ABSTRACT: The IIS implementation was based on the compilation and organization of basic information on the Project area. The Project has recompiled the existing information on the Rio de la Plata and its Maritime Front, has directed campaigns for new data gathering and has developed and financed research activities. These activities were focused on the following subjects: circulation patterns of the river, red tides, biodiversity, pollution, aquatic ecosystems, generation of new data, training activities, institutional strengthening, and new developments in data handling, among others. The Project has promoted the joint work and the data exchange between the major stakeholders involved in the river. In order to make the Project information available to all stakeholders involved in the environmental issue of the Rio de la Plata and its Maritime Front, several actions were taken and activities performed, which enable the Project to overcome the existing difficulties and to promote the exchange and use of the information, and the detailed actions and activities are presented in this paper.

INTRODUCTION

The Integrated Information System (IIS) of the FREPLATA Project has as its main objectives:

- To compile, systematize, process and disseminate environmental data of the Rio de la Plata and its Maritime Front
- To integrate elements for the Transboundary Diagnostic Analysis (TDA)

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• To support the development and implantation of the Strategic Action Program (SAP)

• To support the decision making processes for the transboundary management of the water-body

• To supply information to the different actors involved with the environmental problematic of the Rio de la Plata and its Maritime Front (decision makers, scientists, private sector and public in general)

The IIS implementation was based on the compilation and organization of basic information on the Project area. The information offerers were determined, the state of the information was assessed, and the necessary procedures for that information to become part of the IIS were carried out.

The main components of the IIS correspond to:

• Information for the GIS: Basic information – basic cartography (chart of the Project area, chart of the Republic of Argentina, chart of the Oriental Republic of Uruguay, chart of South America), thematic maps –information layers and their associated databases, political division, demography, localities, protected areas, wetlands, lands, geographical accidents, basins, coastal areas, hydrography, roads, ecosystems, among others.

• Databases that, depending on the need of data input in a distributed way in both countries and in different institutions, were implemented on line, both for the input as well as for consultation: bibliographic references; legal instruments; organizations, projects and information offer.

• FREPLATA web sites.

The FREPLATA Project coordinates activities among 18 institutions, public and private from Argentine and Uruguay. The Project has recompiled the existing information on the Rio de la Plata and its Maritime Front, has directed campaigns for new data gathering and has developed and financed research activities. These activities were focused on the following subjects: circulation patterns of the river, red tides, biodiversity, pollution, aquatic ecosystems, generation of new data, training activities, institutional strengthening, and new developments in data handling, among others. In this way, the Project has promoted the joint work and the data exchange between the major stakeholders involved in the river.

**KNOWLEDGE MANAGEMENT AND KNOWLEDGE SHARING ACTIVITIES**

All the information considered relevant by the Project Specialists and by the stakeholders for the environmental management and decision-making of the water-body, was gathered into the Integrated Information System (IIS). This task required the adjustment of scales, units, projections, digitalization, data processing, generation of new information, among others.
Due to the difficult economical situation existing in Argentine and in Uruguay, many of the institutions related to the Project, neither have the necessary tools for handling the information (or with obsolete hardware and software) nor the trained personnel. Consequently, in order to make the Project information available to all stakeholders involved in the environmental issue of the Rio de la Plata and its Maritime Front, several actions were taken and activities performed, which enable the Project to overcome the existing difficulties and to promote the exchange and use of the information.

Spatial information

Due to the existing limitations above-referred, and with the aim of distributing the spatial information of the Project for the institutions’ reference, we decided to give training in basic handling of spatial information, using Arc Explorer, a free distribution software. A training course was developed together with a distribution kit. This course was given in both countries in several opportunities, leaving a result of nearly 60 trained technicians from a total of 15 institutions (governmental and non-governmental) and most of the information produced by the Project was distributed among those institutions with a basic handling tool.

Through the Portal of the Rio de la Plata and its Maritime Front, people have access to the cartographic information compiled and generated by the Project, according to the users needs: be them to maps as images (raster format), or to maps with associated alphanumeric information (vectorial format). In this last case, the person interested can use the information offered to perform spatial analysis, and also in this case, the web offers the shape files of ArcView (set of 3 files and extensions .shp, .shx, and .dbf), which can be incorporated to local GISs such as ArcView, ArcInfo, AutoCAD Map and ArcExplorer, among others. For those interested persons who don’t have or don’t want to work with a GIS tool, the Project has developed a visualization tool that enables the basic handling of maps from the FREPLATA web site. The visualization tool was developed using Flash and Java tools, and allows to zoom, to move the image, to visualize the geographic coordinates of any dot, to see the alphanumeric information associated to the layer of information presented and to superpose layers (at present we are working on this development). On Figure 1 it is observed the visualization tool presenting the sediments layer of the Rio de la Plata and its Maritime Front.
**Figure 1. Distribution of sediments in the Rio de la Plata and its Maritime Front**

*Development of databases and applications*

Most part of the information on the Rio de la Plata and its Maritime Front is spread and not digitalized and in most cases is heterogeneous. To overcome this difficulty, we developed tools to systematize priority information for the stakeholders involved in the environmental issue of the water-body. The Project together with a reduced group of institutions with trained personnel, designed, developed and implemented databases, applications and standards which enable the systematization of information and constitute tools for management and decision-making (bibliographic references, legal instruments, organizations and projects related to the Project area, Project documents and activities, oceanographic information, chemical, physical and biological, socio-economic information, fisheries captures, among others).

