National Water Agency of Brazil) to conduct hydrological studies and have recently been used by the state of Acre in the process of building their State Plan for Water Resources.

Activities to be developed:

Activity	Detail
Hiring	Drafting the detailed Work Plan for release of funds
Bibliography, collecting initial data, obtaining and assembling a database of images	Bibliographic research and setting of standards for images to be used and mounting a primary database
Editing reports	<p>Three reports will be generated in addition to the Work Plan:</p> <ul style="list-style-type: none"> - 1st. Presentation of the preliminary map, 6 months after project contracting; - 2nd. Presentation of the first draft of the final map 10 months after contracting; - 3rd. Presentation of the final product 12 months after project contracting.
Preliminary Mapping	<p>Based on satellite images and data bases available at LAPA / UFAM</p> <p>Boundary definition of areas of basins and sub-basins</p>
Field Trips	Two field trips to check details and for the validation of the preliminary mapping and methodological

	adjustments at different times (4 months and 8 months after the contract)
Final Mapping	Based on field validations and results of technical meetings and the progress of work on databases and images developed during the project
Technical Meetings	Three technical meetings of the team for validation of information, consolidation of results and construction of support for the collective project-phase reports (2 months, 8 months and 11 months after project contracting)

c. Statement of Project Goal , Objectives , Indicators and Activities:

- *Goal: describe the general outcome of the project. (i.e., at the end of the project what change will have been achieved? How will the project contribute to the achievement of the goal of the Guiana Shield Facility (GSF) project?)*

The results, whether they are a specific feature or as seen per basin may be used by the scientific community and government agencies, notably SEPROR, as a tool for identifying areas for conservation or other demands for land management in their area of activity such as agricultural potential, especially those linked to the activities of traditional Amazonian inhabitants requiring specific physiographic evaluation.

There being secondary data on hydrology, such as data on water level and flow for example (which is satisfactorily present in the Brazilian case and needs to be checked as for the other countries) there will be the production of a map of flow volumes per basin.

For areas with adequate information, flow estimates will be generated using data from international databases or from the specific literature, so that it can generate the flow regimes for each bounded river basin.

- *Objectives: describe the specific changes (components/stages) that will lead to the achievement of the project goal (objectives should incorporate the SMART rule, i.e. Specific, Measureable, Achievable, Realistic and Time - bound)*

- Indicators: *identify qualitative and/or quantitative measurements to determine the level of achievement of the project objectives within the project duration*
- Activities: *briefly list the major project activities*

d. Beneficiaries: *Who will benefit from the project and how will they be involved, directly / indirectly? [See the GSF Gender and Environment study report produced for Guyana]*

The final product of the project will directly benefit SEPROR, its partner institutions and the technical and scientific community participating in the GSF and other Brazilian institutions that support the initiative (see below). Indirectly, governmental and non-governmental organizations will also have full access to data and information on the methodology and method use mode through a technical report.

e. Project Management: *Include project management structure and responsibilities of members of the project team.*

For its execution, the project has been divided into four thematic axes and one overall coordination for the integration of the themes, namely:

- **Geology axis** - Definition and identification of geological environments presents in the area and their dispersion, main outcrops and basic characteristics of identifiable relief markers and prevailing structures, approximate ages, remarkable tectonic events, ages etc.
- **Geomorphology axis** - Definition and identification of the main geomorphological units, current conditions and conformations , styles, their relations with the environment at the regional and subregional levels, most likely genetic classification.
- **Hydrology axis** - Determination of the areas of the basins and sub-basins and their main attributes (morphometric analysis of basins), identification of the main watercourses and their geomorphological and hydrological characteristics (hydrological regimes, flow characteristics and dimensions - maximum, average and minimum) and study of interannual relationships in the same watercourse and across watercourses.
- **GIS and Remote Sensing axis** - Definition of use of satellite images, extraction of features to be usable by the other axes, forms of use and classification, treatment and vectorization, generation of thematic files in vector format corresponding to the topics addressed by the other axes and conducting multiscale spatial and temporal analyzes.

The activities will be carried out jointly by the four thematic axes, for which there will be two field activities specifically for checking and three technical meetings for coordination and validation of information and procedures, managed by the coordination of the project.

