



# AMAZON PROJECT

REGIONAL ACTION IN THE  
AREA OF WATER RESOURCES

**PHASE II**  
**EXECUTIVE SUMMARY**

PERMANENT SECRETARIAT OF THE AMAZON  
COOPERATION TREATY ORGANIZATION (SP/ACTO)

BRAZILIAN COOPERATION AGENCY (ABC) OF  
THE MINISTRY OF FOREIGN AFFAIRS

NATIONAL WATER AND BASIC  
SANITATION AGENCY OF BRAZIL (ANA)



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## PHASE II EXECUTIVE SUMMARY

BRASÍLIA, 2025

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# Contents

<b>FOREWORD</b>	<b>06</b>
<b>1. INTRODUCTION</b>	<b>08</b>
<b>2. PROJECT OBJECTIVES</b>	<b>12</b>
<b>3. PROJECT RESULTS</b>	<b>16</b>
<b>3.1</b> Exchange of information and experiences	<b>17</b>
<b>3.1.1</b> Water Resources Situation Room	<b>17</b>
<b>3.1.2</b> “Amazon Networks” and “Water Resources” modules of the Amazon Regional Observatory	<b>21</b>
<b>3.1.3</b> Systematization of SDGs 6 and 13 in the Amazon Basin	<b>23</b>
<b>3.1.4</b> Dissemination of successful initiatives in Water Resources Management in the Amazon Basin	<b>24</b>
<b>3.2</b> Support for the structuring of a regional monitoring network	<b>27</b>
<b>3.2.1</b> Amazonian Hydrological Network (AHN) Project	<b>27</b>
<b>3.2.2</b> Water Quality Network Project (WQN)	<b>30</b>
<b>3.2.3</b> Hydrological and water quality monitoring protocols	<b>31</b>
<b>3.2.4</b> Acquisition and installation of Data Collection Platforms	<b>33</b>
<b>3.2.5</b> Report on the State of Water Quality in the Amazon Basin	<b>35</b>
<b>3.3</b> Training of technicians and specialists	<b>37</b>



## **4. COORDINATION OF THE AMAZON PROJECT PHASE II WITH OTHER INITIATIVES**

40

**4.1** Amazon Basin GEF Project

41

**4.2** Amazon Summit

41

**4.3** Amazon Water Authorities Network – ANWA

42

**4.4** Amazon Regional Observatory – ORA

43

## **5. PROJECT MANAGEMENT AND LESSONS LEARNED**

44

## **6. CONCLUSIONS**

46




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# FOREWORD







We are pleased to introduce this executive summary of the second phase of the **Amazon Project: Regional Action in Water Resources**, which aimed to strengthen cooperation among Amazonian countries for the integrated management of water resources in the Amazon Basin.

This project was developed within the framework of the trilateral South-South cooperation partnership established between the Permanent Secretariat of the Amazon Cooperation Treaty Organization (ACTO), the National Water and Basic Sanitation Agency (ANA), and the Brazilian Cooperation Agency (ABC) of the Ministry of Foreign Affairs (MRE).

Phase I of the Amazon Project (2012 to 2017) contributed to strengthening coordination, technical knowledge exchange, and capacity building among Amazonian countries. Phase II (2017-2024), the subject of this executive

summary, developed actions to improve water resources monitoring, capacity building, and dissemination of information to managers and society.

The two phases of the Amazon Project are aligned with the Strategic Agenda for Amazonian Cooperation and the Amazon Cooperation Treaty, in which member countries have committed, among other things, to cooperate in promoting the rational use of water resources, an essential condition for the sustainable development of the basin where more than 33 million people live.

This executive summary shows the main results of the second phase of the Amazon Project, the lessons learned, and the main challenges for managing the Amazon Basin. We're sure this project has made significant progress that will have a lasting impact on the integrated management of Amazonian waters.

**Permanent Secretariat of the Amazon Cooperation Treaty Organization (ACTO)**

**National Water and Basic Sanitation Agency of Brazil (ANA)**

**Brazilian Cooperation Agency (ABC), Ministry of Foreign Affairs (MRE)**

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# 1. INTRODUCTION



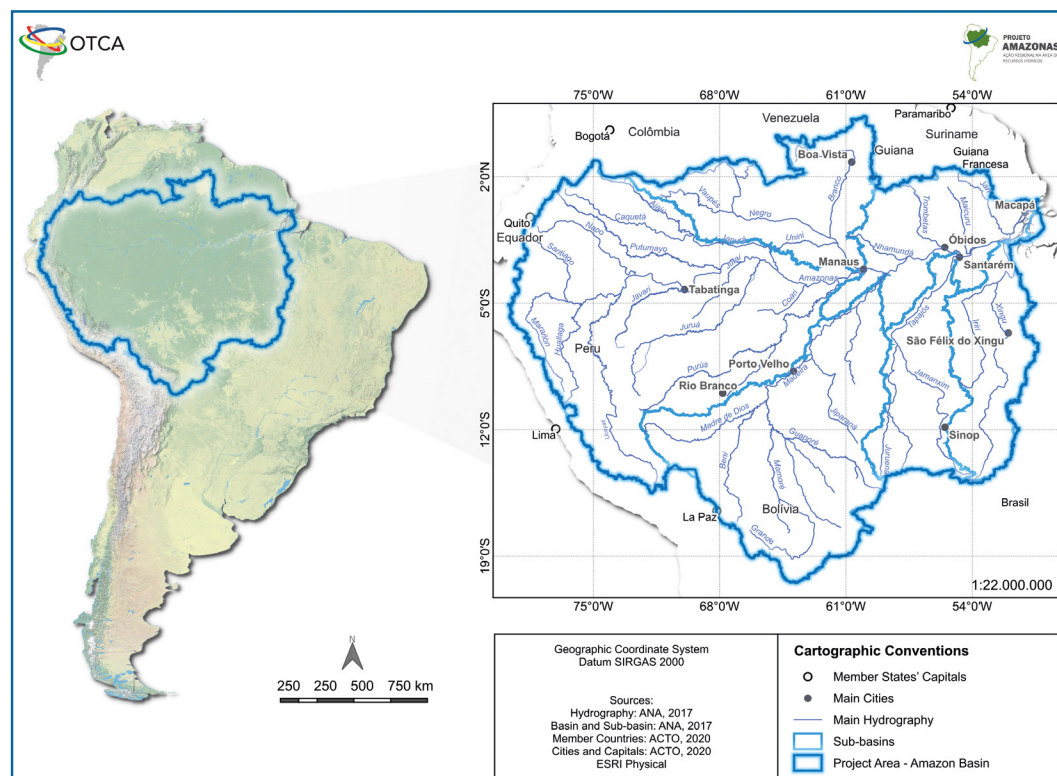
The Amazon Basin is the largest hydrographic basin in the world (5.9 million km<sup>2</sup>)\* and is shared by eight countries (Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, and Venezuela).

With the aim of promoting sustainable development in this region, the Amazon Cooperation Treaty was signed in 1978, under which the eight Amazonian countries made a joint commitment to preserve the envi-

ronment and use water resources rationally.

In 2002, the Amazon Cooperation Treaty Organization and its Permanent Secretariat were established, based in Brasília, with the aim of improving and strengthening the process of cooperation, coordination, and joint action among countries, as well as promoting sustainable development within the framework of the Amazon Cooperation Treaty.

