Developing a Common Platform for Invasive Alien Species Management by South American Countries to Contribute to the Achievement of SDG/2030 Agenda Target 8 and Aichi Target 9

TERMS OF REFERENCE

Background

The threat posed by invasive alien species (IAS) is acknowledged in the Convention on Biological Diversity (1992) as one of the major causes of global biodiversity decline. These species threaten the integrity and functions of natural ecosystems, generate significant economic losses, harm human, animal, and plant health, and compromise human well-being.

International cooperation is required to properly address this issue, as species move across country boundaries and challenge national control efforts. Priority species, pathways and vectors need to be identified and jointly tackled for prevention, early detection and control measures to be effective.

Between 2005 and 2013, 14 countries in Latin America and the Caribbean have developed online invasive species databases, chiefly through support provided by the IABIN Invasive Species Network (funded by GEF). The databases in Argentina, Brazil and Jamaica are currently functional, while the Uruguay and Paraguay databases have stopped functioning due to technical and financial issues.

The country database administrators have been cooperating on the update and maintenance of these systems since their inception. In addition, networks of collaborators in scientific fields, as well as field managers, especially in protected areas, were trained to update content and maintain the databases operational during that period of time. Input was also provided by international collaborators from the Hawaii Ecosystems at Risk project and the Global Invasive Species Database maintained by the Invasive Species Specialist Group (ISSG – IUCN). To date, there are no other comprehensive databases on invasive species in any of these countries.

Rationale

These databases have provided and continue to provide key information for numerous legal regulations and policies. In Brazil, the national database provides references for national legislation related to invasive alien species. In Argentina, Uruguay and Brazil, the databases act as a reference to the National IAS and Biodiversity Strategies and support their implementation and functionality. They provide support for field managers to prioritize species and methods for control of invasions in natural areas, reference for risk assessment procedures and the management of pathways, and for the application of legal regulations.

The proposed regional common platform will be stored in the cloud and made accessible to relevant authorities, managers, NGOs and the general public. This regional initiative is in line with larger-scale international projects, like the Global Register of Introduced and Invasive Species (GRIIS) of the IUCN SSC Invasive Species Specialist Group, therefore contributing to generate information of global relevance.

Goal and Objectives

The goal of this Project is to foster long-term cooperation on the management of invasive alien species (IAS) between the Horus Institute for Environmental Conservation and Development (Brazil),

Universidad Nacional del Sur (Argentina), Guyra Paraguay (Paraguay), the Dirección Nacional de Medio Ambiente under the Ministry of Environment (DINAMA MA, Uruguay), and the Universidad de la República (Uruguay).

The immediate objectives to which the small-scale funding contributes are as follows:

- *Objective 1:* To facilitate access to high-quality data on invasive alien species in Spanish, Portuguese and English in all four participating countries (Argentina, Brazil, Paraguay and Uruguay).
- *Objective 2:* To facilitate analyses of common priority species and pathways in the region, leading to better-informed joint decisions on the required management actions.
- *Objective 3:* To promote citizen science to increase involvement of the public and its contributions to the continued update of the information systems on invasive alien species.

Activities

The activities to be carried out by the Horus Institute, in collaboration with partners and with the support provided under this Agreement are the following:

- *Activity 1: Development of a regional common information platform on invasive alien species (5 months):* The new common platform will be a free, read-only site featuring filters allowing users from multiple countries to easily access data and find species that are common to more than one country, as well as other data useful for policies, regulations, and practical management. The product will include a Web Services layer for access by third-party websites or mobile applications. Factsheets on invasive species that are common to two or more countries will be produced and delivered to the respective Ministries of Environment to highlight priorities for regional cooperation.
- *Activity 2: Update of the Uruguay and Paraguay IAS databases (2 months):* The Uruguay and Paraguay databases require IT support for conversion from Microsoft Access format to MySQL so they can be published online again and integrate the regional common platform. This will entail importing the databases, configuring the vocabulary used, and developing interface graphics. In Uruguay, students and professors at the Universidad de la República will help update the database and improve their scientific background in the process once it is operational.
- *Activity 3: Development of a user-friendly interface for databases (6 months):* In parallel, a more user-friendly interface for all four national databases will be developed in order to allow the general public, decision-makers, researchers, and technical staff to easily find the data they need, make inquiries, and export data. The programming will use Node.js for backend and Vue.js for frontend, plus Figma or Adobe XD for the new interface design. The first step is to import existing users at the three levels (administrator, collaborator, and public user), then develop a separate interface for each of the layers.
- *Activity 4: Development of a cell phone application for data collection (6 months):* A cell phone application will be developed to facilitate data collection in the field by scientists, protected area managers, field practitioners, and volunteers of the general public. Login will be activated through existing social networks such as Facebook or Google. Volunteers will contribute data in the form of photographs, corresponding GPS coordinates, the name of the location, and other details as appropriate. Data will be sent to the database platform, then

validated according to a unified protocol for inclusion by the administrators and respective networks. The app will be developed for Android and IOS devices using the following technologies: Flutter, Node.JS and MySQL. Il will include an occurrence loading repository and updates.