The final integration of data, information and related files will be made by the GIS and Remote Sensing axis with the initial use of a closed dedicated platform, initially shared only with the coordination of the GSF / UNDP, and which, upon approval, will be made available as described above.

The working team is composed of 4 expert advisors on themes to be worked on so that the product is generated. See table below:

Name	Work thematic in the project	Home institution
Dr. Edileuza Mello	GIS and Remote Sensing	UFAM, Manaus, Brazil
Dr. Edgardo Latrubesse	Geomorphology	UNESP, São Paulo, Brazil and University of Texas at Austin, USA
Dr. José Cândido Stevaux	Geology	EMU Maringa and UNESP, São Paulo, Brazil
Dr. Naziano Filizola	Coordination and Hydrogeomorphology	UFAM and INPA, Manaus, Brazil

Note: The hiring of two freelance professional will be necessary to assist in the work of support for consultants concerning image analysis, building a GIS and Web design.

f. Collaboration: *Briefly describe the collaboration you intend to Undertake for this project with stakeholders (eg. NGOs, FBOs, Ministries, private sector agencies).*

Secretary of Sustainable Development - SDS of the State of Amazonas.

An institution of the State of Amazonas which supported the project from its very beginning and signed the letter of intent with UNDP as interested-party in the GSF initiative. It intends to use the information as a support for improving the management of natural resources in conservation areas of the state and also as a basis for identifying potential new areas of environmental protection.

Federal University of Amazonas - UFAM.

Department of Geography, notably the Amazon Potamology Laboratory which will contribute to part of their infrastructure for the execution of this proposal, with a total value of U\$50,000.

National Water Agency - ANA.

Executive institution of the Brazilian government that administers the national collection of hydrological data and is responsible for the implementation of the National Policy of Water Resources. Is interested in the results of the project as a product generated, also, with agency data, in a region devoid of information, as a basis for improvement of the work of water resources management in the Amazon.

Geological Services of Brazil / Superintendence of Manaus - CPRM/Man.

Executive institution of the Brazilian government that operates the national hydrometric network and is responsible for the geological and geomorphological mapping of the country. It has an interest in the results of the project as a product generated to complement their actions in the northern region of the Brazilian Amazon. It intends to use the product as a support in the process of federal management of natural resources in the Amazon.

g. Products: *Describe the products (eg. reports, videos etc.) that will be produce during and on completion of the project.*

A thematic hydrogeomorphologic map will be produced as a result of the Project, to be made available to the scientific and general communities, in digital Geographic Information System - GIS format, with several different levels of associated information.

The levels of information generated (in themes explained above) will be formatted as independent files associated with specific information and will be freely distributed using tools like Web Map Server connected to the Guiana Shield Facility (GSF) Web site.

It will be also possible to use the map files independently to generate new products from the data available there, in format that will allow its use in different computational platforms.

IV. Sustainability: *Describe mechanisms for sustaining project results and how lessons learned from successful approaches will have a wider application to the organization's mandate.*

The final product will be incorporated into SEPROR programs in order to provide support for the development of production policies as most appropriate to the mission of the Secretariat within the new vision of the State Agricultural Plan laid out for the State of Amazonas, according to which "there is no development without sustainability nor sustainability without development", incorporating hydrogeomorphological variables to the production system of the State of Amazonas. Moreover, the product will be

fully available to the GSF for use in its Web platform, ensuring that the product stands as such to provide tools for its users. Additionally an explanatory report will be produced together with a technical report which will also feature indications of best practices for use and/or lessons learned during the production process. Because the base data (especially the hydrological) are resulting from the analysis of time-series is important that 10 years after the product is finished a review of this level of information may be incorporated as a way to assess the evolution of the subject in both accordance with changes in land use and as a function of potential variability related to climate issues. Thus, this project will serve as a baseline in these substantive issues regarding the area of the Guayana Shield.

V. Proposed Budget (U\$):

Budget Line Items	Amount Requested (Donor)	Applicant Counterpart		Other Sources (ie. donors, community)		Total Project Cost
		Cash	In - Kind	Cash	In - Kind	
Consultants	120,000					120,000
Staff technical meetings	7,500					7,500
Field missions	7,500					7,500
Materials and various support services	5,000		50,000			55,000
Management fee	10,000					10,000
TOTAL	150,000		50,000			200,000