**FIGURE 1. GEOGRAPHICAL LOCATION OF THE AMAZON BASIN**



Source: ACTO

\* In the Amazon Project, the delimitation of the Amazon Basin was established according to the Otto Pfafstetter method for the classification of hydrographic basins. For this reason, area and population data, among others, may be divergent from other ACTO projects that use another delimitation.



Proper management of the waters of the Amazon Basin requires hydrological and water quality monitoring data so that countries can prepare for critical events (droughts, floods, and pollution), as well as for planning in sectors that use water resources (hydroelectric power, human supply, waterway transportation, among others).

Considering the strategic importance of this issue, the Amazon Project: Regional Action in the Area of Water Resources was launched in 2012 within the framework of trilateral South-South cooperation. This is a joint initiative between the National Water and Basic Sanitation Agency (ANA), the Brazilian Cooperation Agency (ABC), and the Amazon Cooperation Treaty Organization (ACTO).

The objective of the Amazon Project is to contribute to the promotion of shared and sustainable water resources management in the Amazon Basin through the implementation of shared hydrometeorological monitoring networks and the structuring of a water resources database. Another objective of the project is to promote the dissemination of knowledge about the Amazonian reality, as well as to strengthen the capacities of institutions involved with water resources in ACTO member countries, based on Brazil's successful experiences in this area.

The actions of the Amazon Project are aligned with the Belém Declaration, adopted at the IV Meeting of Presidents of the States Parties to the Amazon Cooperation Treaty, held in Belém (PA) in August 2023.

This declaration points to the need to strengthen cooperation and harmonization of integrated hydrological monitoring systems in Amazonian countries for the generation of extreme event alerts.

The Belém Declaration also established the Amazon Network of Water Authorities (ANWA) of the ACTO Member States, whose objective is to establish regional protocols for monitoring, training, cooperation, and mutual support in the management of the Amazon Basin.

The Amazon Basin has experienced extreme weather events with increasing frequency and intensity, significantly impacting local populations and ecosystems. In 2014, the basin faced one of the worst floods in its history, with the Madeira River reaching record levels that caused large-scale flooding, population displacement, and damage to infrastructure.

In contrast, the years 2023 and 2024 were marked by a historic drought, with even more severe and lasting impacts caused by the El Niño phenomenon and the warming of the North Tropical Atlantic Ocean. In 2024, the rivers did not recover from the previous year's drought, and the levels of the main rivers reached historic lows.

These events reinforce the need to improve hydrological monitoring systems and integrate countries in actions to adapt to extreme weather events. In this sense, the Amazon Project is strategically important in the context of regional cooperation and the adaptation of countries to climate change.










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## --- 2. PROJECT OBJECTIVES







The first phase of the Amazon Project (2012-2017) aimed to strengthen the capacities of technicians and specialists from water agencies in Amazonian countries, establish a pilot hydrological monitoring network, and exchange information systems among ACTO member countries. The project was carried out over five years as a trilateral South-South cooperation initiative with a budget of R\$ 4 million, financed by the National Water and Basic Sanitation Agency (ANA). The results of this phase are contained in the publication ["Amazon Project – Regional Action in the Area of Water Resources,"](#) published in 2017.

The second phase of the Amazon Project (2017-2025) expanded the activities developed in the first phase, contributing, through South-South cooperation, to the promotion of shared and sustainable water resources management in the Amazon Basin. This stage of the project also aimed to strengthen the technical capacity of ACTO member countries' institutions for integrated water resources management.

The Amazon Project Phase II was signed in December 2016, with funds in the amount of R\$ 6.19 million from the ANA budget, and began in 2017.

The project funds were invested by ACTO in CDBs (Bank Deposit Certificates) that yielded R\$ 2.67 million between 2017 and 2024, which were incorporated into the project budget in the revisions carried out in 2020, 2022, 2023, and 2024.

In 2023, with a view to continuing the planned activities and ensuring their full implementation, ANA made an additional contribution of R\$ 730,000 to the project.

The Amazon Project Phase II was developed in accordance with the principles of Brazilian South-South cooperation, with responsibilities defined among the partner institutions.

In accordance with its institutional mandate, ABC/MRE was responsible for planning, coordinating, negotiating, approving, executing, monitoring, and evaluating the project.

ANA, in addition to financing the project, was responsible for the execution, management, and technical monitoring of the planned activities.

The Permanent Secretariat of ACTO (PS/ACTO) was responsible for the administrative and financial implementation and execution of the project, as well as coordination with the agencies responsible for water resources management in ACTO member countries.

The Amazon Project Steering Committee consisted of four members, representing ANA, ABC/MRE, and ACTO, with the political unit responsible for South America (DAS II) in the Ministry of Foreign Affairs (MRE) acting as an observer member. Throughout the project's implementation, the Steering Committee evaluated the initiative's progress annually and planned activities for the following year.

The diagram illustrates the institutional articulation mechanism for the Amazon Project. It features several interconnected components:

- MRE (ABC and DAS II\*)**: A light blue rounded rectangle at the top center.
- \*PROJECT STEERING COMMITTEE (strategic level)**: A dark blue rounded rectangle on the left.
- ACTO**: A light blue rounded rectangle in the center.
- BENEFICIARY ACTO MEMBER COUNTRIES**: A dark blue rounded rectangle on the right.
- AMAZON PROJECT NATIONAL COORDINATOR**: A green rounded rectangle at the bottom center.
- ANA**: A light blue rounded rectangle at the bottom left.

The flow of information and coordination is as follows:

- Institutional Articulation** (solid blue arrows):
  - From **MRE** to **\*PROJECT STEERING COMMITTEE** and **BENEFICIARY ACTO MEMBER COUNTRIES**.
  - From **ACTO** to **\*PROJECT STEERING COMMITTEE** and **BENEFICIARY ACTO MEMBER COUNTRIES**.
  - From **ANA** to **\*PROJECT STEERING COMMITTEE** and **AMAZON PROJECT NATIONAL COORDINATOR**.
- Institutional Articulation** (dashed red arrows):
  - From **AMAZON PROJECT NATIONAL COORDINATOR** to **ACTO** and **BENEFICIARY ACTO MEMBER COUNTRIES**.
  - From **BENEFICIARY ACTO MEMBER COUNTRIES** to **MRE**.

A note at the bottom right states: **\*Observer**.

\*Observer

## The Amazon Project Phase II has three main areas of focus



### **EXCHANGE OF INFORMATION AND EXPERIENCES FOR WATER RESOURCES MANAGEMENT IN THE AMAZON BASIN**

This axis includes the implementation of the Water Resources Situation Room at ACTO, the “Water Resources” and “Amazon Networks” modules of the Amazon Regional Observatory (ORA), the systematization of Sustainable Development Goals (SDGs) number 6 (Clean Water and Sanitation) and 13 (Climate Action), and the dissemination of successful initiatives in Water Resources Management in the Amazon Basin.



### **SUPPORT FOR THE STRUCTURING OF A REGIONAL MONITORING NETWORK THAT ENABLES THE EXCHANGE OF HYDROLOGICAL, HYDROMETEOROLOGICAL, AND WATER QUALITY INFORMATION**

This axis includes the Amazon Hydrological Network (AHN) and Water Quality Network (WQN) projects, monitoring protocols, the Report on the Status of Water Quality in the Amazon Basin, and the acquisition and installation of Data Collection Platforms (DCPs) in Bolivia and Peru.



