AMAZON WATERS

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GEF- Amazon Project Awarded at the Seventh Biennial International Waters Conference

The Project "Integrated and Sustainable Management of Transboundary Water Resources in the Amazon River basin considering the variability and climate change" executed by the Member Countries of the Amazon Cooperation Treaty Organization (ACTO) through its Permanent Secretariat, won the award for the best Project Presentation, at the Seventh Biennial International Waters Conference (IWC7 for its acronym in English) conducted by the Global Environment Facility (GEF) from 28 to 31 October, 2013 in Barbados.

GEF Amazon Project awarded at the IWC7

IWC7
7TH GEF BIENNIAL INTERNATIONAL WATERS CONFERENCE
26 – 31 OCTOBER 2013, BRIDGETOWN, BARBADOS

Team of the GEF Amazon Project, Coordination Unit

The IWC7 convened approximately 325 participants, including GEF IW project managers, representatives of beneficiary countries, NGOs, border management institutions, United Nations Agencies and the private sector. Overall, the participants represented approximately 75 active GEF IW projects, 80 countries and the various agencies of GEF.

The Conference organized an Innovation Marketplace, where the GEF Amazon Project distributed information about ACTO and of the Project´s activities, through an illustrative Panel with a video clip.

NEWS FROM COMPONENT II

1000 fish species live in the Rio Negro basin

To understand the natural resources base of the Amazon basin and improve knowledge about aquatic ecosystems in the Amazon, the GEF Amazon Project - Water Resources and Climate Change is investigating the Rio Negro in its middle stretch, the Amazon's greatest tributary on its left bank.

This field work is part of studies being conducted in three important areas or hotspots with a view to conserving aquatic ecosystems, a project activity coordinated by Professor Cleber Alho, PhD in Ecology and leader of the science team in the area.

Among the aquatic habitats of the Negro basin are low gradient rivers and streams. Water in the Negro river is extremely poor in mineral content and highly acidic, with a pH ranging from 2.9 to 4.2. Even so it is home to a wide variety of fish species, especially small ones, which are used in aquariums.

Extending over 2,230 km and with an average discharge of 28,000 m3—14% of the Amazon basin's annual average outflow—it is the greatest black river in the world.

According to ichthyology expert and GEF project consultant Dr. Roberto E. Reis: "The Negro basin's current species richness is estimated to exceed the 750 described fish species. Of the 11 orders, the Characiformes and Siluriformes represent about 74% of the species. The total species richness is probably close to 1000 species, 90 of which are considered endemic to the Rio Negro basin, meaning this is the only ecosystem they live in."

The Characiformes order has the greatest species richness of all freshwater fish. Some serve as food for other species and are key for fishing.

Fishes of the Amazon Basin

Sustainable economy with ornamental fish

The Negro river is home to more than 100 species that in demand for the ornamental fish trade.

The GEF Amazon Project led an expedition in the area with the participation of the project's support consultants. Together they visited sites on the left bank of the Rio Negro, in front of Barcelos and the Daraquá community. They also went to the Bacabal community on the Rio Aracá, and traveled along the right bank all the way up to the Rio Quiuini, where the Ponta de Terra community is located.

"Up until 10 or 12 years ago the city of Barcelos had 600 families living off ornamental fish. Today only ten percent of them remain. Agriculture, trade and sport fishing became the main economic activities," explained Dr. Reis.

Ornamental fish are caught in areas where the river is shallow. The GEF Amazon Project observed the process used to catch ornamental fish, especially cardinal fish. "Fishermen use nets that they keep inside the water; they put the live fish in nurseries made of plastic nets and send them to Barcelos and Manaus, from where they are exported," noted the project consultant.

On the other hand, the experts noted that since the landscape of the middle Rio Negro is dominated by floodable forests, agriculture is practiced on small portions of dry land, as the areas near the communities and Rio Negro basin are not suitable for extensive agriculture.

"In addition, climate change is affecting the Amazon basin—especially through floods and droughts— and can be harmful for fish. Particularly droughts, which reduce the areas they use for shelter, food and reproduction," concluded Dr. Reis at the end of his expedition through Barcelos.

This GEF Amazon Project activity focuses on studying fish to foster knowledge and conservation of Amazonian aquatic ecosystems.

ACTO
Amazon Cooperation
Treaty Organization

PROJECT
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WATER RESOURCES AND CLIMATE CHANGE

NEWS FROM COMPONENT III

How can we face the rising sea level at Marajó Island?