The methodology used for the design, development and implementation of applications for the Project involved the following processes:

- To identify the needs of users a/o organizations participant in the Project which request the application
- To design the application
- To define the structure of the database(s) constituting the application
• To develop the dictionary of data elements (table fields composing data)
• To develop database(s) of modulus and sub-modulus, (tables and relationships, data input, reports and consultation forms) of a prototype application
• To assess the prototype with the user
• If requested, to implement changes and improvements
• To implement the final application
• To document the application in operative manuals: Users Manual and Technical Manual

The applications were developed in Access and placed in the Project server but with an input and consulting interface through Internet. The challenge set forth regarding the charge and maintenance of information in databases and development of several of its activities in different organizations within each country, has been exceeded by the development of applications in a web environment, that permit the Internet online entry and the distributed load of information.

For all databases, standards and formats have been defined for the input of registers, and protocols have been edited, which are used by all who enter information into the bases. This way, besides the distributed load, registers are homogeneous in format.

Data input into the bases through Internet only is permitted to those authorized persons (at the beginning of the applications a username and password must be entered). In each register that is entered, it is kept in the database the name of the person responsible for the load. This allows to keep control on the information input.

With the purpose of facilitating the search of information in the databases developed, all entered registers are classified with one or many key words from defined listings, previously agreed by the specialists and researchers associated to the Project.

*The Rio de la Plata and its Maritime Front Portal*

The Rio de la Plata and its Maritime Front Portal has been and is being implemented in Internet as an improvement of the FREPLATA Project web site. The Portal objective consists in systematizing and presenting all the information on this particular area of South America, which due to its characteristics, corresponds to an area of great interest from an ecological and economic point of view, and with regards to its administration and management represents a challenge. Here is where the Portal must be useful to the main actors involved with the river, and to achieve this, information on the topics mentioned (ecology, pollution, biodiversity, socio-economical aspects, legal and institutional aspects) is included. Here, also, several of the products of the Integrated Information System (IIS) (databases, cartography, satellite images) are presented. Likewise, novelties related to the study area, the activities and products of the Project are included.
Still there is no definition regarding in which institution or institutions the Portal should be settled once the Project is over and considering the lack of trained personnel and economic resources, the Portal was developed taking into account these future difficulties. Consequently, standards for the systematization of its contents were defined and implemented through the information input into databases and its further presentation in dynamic pages whenever the information format allows it.

**Implementation of data exchange nets**

Being aware of the difficulties of the local governments for exchanging information and experiences in the management and protection of the river and its coastal zone, the Project decided to support the implementation of a net of data exchange between the local governments of both countries. This net will be implemented within the Portal and when required, will have restricted access to those technicians working for the institutions making up the net.

**CONCLUSIONS**
Experiences, difficulties and lessons learned

Most of the institutions are not used to share their information. This represents a major difficulty when trying to build an Information System. Partially, it can be solved by the use of metadata, for instance, to know which data exists, which characteristics have, where, and all this without the need of the information itself. The Project is making a pilot test with the aim of facilitating the information sharing among the local governments. In a parallel way and in the case of those organizations reluctant to share information, the Project invites them to use the metadata adopted in both countries (based on the Federal Geographic Data Committee Standards).

Lack of human and economic resources in institutions of the region make difficult the information exchange. In order to overcome this limitation, the Project implemented low-cost and free distribution tools and favored the development of applications in Internet (for input and consultation) only needing a server to place the database.

Lack of trained personnel has been considered by the Project. Training courses have been given and we will continue with this trend.

Make the spatial information systematized in the Project available for every user. Although this information has been distributed among the institutions working with the Project, who can handle it and visualize it using Arc Explorer, we decided to give this information to any person who might be interested in it through the Portal of the Rio de la Plata and its Maritime Front. Not counting with a map server or with the knowledge to implement it, the computer expert at the Project investigated and developed systems of dynamic presentation and basic handling of maps in Internet. These developments have lower costs than those existing in the market, since they use programs in Flash and Java. Considering that in the future the institutions on their own will publish the dynamic maps in the Portal in Internet, we are developing programs to allow the input of spatial information (the maps and their associated database) in the Portal by an inexperienced person in a simple and standardized way.

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