### **TRAINING OF TECHNICIANS AND SPECIALISTS FROM WATER RESOURCES MANAGEMENT AGENCIES IN THE REGION, ESPECIALLY ON TOPICS RELATED TO QUANTITATIVE AND QUALITATIVE WATER MONITORING, EXTREME EVENTS (FLOODS AND DROUGHTS), AND TRANSBOUNDARY WATER RESOURCES MANAGEMENT**

This axis comprises courses, technical meetings, and events to promote the project.



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## --- 3. PROJECT RESULTS





## 3.1 EXCHANGE OF INFORMATION AND EXPERIENCES

### 3.1.1 Water Resources Situation Room

A Water Resources Situation Room has been established at ACTO with the aim of monitoring the hydrological and meteorological conditions of the Amazon Basin. Its function is to identify critical events and provide essential input for decision-making, enabling the early adoption of mitigation measures to address the impacts of droughts and floods. In situations of extreme events, the room functions as a crisis management center, facilitating coordination between the responsible institutions of the countries involved, such as water agencies, civil defense, etc.



















The Water Resources Situation Room is part of ACTO's Amazon Regional Observatory and receives hydrological, climatic, and water quality monitoring data sent by countries through the "Amazon networks" module, described in item 3.1.2. The situation room should work in an integrated manner with the existing situation rooms in the Amazonian countries, in addition to being able to connect with future rooms to be implemented.

Through the Amazon Project Phase II, equipment was purchased for the Situation Room (video wall, computers, videoconferencing system, projector, and projection screen). Given the need for a specialized technician to operate the room and support ANA in monitoring, controlling, and collecting hydrometeorological information, the project also financed the hiring of a technical analyst for a period of one year, to be based at ACTO headquarters.

This technical analyst remained with the Amazon Project from January 2022 to July 2023, and was absorbed by the GEF [Amazon Basin Project](#) - a regional initiative of the eight ACTO member countries, financed by the Global Environment Facility (GEF), implemented by the United Nations Environment Programme (UN Environment) and executed by the Permanent Secretariat of the Amazon Cooperation Treaty Organization (SP/ACTO), beginning in August 2023.

In 2022, the need to hire a geoprocessing analyst was identified to work on the development and management of georeferenced products from the Situation Room, assisting in their respective monitoring. The analyst began his activities in August 2022.

Among the main results produced by the Situation Room to date, the following stand out:

	Structuring of the geospatial database of water resources.
	Semi-automated hydrological bulletins (daily and monthly).
	Automated hydrological alert notification.
	Technical manual for receiving geospatial data and structuring thematic maps.
	Updating the geometries of the maps in the Hydrological Vulnerability Atlas.
	Monitoring of hydrometeorological conditions and remote sensing.
	ENSO bulletin: impacts on the Amazon Region.
	Monthly and annual inventory of the situation room.
	Drought reports.
	Guide to georeferencing images without projection.
	Guide to creating a hydro estimator map: data handling instructions.
	Guide to creating IMERG maps and interpolating rainfall data (IDW method).
	Situation room operating manual.
	DCP maintenance manual.
	Station status error report.
	Terms of reference for DCP acquisition.
	Hydro estimator maps (study area and basin).
	Water status map.

**FIGURE 3.** WATER RESOURCES SITUATION ROOM AT THE HEADQUARTERS OF THE PERMANENT SECRETARIAT OF ACTO IN BRASILIA (DF)



Photo: ACTO image bank

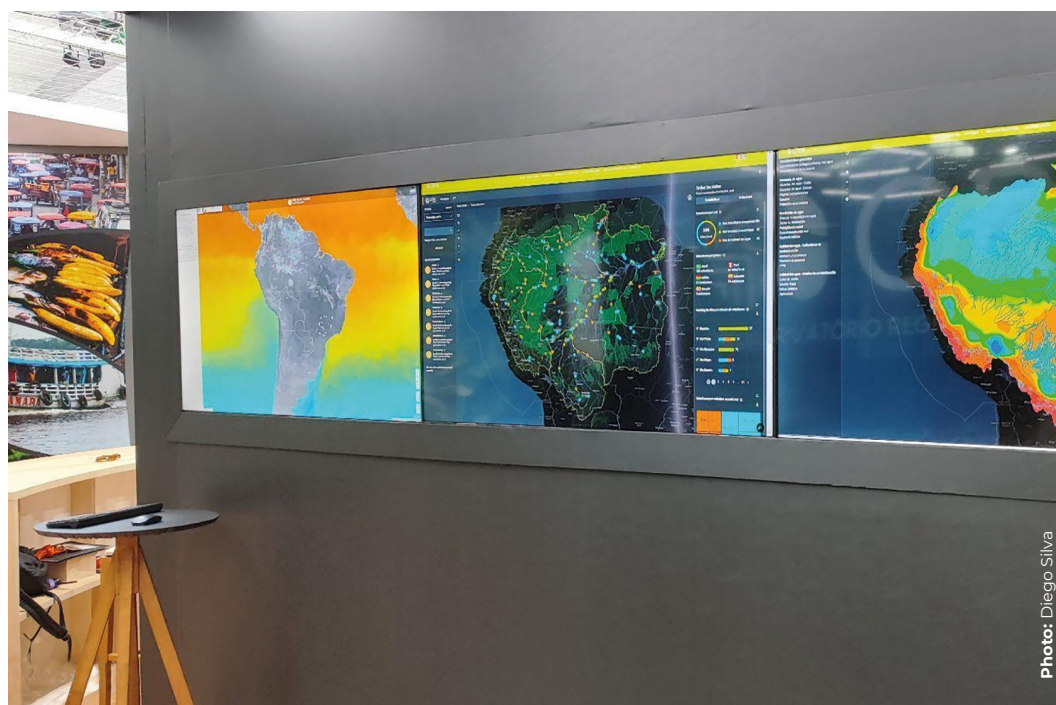


### **AMAZON DIALOGUES**

During the Amazon Dialogues, an event held in Belém (PA) between August 4 and 6, 2023, as part of the pre-Amazon Summit program, a replica of the Situation Room was set up at the ACTO booth. Lectures were given on the results of the Amazon Project Phase II and the functionalities of the Situation Room.