Sea level rise in Marajó Island

"Adaptation to sea level rise in the Amazon River delta" is an activity developed by the GEF Amazon Project - Water Resources and Climate Change to understand the dynamics of the Atlantic Ocean's behavior at the Amazon River mouth and propose adaptation measures to sea level rise, which is causing massive land loss in the Island.

The residents of Marajó Island, located in the Amazon River delta, are already familiar with the phenomenon. "When I was 8 years old, the houses used to be where the sea is now and we had a lot of fish, but now the water is moving closer and closer to us. We live off fishing and handicrafts, like my parents did. In February the sea came all the way over here, where the houses are. I think that in three years everything will have turned into sand," explains 61 year old Mrs. Angelina, from the

municipality of Soure, who lives with her family at Playa de Pesquero, one of the study sites of the GEF Amazon Project.

In view of the above, the GEF Amazon Project held a meeting with local authorities, fishermen, residents, teachers and students at the Soure Parish, located between Joanes and Playa de Pesquero, to share information about the coastal dynamics of Marajó Island.

Both the Joanes and the Soure municipalities were identified as vulnerable areas where the population is suffering the effects of Marajó Island's rising sea level.

As such, the GEF Amazon Project is assessing the geological, hydrographic and socioeconomic conditions of the northern and eastern part of the Island to understand its dynamics and propose adjustments, monitoring and adaptation measures to climate change.

The GEF Amazon Project in Joanes

The municipality of Joanes is located in the highest part of the Island. It is an archeological and historic site that still showcases the ruins of the first Jesuits that arrived in the 16th Century.

Joanes has many neighborhoods, a square and a community meeting place shared by approximately 25,000 people. The municipality is suffering land loss due to the strong tides.

The tide, driver of environmental life

Unlike what happens in Joanes, in the municipality of Soure the sand is invading the mangrove forest, a humid marine ecosystem located in the intertidal zone.

"Environmental life on the island is driven by the tide. People live according to the tide, which also determines whether they can travel or take a boat," explains Dr.

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Maamar El Robrini, oceanographer and coordinator of this activity.

In view of the above, the GEF Amazon Project is collecting oceanographic data, like waves, tides, height, velocity, temperature and salinity, among other parameters, to better understand retrogradation or land loss in Marajó Island.

It is also studying extreme events like storms, rainfall and wind in the Island, since their increased velocity and intensity is affecting streamflow.

The GEF Amazon Project is also investigating sea level rise, the rising levels of the Amazon and Pará rivers, and rainfall, which is causing climate change in the area.

"Abnormal phenomena in the open ocean are causing ocean waves, something we don't know a lot about since we don't have instruments to measure them.

And it all contributes to erosion," notes Dr. El Robrini.

Storms in the Amazon, a new weather phenomenon

Through time the rainy season has changed in the area. So much so that we now see storms in the Amazon that we didn't use to see. "Storms are becoming increasingly frequent. This increases the tide and raises the water level, which contributes to coastal erosion in the Island", notes the expert that works with the study's project consultants.

Thematic map of Marajó Island

One of the products of the GEF Amazon Project is a thematic map that compares old and new data to show changes in the Island's coastal margins, meteorological processes, extreme events like storms,

and increased speed and intensity of the winds, among others.

Rafael Rodrigo Souza de Oliveira, geographer and project support consultant explains:

"We are working on the Island's thematic map using ARC GIZ to show land use, plant cover, geology, geomorphology and relief, and conducting a general survey of Marajó Island. We are spatializing the socioeconomic data being collected, as well as climate and weather data."

In addition, the GEF Amazon Project will purchase a portable ALAZER device capable of taking a field reading of up to 5,000 meters in a fraction of minutes to obtain topographic data.

This way, the Project is preparing to formulate a consistent proposal that offers basic guidelines for the Island to monitor sea level rise and adapt to climate change.

Building an Operational Risk Management Model

The Amazon region, a landscape with multiple realities

Due to its size and complexity, the Amazon region needs to be addressed as a landscape with various distinct realities. This is the case of the Purús sub-basin, where the GEF Amazon Project is conducting research to identify the population's vulnerability to risks, more specifically to extremely high water and droughts.

"Having recognized these phenomena, the GEF Amazon Project is assessing the risks and impacts faced by the population in order to develop a strategy to minimize or mitigate them as much as possible," says Nirvia Ravena, BA in Social Science and PhD in Political Science by the Research Institute of the University of Rio de Janeiro, who coordinates this activity and leads an interdisciplinary team of project consultants.