- *Activity 5: Development of a unified data validation protocol (4 months):* The administrators of the four databases will develop an explicit, unified protocol to corroborate data quality and reliability, and validate the information that is added to each system. The criteria already in use for inclusion of data (history of invasion, local invasion, confirmed taxonomic identity, confirmed occurrence) will be reviewed and agreed upon by the four countries.

Planned Outputs

The expected outputs are as follows:

- *Output 1:* Regional common platform functional and online.
- *Output 2:* Uruguay and Paraguay databases updated and online.
- *Output 3:* New user-friendly interface ready for all databases.
- *Output 4:* New cell phone application ready and available for use by scientists, practitioners and the general public.
- *Output 5:* Unified data validation protocol agreed upon.

Expected Outcomes

The expected outcomes are as follows:

- *Outcome 1:* Data on invasive alien species in all four countries (Argentina, Brazil, Paraguay and Uruguay) is available online through a regional common platform to facilitate analyses of common priority species and pathways in the region and to support joint management decision.
- *Outcome 2:* Factsheets about invasive alien species occurring in more than one of the four countries are made available from both the regional common platform and the national databases and are delivered to the Ministries of Environment in the project countries.
- *Outcome 3:* Scientists, practitioners and the general public contribute data on IAS through a new cell phone application, thus contributing to the continued update of the databases.
- *Outcome 4:* Data reliability is increased thanks to a unified data validation protocol.
- *Outcome 5:* Access to the databases and data contributions are increased thanks to the development of a user-friendly interface.

Schedule of Activities

Dates	Activity	Brief Description
May – July 2021	Activity 1	Development of a regional common information platform on invasive alien species
Feb. – Mar. 2021	Activity 2	Update of the Uruguay and Paraguay IAS databases
Feb. – July 2021	Activity 3	Development of a user-friendly interface for databases
Feb. – July 2021	Activity 4	Development of a cell phone application for data collection
Feb. – May 2021	Activity 5	Development of a unified data validation protocol

Management and Coordination

The project will have a Technical Committee formed by one representative of each country. The Technical Committee will be closely involved in the development of the listed products, providing guidance for the programmers and performing tests on the products as they are developed. An evaluation of progress will be jointly made twice a month to make sure progress is steadfast for the products to be finished according to the deadlines established. Adjustments to the products will be made throughout the process.

Roles and Responsibilities of the Technical and Scientific Cooperation Partners

Under the leadership of the Horus Institute, the activities of this Project will involve the following institutions: Universidad Nacional del Sur (Argentina), Guyra Paraguay (Paraguay), the Dirección Nacional de Medio Ambiente under the Ministry of Environment (DINAMA MA, Uruguay), and the Universidad de la República (Uruguay).

Cooperation will be carried out along the following lines:

- *The Horus Institute (Brazil):*
  - Adjust the data validation protocol, implement and disseminate it on each website and on the regional common platform;
  - Hire programmers to develop the user-friendly interface and the cell phone application;
  - Provide technical support for the development of all products;
  - Help test the products as they are developed;
  - Publish and maintain the Brazil database online in the long term.
- *Universidad Nacional del Sur (Argentina):*
  - Adjust the data validation protocol, implement and disseminate it on each website and on the regional common platform;
  - Hire one programmer to develop the regional common platform and to update the Uruguay and Paraguay databases;
  - Provide technical support for the development of all products;
  - Help test the products as they are developed;
  - Publish and maintain the Argentina database online in the long term.
- *Guyra Paraguay (Paraguay):*

- Adjust the data validation protocol, implement and disseminate it on each website and on the regional common platform;
- Provide support for the update of the Paraguay database;
- Provide technical support for the development of all products;
- Help test the products as they are developed;
- Publish and maintain the Paraguay database online in the long term.

- *DINAMA MA (Uruguay):*
  - Supervise the implementation of the work;
  - Adjust the data validation protocol, implement and disseminate it on each website and on the regional common platform;
  - Provide support for the update of the Uruguay database.
- *Universidad de la República (Uruguay):*
  - Adjust the data validation protocol, implement and disseminate it on each website and on the regional common platform;
  - Provide support for the update of the Uruguay database;
  - Provide technical support for the development of all products;
  - Publish and maintain the Uruguay database online in the long term.