**FIGURE 4.** ACTO BOOTH AT THE “AMAZON DIALOGUES” EVENT IN BELÉM (PA)



### 3.1.2 “Amazon Networks” and “Water Resources” modules of the Amazon Regional Observatory

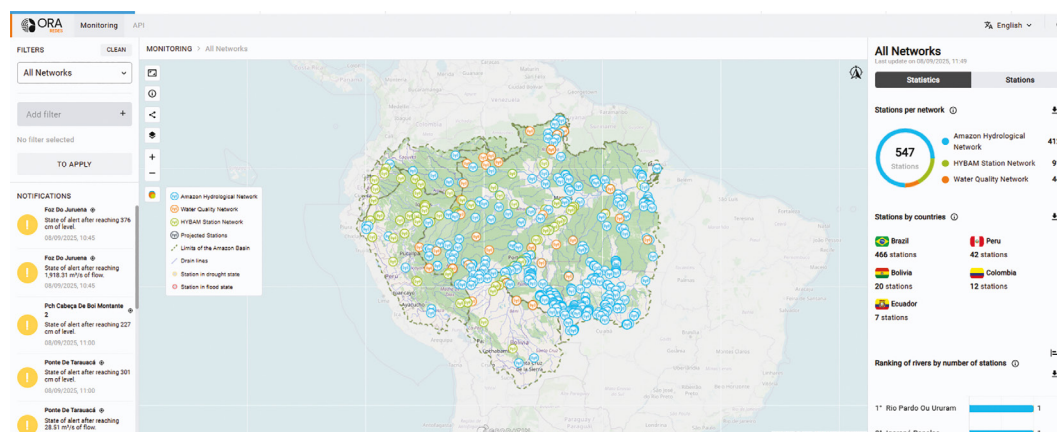
The Amazon Networks Module is an integral tool of the Amazon Regional Observatory (ORA), managed by the Permanent Secretariat of the Amazon Cooperation Treaty Organization (SP/OTCA), which provides access to telemetry and conventional station data collected by ACTO member countries through the compilation of data on rainfall, river levels and flows, as well as information on levels, and volumes of various reservoirs in the Amazon basin.

It is an important tool for society and for public and private institutions, since the data collected by hydrometeorological stations is essential for water resources management and various economic activities, such as power ge-

neration, irrigation, navigation, and industry, as well as the design, maintenance, and operation of small and large hydraulic infrastructures, such as dams, urban storm drainage, and even manholes and roofs.

This information also makes it possible to monitor the occurrence of critical hydrological events, such as floods and droughts, and to plan measures to mitigate the impacts of these events. More than just monitoring these phenomena, in many cases the data set also allows for the simulation and prediction of hydrological events and their impacts on urban or rural areas in various river basins.

**FIGURE 5. AMAZON NETWORKS MODULE OF THE AMAZON REGIONAL OBSERVATORY**



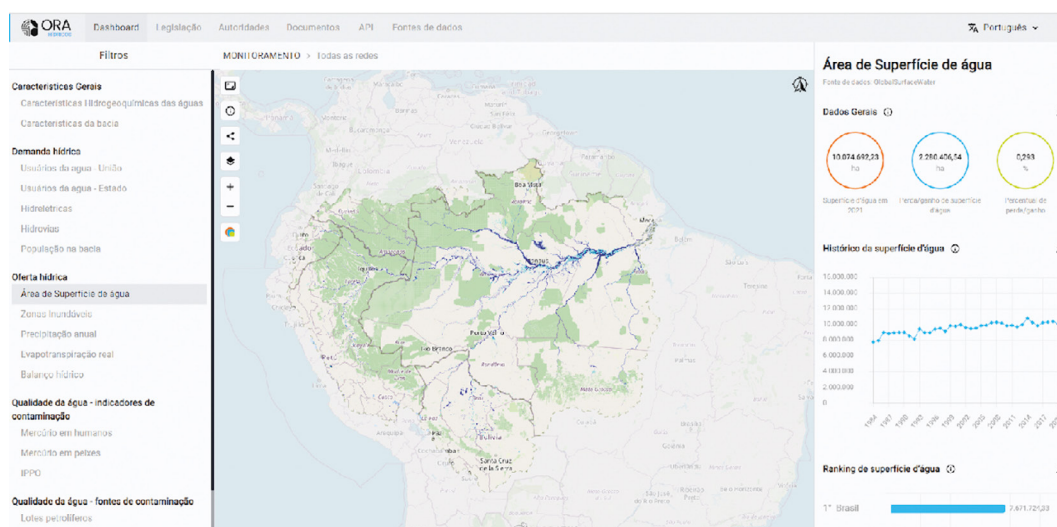
Source: ACTO.



The Amazon Networks module is a tool that allows water resources monitoring data to be viewed in the situation room and on the ORA website.

Through this module, data is viewed in near real time, facilitating the rapid identification of critical events such as floods and droughts.

**FIGURE 6. WATER RESOURCES MODULE OF THE AMAZON REGIONAL OBSERVATORY**



Source: ACTO.

The Water Resources module allows users to view geographic, documentary, and statistical information on various topics, including general characteristics of the basin, water availability and demand, water quality, sources of water contamination, and mercury levels in fish and humans.

The two modules offer different formats for viewing information, including dashboards and graphs. For the development and implementation of these modules, a consulting firm was hired to conduct a comprehensive assessment of the databases, information systems, and information technology (IT) infrastructure used

in the management of hydrological data in Amazonian countries. In addition, a database was developed that includes historical information on river levels and flows. The consulting firm's technicians also conducted a mission to Peru and Bolivia to evaluate the geospatial information systems of those countries.

The Water Resources thematic module and the Amazon Networks integrator module were integrated into the ORA in the first quarter of 2023, after their functionalities and operability were presented to member countries.

### 3.1.3 Systematization of SDGs 6 and 13 in the Amazon Basin

The United Nations (UN) 2030 Agenda proposes 17 Sustainable Development Goals (SDGs) and 169 related targets, approved by all Amazonian countries, to be implemented between 2016 and 2030. The targets

are monitored through a framework of global indicators from the United Nations Statistical Commission, which provides a historical overview and comparative analysis of each country's results.

**FIGURE 7.** SUSTAINABLE DEVELOPMENT GOALS 6 AND 13



Source: ONU.

SDG 6 (Drinking Water and Sanitation) aims to “ensure availability and sustainable management of water and sanitation for all,” addressing issues of water resources management, water, and sanitation from an integrated perspective. SDG 6 consists of eight specific targets and a set of indicators linked to issues of water resources availability, water demand and use for human activities, actions to conserve aquatic ecosystems, waste reduction, and access to water supply, sewage, and wastewater treatment.



Source: ONU.

SDG 13 (Action Against Global Climate Change) aims to take urgent action to combat climate change and its effects, incorporating issues related to mitigation, adaptation, and risk management. SDG 13 consists of five specific targets and a set of indicators linked to the themes of national risk reduction strategies, integrated climate change adaptation plans, climate change mitigation, among others.

**The study systematizing SDGs 6 and 13 in the Amazon Basin had the following objectives:**

- Establish a conceptual, methodological, and indicator framework to systematize the fulfillment of SDG 6 and 13 targets in the Amazon Basin region, including at the national level of Amazonian countries and at the regional level;
- Extensively review quantitative and qualitative data and information on progress in fulfilling SDG 6 and 13 in ACTO member countries;
- Systematize the fulfillment of SDG 6 targets for the Amazon Basin region, identifying the regional measures and actions necessary to achieve them by 2030;
- Systematize compliance with SDG 6 indicator 6.5.2 in the Amazon Basin region, which addresses the proportion of transboundary river basins covered by an operational agreement for water cooperation;
- Present the results in different formats that allow sharing to the relevant United Nations entities, ACTO member countries, and for general dissemination.

It is important to highlight the global efforts made to advance the monitoring of the SDGs of the United Nations 2030 Agenda for Sustainable Development, through Sustainable Development Reports and the establishment of a global database on progress in the indicators of the United Nations Statistics Division.

At the national level, some Amazonian countries have also made progress in producing national reports, particularly with regard to progress in meeting SDG 6. However, there is still a lack of support for progress in meeting the SDGs at the regional level, particularly in the Amazon Basin region.