What does the Operational Risk Management Model consist of?

Our strategy is to prepare an operational model to govern risks and validate the im-

pacts of climate change through three components: a climatic and hydrologic model, an assessment of the communities' current adaptation capacity, and an analysis of institutional capacity in selected locations. Three specific databases will be built throughout the process.

An interdisciplinary team consisting of specialists in the areas of meteorology, computer intelligence, hydrology, anthropology and political science will then develop the Operational Risk Management Model based on the Cross Scale Interplay methodology.

"This methodology takes into account the interdependence that characterizes ecological (human and physical) and institutional systems, interpreting the problems in these systems as matters with global dimensions to be addressed through collective action. This gives rise to different scales—physical, human and institutional—, and when risks become collective they also give rise to local, regional and international scales", says Dr. Nirvia Ravena.

As such, efforts are being made to promote new institutional arrangements between national States to solve the dilemmas that appear in this type of interaction.

What type of information will the operational model provide?

"After reviewing the literature about climate and environmental changes, as well as economic, institutional and political data about the Purús sub-basin, the project team went to the field to collect data about local infrastructure, land use and socioeconomic parameters in order to build a first database that will feed the Risk Governance Model", explains coordinator Nirvia Ravena.

That first trip was to the state of Amazonas, Brazil, in the stretch that goes from Beruri to Labrea, and from Pauini to Santa Rosa in the state of Acre. Acre and Amazonas concentrate the 9 municipalities that form the Purús river canal in Brazil. A similar trip is planned to transboundary areas of Peru and Bolivia.

In addition to obtaining key data for the model, these field trips will strengthen the ties between the GEF Amazon Project and local players of the Purús sub-basin.

The model will incorporate the municipalities' risk management capacity

"The GEF Amazon Project will also create a database on institutional capacity at the sub-basin level in each country to feed the Operational Risk Management Model. What's innovative about the model is that institutional capacity, the municipalities' actual ability to produce their own public policies, will be interpreted using Fuzzy logic. The institutional capacity variable will also be used as input for the Risk Governance Model," noted project consultant Romulo Sousa, who holds a Masters in Computer Science and is in charge of developing the model.

To understand the living conditions of the sub-basin communities, learn how the locals respond to risks and observe the provisions required from the institutions, the team applied Fuzzy logic, which analyzes the language people and institutions use to describe the situations they go through. This provides more precise information than simply answering yes or no.

As such, 180 specific questionnaires were applied in communities from Beruri to Labrea in the Brazilian Purús. "Many people live on houseboats and may live in different places depending on whether the season is rainy or dry. A houseboat is built on wooden poles and then floated; it has bedrooms, a bathroom, a patio, a chicken coop, and even a small vegetable garden. If the river level rises, the houses rise, if it falls, so do the houses, but during the dry season the houses remain buried in the ground," notes the project consultant.

"Thanks to the questionnaire we applied during the field trip we learned about problems they faced in the past, which will help us build the model", he adds. "That way we will learn more about past droughts and floods."

How is the population adapting to climate change in the Purús sub-basin?

Anthropologist Voyner Cañete, PhD in Ecology and project consultant, explains the traditional population of the Purús sub-basin. "These people dispose of the environment traditionally and produce the food they need to live, but climate change is strongly changing the way they use natural resources."

On the other hand, the consultant noted that change is taking place not just in the environment, but also within the communities. "The people live off fishing, through which they relate to the market. Their crops are merely for subsistence. To sell fish they used to move from one beach to another, now they have to move from dry land to the beach and to the basin, which requires them to master knowledge they don't have."

"I'm impressed with what's happening, with how the communities are having to adapt. The last time I came was in 2007 and since then things have changed, both in terms of fishery resources and in crops. In all the communities I heard the same expression: We lost the harvest. They're no longer able to find the fruits they were used to eating, like banana and mango," notes Dr. Cañete.

To collect data in the communities we developed a qualitative questionnaire through which we concluded they don't have time to deal with climate change, because the river cycles are happening very fast, which can weaken the health scenario. All the information we obtain will feed the Operational Risk Management Model.

Adaptation to climate change in Purus river basin.

Artisanal and sport fishing in the Negro River

Artisanal fishing in the Negro River

Under Component II "Understanding the natural resources base" of the GEF Amazon Project - Water Resources and Climate Change, one of the activities consists of improving knowledge of Amazo-nian aquatic ecosystems, which includes a study to assess fishing in the middle stretch of the Negro river, a task coordinated by Professor Cleber Alho, PhD in Ecology.