### **3.1.4 Dissemination of successful initiatives in Water resources Management in the Amazon Basin**

The purpose of this activity was to recognize the merit of initiatives that stood out for their contribution to the sustainable use of water resources in the Amazon Region, promoting the strengthening of management.

The activity also sought to point out paths for regional cooperation in the area of water resources and climate change, contributing to:

- Building consensus and raising awareness of the importance of sharing experiences and information for effective water resources monitoring;
- Consolidating a favorable environment for sharing information related to water resources management; and
- The importance of coordination between institutions in the region on hydrology and water resources issues, contributing to the strengthening of views on the importance of regional management and coordination.

The Amazonian countries presented projects and initiatives that addressed issues related to water resources, such as transboundary management, early warning systems, monitoring, and information systems.

An evaluation committee formed for this purpose identified and selected eight initiatives considered successful, according to predefined criteria and in accordance with the proposed selection methodology.

After the selection, representatives of the initiatives were invited to present their projects during the 8th World Water Forum (Brasília, 2018), whose mission was to promote knowledge, create political commitment, and drive action on critical water issues at all levels.

**FIGURE 8. REPRESENTATIVES OF AMAZONIAN COUNTRIES AT THE 8TH WORLD WATER FORUM, BRASILIA**



Photo: ACTO image bank



The initiatives selected and presented at the 8th World Water Forum were:

- **Educational Routes of the Andean and Sub-Andean Microbasins (Bolivia)**: integration of popular knowledge and scientific knowledge in educational and recreational activities in communities, involving more than 20,000 families;
- **MAP Initiative (Madre de Dios-Peru, Acre-Brazil, and Pando-Bolivia)**: A tri-national project created in 2000 that promotes cross-border cooperation through inter-municipal consortia, a tri-national committee of border municipalities, and environmental monitoring tools such as the TER-RAMAR 2 platform, which monitors rainfall, heat, deforestation, and landslides, allowing natural disasters to be anticipated;
- **Anaconda River Traveling Classroom (Colombia)**: school-boat equipped with satellite internet, workshops, and environmental communication that trained more than 10,000 people and created 12 environmental committees and 3 documentaries to record the activities that took place between 2012 and 2015;
- **Sustainable Livestock Management in the Department of Putumayo (Colombia)**: incentives for converting pastureland into silvo-pasture systems and payment for environmental services, resulting in the recovery of 660 hectares and protection of 210 km of water sources;
- **Coca SAT Early Warning System (Ecuador)**: active monitoring platform for the Paiamino, Coca, and Napo rivers, which issues water risk bulletins to the National Risk Management Secretariat, saving lives and preventing disasters;
- **Creation of the Rio Mayo Committee (Peru)**: strengthening local water governance through participatory analysis, public policy development, and institutional design based on the Water Resources Law;
- **Sowing and Harvesting Water (Peru)**: Reforestation techniques using native species and infiltration ditches increased water availability by 300,000 m<sup>3</sup>, benefiting 6,500 people with improved irrigation practices;
- **Coastal Protection with Natural Technologies (Suriname)**: restoration of mangroves using bamboo structures that retain sediment and create artificial nurseries, counteracting coastal erosion that had already receded 200 meters from the coastline in 20 years.



## 8TH WORLD WATER FORUM

During the 8th World Water Forum, the publication [Amazon Project – Successful Initiatives in Human Resources Management](#) and a [footage](#) of this activity were launched.

**FIGURE 9.** PUBLICATION “AMAZON PROJECT – SUCCESSFUL INITIATIVES IN WATER RESOURCES MANAGEMENT”



Photo: ACTO image bank

## 3.2 SUPPORT FOR THE STRUCTURING OF A REGIONAL MONITORING NETWORK

### 3.2.1 Amazon Hydrological Network (AHN) Project

In November 2018, a technical meeting was held in Brasília entitled “Discussions on progress in establishing the Amazon Basin Regional Hydrometeorological Network.” The event was attended by 12 representatives

from member countries, who discussed objectives and criteria for detailing the regional network, as well as proposals for the storage and dissemination of hydrometeorological data.



As a result of this technical meeting, ANA and the Geological Service of Brazil (SGB) developed a proposal for a Amazon Hydrological Network (AHN) throughout 2019, based on information provided by the countries.

The establishment of an Amazon Hydrological Network (comprising all countries that share the basin, aims to institute a system for data exchange and harmonize operational procedures. The goal is to ensure the quality, timeliness, and comparability of hydrometeorological data generated in the basin for integrated water resources management.

In 2020, in light of the COVID-19 pandemic, the technical meetings on the AHN project, which were to be held in person in the countries, had to be rescheduled to a virtual format, divided into two stages.

The first meetings presented the background of the AHN, its design proposal, and the proposed strategies for the installation and operation of the Network. In the second phase, the countries deepened the discussion on the installation proposal, identifying and sharing possibilities and also possible difficulties for each country. These virtual meetings were held with the par-

ticipation of technicians and authorities linked to water resources management.

A second technical meeting to consolidate the AHN proposal was held virtually on June 15, 2021, with the participation of approximately 59 representatives from all Amazonian countries. During the meeting, most countries validated the AHN proposal at a technical level, incorporating the adjustments to the location of the stations suggested during the meeting.

The AHN was designed in a participatory manner with the involvement of ACTO member countries through technical discussions, information exchange, training, and meetings attended by key stakeholders in the water resources sector of Amazonian countries, as well as their diplomatic bodies.

The design of the AHN was defined based on two priority objectives: border control and water balance. With regard to border control, the objective is to quantify and qualify water sharing and transfer in order to enable management and the establishment of indicators between border countries. With regard to water balance, the objective is to acquire information on the volumes of water drained in the basin as essential data to support integrated water resources management.



### POINTS ON THE MAIN RIVERS OF THE AMAZON BASIN

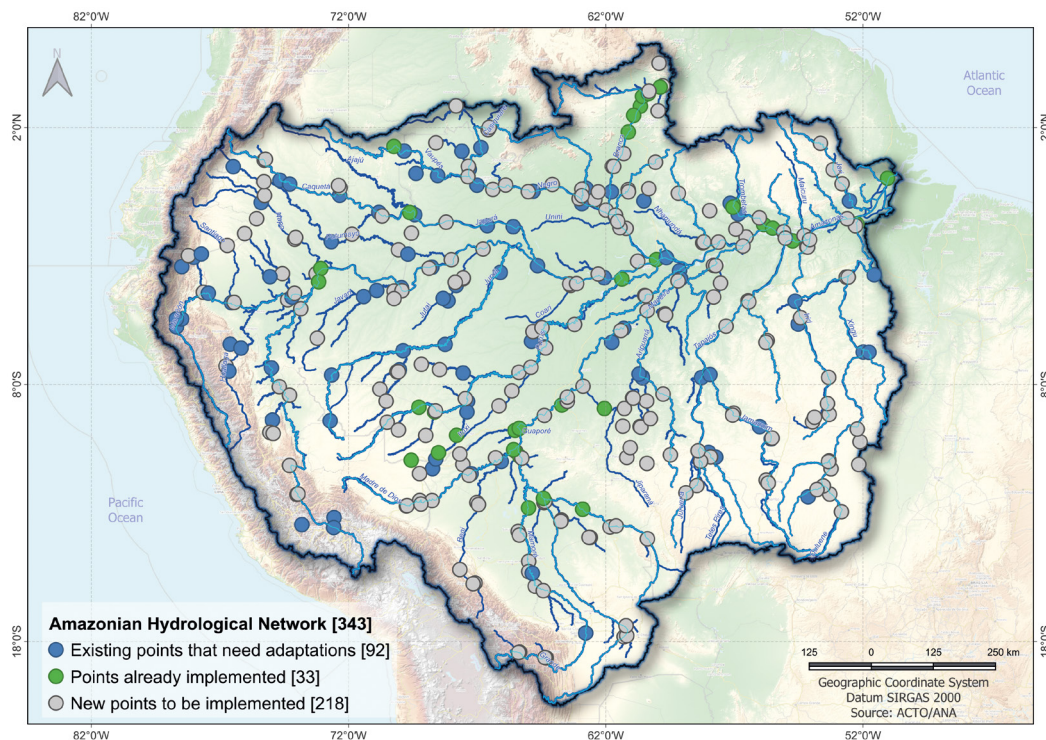
The **AHN project provides for 343 monitoring points on the main rivers of the Amazon basin**: Madre de Dios, Beni, Ucayali, Putumayo, Amazonas, Solimões, Xingu, Madeira, Tapajós, Negro, Juruá, Purus, among others.

Of the 343 proposed points, 33 are already in place. Another 92 points already exist but require facility adaptations. The remaining 218 new points will be implemented gradually, in a partnership between ACTO and the countries.

The implementation of the AHN will make essential data available for water resources management in order to improve knowledge of the basin's

hydrology, provide data for water balance calculations, support the assessment and mitigation of the effects of climate change, among others.

**FIGURE 10. PROPOSAL FOR THE AMAZON HYDROLOGICAL NETWORK**



Source: ACTO.

The AHN will also contribute with reference information for conflict management, information for hydraulic

works projects with transboundary impacts, and information for critical event management.

### 3.2.2 Water Quality Network (WQN) Project

The Water Quality Network (WQN) Project was developed with the aim of generating harmonized, validated, and systematized regional information on water quality in the Amazon Basin. The WQN also aims to assess the spatial and temporal variability of water quality and support efficient, integrated, and comprehensive management of water resources in the basin.

During the development of the WQN project, a consulting firm was hired to hold meetings with each country individually and also a regional technical meeting in February 2021, with the participation of technicians from all countries in the Amazon region.

Three types of monitoring points were defined in the WQN project:

- Strategic point: located in areas of jurisdictional change between countries;

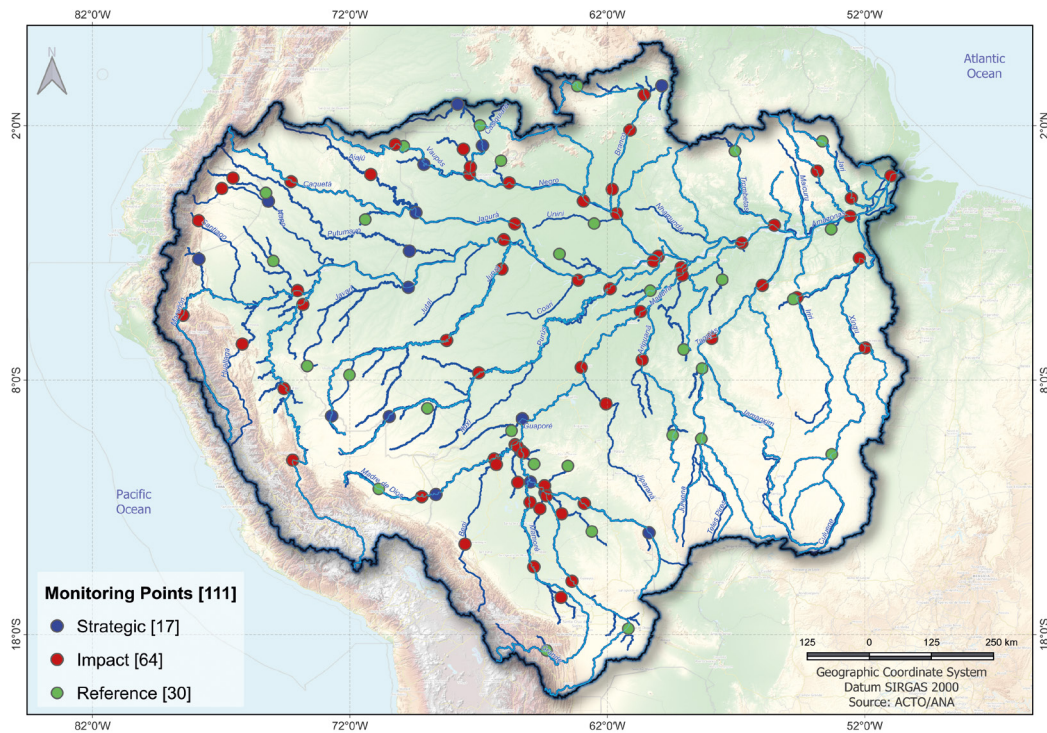
- Impact points: located in areas of anthropogenic impact (pollution);
- Reference point: located in natural areas that have undergone little change and have no significant sources of pollution.

The monitored parameters are pH, electrical conductivity, dissolved oxygen, temperature, turbidity, total dissolved solids, total suspended solids, ammoniacal nitrogen, nitrate, total phosphorus, orthophosphate, and soluble reactive phosphorus.

The WQN project provides for two annual collections, corresponding to the rainy and dry seasons in the Amazon Basin.

The WQN provides for the implementation of 113 monitoring points (Figure 11). As proposed in the Hydrological Network, the implementation of the WQN will occur gradually, in partnership between ACTO and the countries involved.

**FIGURE 11. PROPOSAL FOR THE AMAZON WATER QUALITY NETWORK**



Source: ACTO.

### 3.2.3 Hydrological and water quality monitoring protocols

After developing the Amazon Hydrological Network and Water Quality Network projects, it was identified that there was a need to establish a regional protocol with guidelines for the installation, adaptation, and operation of monitoring stations, in addition to specifying the parameters to be monitored.

The development of these protocols had the following objectives:

- Identify and propose arrangements (flows and responsibilities), considering the entities and/or institutions potentially responsible for the implementation, operation, and publication of AHN and WQN data;
- Identify and list the training needs of the teams and their costs, considering local specificities, with a view to leveling technical and operational capacities;
- Propose a regional protocol for field analysis, sample collection, and laboratory analysis for the WQN;
- Estimate the overall costs for the implementation (installation and/or adaptation), operation, and publication of AHN and WQN data for existing and planned stations.



To develop these protocols, a consulting firm evaluated those used by Amazonian countries and protocols used by international organizations, such as the World Meteorological Organization. Interviews were conducted with those responsible for managing national monitoring networks, and workshops were held involving all Amazonian countries.