To this end, a 310 km expedition was organized along the Rio Negro and its tributaries with GEF Amazon Project consultants close to the city of Barcelos, State of Amazonas, Brazil, where the project team

In what liquid discharge is concerned, the Negro river ranks sixth globally with approximately 29,000 m3 per year. The river is born in Colombian grounds, where it is known as the Guanía, and becomes the Rio Negro upon entering Brazil.

The dark color of its water is due to the high concentration of undecomposed organic matter. Despite its low nutrient concentration, the Negro basin hosts a great variety of fish species, almost 1,000 in total. A large part of its ichthyofauna consists of small species living in floodable forests and currents.

Fishing in dry periods

Dr. Pedro de Podestá Uchôa de Aquino, project support consultant, found two fishing modalities in the middle stretch of the Rio Negro: artisanal fisheries (subsistence, commercial and ornamental) and sport fishing.

"Local riverside populations keep subsistence artisanal fisheries close to their homes. Some of the tools used are bows, arrows and spears. The scale is small and boats can usually carry up to 300 kg of fish. The fish are eaten by the fishermen and their families, sold to other fishermen, or sold in city markets and fairs," explained the specialist, a biologist and PhD in Ichthyology.

Artisanal commercial fishing occupies a greater stretch of the river than subsistence fishing. Its boats are also better equipped and carry larger amounts of fish. They also use nets. The fish obtained in the middle Negro river supply the markets of Barcelos, Santa Isabel and San Gabriel da Cachoeira. Among the species traded are aracú (Leporinus spp), pacú (Characidae: Serrasalminae) and cichla or tucunaré (Cichla spp).

During the dry season, when the water level is low, fish are more concentrated and easier to catch. But when the rains come and the plains flood over the fish spread out and fishing becomes less productive.

It is estimated that 13 tons are fished during the dry season and only 3 tons during the rainy season.

In ornamental fishing, fishermen pick up little ornamental fish to supply the aquarium fish market. Among the countries that buy the most ornamental fish from Barcelos are Japan, the United States and Germany.

Fishing tourism

Sport fishing is recreational in nature. The activity is offered by the fishermen themselves and includes transportation to fishing areas, lodging and boat rental. Artisanal fishermen actually function as tourism guides. Sport fishers use fishing rods with reels and hooks. Although they sometimes they eat their catch, mostly they just throw it back in the water.

This activity has become a sustainable alternative to fisheries, since it coexists with other forms of fishing without causing great reductions in the fish stock. Sport fishing season runs from October to February, when the water is lower. The most appreciated fish is the tucunaré, because in addition to its bright colors it is strong and agile, which makes the sport that much more exciting. Tucunaré are carnivorous and feed on small fish. During their reproductive period they become   very protective of their territory, taking care of their eggs and hatchlings in nests built on the river bed.

And so the GEF Amazon - Water Resources and Climate Change Project advances knowledge on Amazonian aquatic ecosystems.

surveyed villages, fishermen colonies and fishing places.

The Negro basin drains an area of approximately 700,000 km2 and extends from the Andes Mountains in Colombia to the city of Manaus in Brazil.

Hydrosedimentology Course for Technicians of ACTO Member Countries

Participation of 30 technicians of ACTO Member Countries

Attended by 30 technicians specialized in water resources and sediment gauging networks, the Hydrosedimentology Course was offered from 5 to 9 August 2013 in Brasilia, Brazil. It was organized by the Amazonas Project: Regional Action on Water Resources that is implemented by the National Water Agency (ANA) and supported by ACTO and the GEF Amazon - Water Resources and Climate Change Project.

One of the course objectives was sharing knowledge about sediment enginee-ring and water basin studies.

Among the topics addressed were notions of hydrosedimentology, water basin studies and sediment gauging applications.

A field exercise to learn how to measure liquid discharge and sample suspended sediments was also part of the package. Other items included computing liquid and solid discharge using computer programs.

The course was offered by renowned specialists like Professor Newton de Oliveira Carvalho, author of the book Hidro-sedimentología Prática, Walszon Terllizzie Araujo Lopes, Hydrometeorological Data and Information Manager of the Brazilian National Water Agency, Maximiliano Andrés Strasser, PhD in Water Resources and Luiz Antonio Pereira Souza, PhD in Chemical and Geological Oceanography Sciences.

Source: GEF Amazon Project