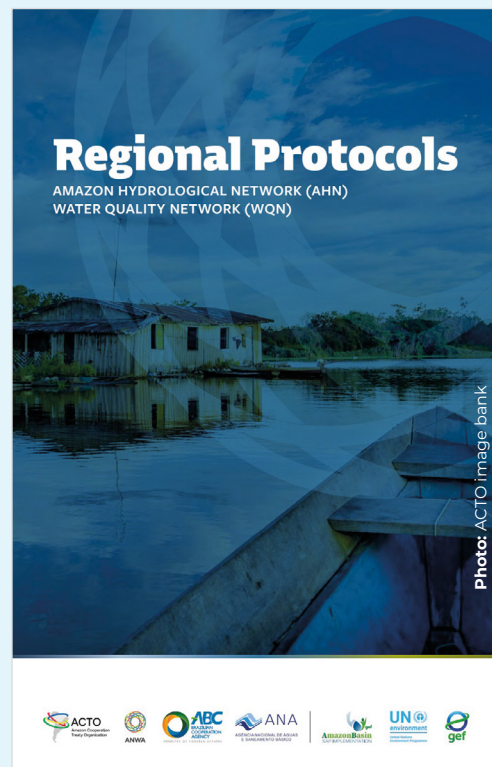
The consulting firm's work was carried out between January 2022 and

November 2023. In January 2024, a workshop was held in which the countries approved the proposed protocols. Subsequently, the proposed protocols were included in the work agenda of the Amazon Network of Water Authorities ([ANWA](#)), described in item 4.3. At the 3rd ANWA meeting, held on April 25, 2025, in Santa Cruz de la Sierra, Bolivia, the following protocols were approved by the countries.

### REGIONAL PROTOCOLS APPROVED BY THE AMAZON NETWORK OF WATER AUTHORITIES (ANWA)

At the 3rd ANWA meeting, held on April 25, 2025, in Santa Cruz de la Sierra, Bolivia, the following protocols were approved by the countries:

- Regional protocol for the adaptation, installation, and operation of stations belonging to the Amazon Hydrological Network and the Water Quality Network;
- Regional protocol for field analysis and sample collection;
- Regional protocol for the treatment, availability, and publication of data generated by the Amazon Hydrological Network and the Water Quality Network;
- Protocol to guide the flows of responsibility for the implementation, operation, and publication of data from the Amazon Hydrological Network and the Water Quality Network.

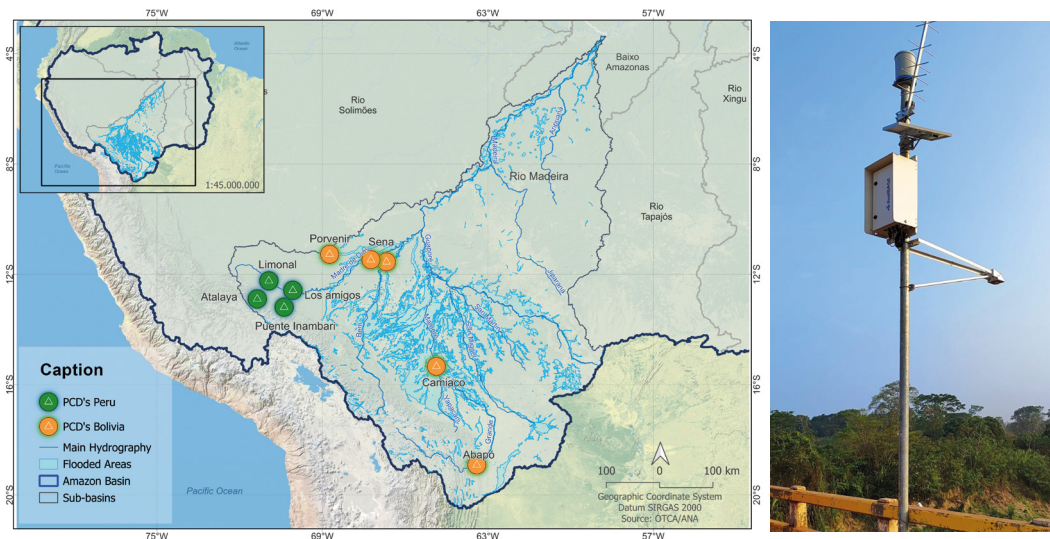


### 3.2.4 Acquisition and installation of Data Collection Platforms

The Madeira River basin is the main tributary of the Amazon River and faces critical episodes of flooding and drought. In 2013/14, the Madeira River reached a historic high of 19.14 meters, while in 2023, it recorded a historic low of 1.20 meters during a drought.

To improve monitoring in this critical area, the Amazon Project donated nine Data Collection Platforms (DCPs), which will function as hydro-metric stations to measure river levels, precipitation, and river flows. Of these, five were sent to Bolivia and four to Peru (Figure 12).

**FIGURE 12.** MAP SHOWING THE LOCATIONS OF DATA COLLECTION PLATFORMS (DCPs) IN PERU (BLUE DOTS) AND BOLIVIA (GREEN DOTS) (LEFT). PHOTO OF THE DCP INSTALLED AT THE SENA STATION, MADRE DE DIOS RIVER (BOLIVIA) (RIGHT)



**Obs.:** photo of the DCPs installed at the Sena station, Madre de Dios river (Bolivia) (right)  
**Source:** ACTO.



DCPs are essential for water resources management and monitoring, enabling a better understanding of hydrological patterns through early detection of extreme weather events, forecasting floods and droughts, and facilitating the development of management strategies and decision-making. Their use is vital for sustainable water resources management, enabling proactive action in risk scenarios and contributing to the preservation of ecosystems and riverside communities.

The installation of DCPs on the Beni (Bolivia) and Madre de Dios (Peru) rivers was planned taking into account the peculiarities of the Andes Mountains. The high flow velocity of these rivers, from the mountain range to the Amazonian plains, required some civil works to ensure the correct installation of the equipment, preventing risks related to water pressure that could compromise the integrity and functioning of the devices.

In meetings with the National Meteorology and Hydrology Service of Peru (SENASA-Peru) and the National Meteorology and Hydrology Service of Bolivia (SENASA-Bolivia), the locations for the installation of the DCPs were identified (as shown

on the map). In October 2022, SENAMHI-Peru technicians conducted a mission to the Madre de Dios river basin to survey the installation sites. In Bolivia, the DCPs will be installed in locations where conventional stations already existed, which were upgraded to automatic stations.

After defining the locations, the technical specifications of the equipment were discussed with Bolivia and Peru, and the Terms of Reference for the acquisition of the DCPs were drawn up. The acquisition also included spare parts, such as sensors and antennas, to ensure the maintenance of the equipment donated in phases 1 and 2 of the Amazon Project.

The installation process of the DCPs in Bolivia took place in 2024. A specialized ACTO technician accompanied this phase, supervising the installation and providing a training course on preventive maintenance of the equipment for local technicians.

In Peru, the DCPs were acquired and installed in 2025 at four monitoring points in the Madre de Dios River basin (Figure 12). A consultant was hired by the project to monitor the installation process and start-up of these DCPs.



#### **DATA GENERATED BY THE DCPs**

The data generated by the DCPs are sent in real time to the Amazon Regional Observatory and can be used by the ACTO Water Resources Situation Room and by the three countries of the Madeira River Basin (Brazil, Bolivia, and Peru). This will enable the establishment of an early warning system for floods, supporting civil defense agencies in protecting populations vulnerable to these events.

### 3.2.5 Report on the Status of Water Quality in the Amazon Basin

The [Report on the State of Water Quality in the Amazon Basin](#) developed under the Amazon Project, was the result of joint work by institutions in Amazonian countries responsible for public policies on the environment and water resources management, which provided monitoring data from their national networks.

The document shows the main factors that impact the quality of Amazonian waters, resulting in biodiversity loss, an increase in waterborne diseases, a reduction in fishing, and the loss of tourism, cultural, and landscape values, among others.

**FIGURE 13.** REPORT ON THE STATUS OF WATER QUALITY IN THE AMAZON BASIN



The report presents a characterization of the main pressures on Amazonian waters, such as illegal mining, domestic sewage, deforestation, and oil exploration. It also provides a comprehensive assessment of the quality of the basin's waters, considering their natural conditions, the need to improve water quality moni-

toring, and data exchange between countries.

The purpose of this report was to inform society, thereby contributing to the establishment of public policies aimed at the protection, recovery, and monitoring of aquatic ecosystems.

On March 22, 2023, during the United Nations Water Conference in New York, the [Report on the State of Water Quality in the Amazon Basin](#) was released at the event "Cross-border cooperation and science for sustainable water management in the Amazon." The launch was attended by Bolivian President Luis Arce, ANA Director President Verônica Cruz, and ACTO Secretary General Alexandra Moreira.

**FIGURE 14.** EVENT ENTITLED "CROSS-BORDER COOPERATION AND SCIENCE FOR SUSTAINABLE WATER MANAGEMENT IN THE AMAZON" HELD DURING THE UNITED NATIONS WATER CONFERENCE IN NEW YORK



Photo: ACTO image bank



**UN**  
**2023 WATER**  
**CONFERENCE**

NEW YORK  
22-24  
MARCH  
2023

### 3.3 CAPACITY BUILDING

Technical training Capacity building was one of the main components of Phase II of the Amazon Project. The classroom courses offered covered theoretical and practical concepts of flow monitoring, water quality, and sediments.

The project supported the participation of technicians from Amazonian countries in the following classroom in-person courses:

COURSE NAME	LOCATION	NUMBER OF PARTICIPANTS	YEARS
International Course on Liquid Discharge Measurement in Large Rivers	Manacapuru (AM)	24	2017, 2018 e 2019
Course on Water and Sediment Sample Collection and Preservation	São Paulo (SP)	25	2018 e 2109
Course on Water Quality Monitoring and Diagnosis	São Paulo (SP)	14	2018, 2019
Course on Water Law in Light of Governance	Brasília (DF)	38	2019
Course on Hydrosedimentology for Technicians from ACTO Member Countries	Brasília (DF)	16	2019

**FIGURE 15.** PARTICIPANTS IN THE TRAINING COURSES PROMOTED BY THE AMAZON PROJECT PHASE II



Photos: ACTO image bank



Considering the aforementioned in-person courses, 124 technicians from Amazonian countries were trained by the Amazon Project Phase II.

Between March 2020 and May 2023, with the onset of the COVID-19 pandemic, in-person courses were suspended. During this period, distance learning courses offered by the National Water and Basic Sanitation Agency (ANA) were made available to Amazonian countries:

- Water quality in reservoirs;
- Codification of watersheds using the Otto Pfaffstetter method;
- Territorial management for water resources using free, open-source software;
- Water governance in Latin America;
- River Basin planning and management.

In-person training resumed in 2024 with the training of technicians from Bolivia on the operation and maintenance of Data Collection Platforms, donated to these countries under the Amazon Project Phase II.

Throughout the project, technical meetings were also held, such as the “Exchange of knowledge and experiences on Surface Water Quality Monitoring Networks and Systems in the Amazon Region

and Introduction to Spatial Hydrology Techniques,” held in 2018 and 2019 in Brasília (DF).

The Amazon Project Phase II supported the participation of technicians from Amazonian countries in the 1st Amazon Hydrology Seminar, held by the Brazilian Amazon Protection System Operational Management Center (CENSIPAM) in Porto Velho (RO), in 2023. This event, organized by CENSIPAM, was supported by ACTO as a special guest.

Representatives from the countries present at the event (Bolivia, Ecuador, Guyana, Suriname, and Venezuela) presented their hydroclimatic monitoring and forecasts for the Amazon region. ACTO presented the Situation Room, highlighting the tools and methodologies used to monitor hydroclimatic events in the Amazon.

After the seminar, a formal meeting was held with ACTO members to discuss how monitoring systems work in their countries, how the ACTO Situation Room could provide support, and how integration with regional situation rooms should be achieved. Topics such as the sharing of hydrometeorological data, the possibility of jointly producing a regional hydroclimatic bulletin, and the promotion of an annual regional seminar were addressed.

This event not only strengthened cooperation among ACTO member countries but also provided





a valuable exchange of knowledge and best practices, as well as paving the way for future regional collaboration in the management of critical events in the Amazon Basin.

In 2025, the project hired a consultant to develop 10 video lessons on the maintenance of Data Collection

Platforms (DCPs) in order to support countries in the management of this equipment. The video classes are available on the OTCA website (<https://otca.org/recursoshidricos/>), on the ANA Virtual Learning Environment (<ava.ana.gov.br>) and on the ANA YouTube channel (<https://www.youtube.com/@anagovbr>).



A dynamic splash of water in shades of blue, with numerous bubbles and droplets, set against a solid blue background.

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## **4. COORDINATION OF THE AMAZON PROJECT PHASE II WITH OTHER INITIATIVES**



## 4.1 PROJETO GEF BACIA AMAZÔNICA



Since 2021, ACTO has been implementing the project “[Implementation of the Strategic Action Program \(PAE\) to Ensure Integrated and Sustainable Management of Transboundary Water Resources in the Amazon River Basin, considering Climate Variability and Change](#)” (GEF Amazon Basin).

The main objective of this initiative is to advance the implementation of the [Strategic Action Program \(PAE\)](#), promoting integrated water resources management. In this context, the project supports countries in strengthening national capacity and regional governance, improving adaptation to climate change, and ensuring robust regional data to improve decision-making and coordination of water resources in the Amazon.

The GEF Amazon Basin Project also aims to support the implementation of an integrated water resources monitoring system, which converges with several actions developed by the Amazon Project Phase II.

Another action of the GEF Amazon Basin Project that converges with the Amazon Project is the tri-national intervention (Bolivia, Brazil, Peru) to implement an Early Warning System (EWS) in the Madeira, Upper Purus, and Upper Juruá river basins.

This intervention project aims to strengthen the trinational actions of Bolivia, Brazil, and Peru in relation to the prediction and reduction of flood disaster risks in the cross-border region, facilitating the exchange of information and interoperability of national systems.

The DCPs donated by the Amazon Project to Bolivia and Peru (described in item 3.7) were installed in the area of this tri-national intervention, in the Madeira River basin, and will generate real-time information on river levels and flows, enabling the warning system to function.

## 4.2 AMAZON SUMMIT



The IV Meeting of Presidents of the States Parties to the Amazon Cooperation Treaty (Amazon Summit) was held on August 8 and 9, 2023, in Belém (PA). The final document of the meeting ([Belem Declaration](#)) established that Amazonian countries should:



- Strengthen cooperation and harmonization of integrated hydro-meteorological monitoring and early warning systems among States Parties for the exchange of experiences, information, and effective knowledge;
- Improve monitoring capabilities by strengthening national monitoring networks to generate alerts on environmental risks, human health, disasters, and extreme hydrometeorological events to the populations of the Amazon, for environmental planning, development of protocols, and actions for the prevention, management, and mitigation of the impacts of natural disasters;
- Support water management as a tool for preventing, adapting to, and mitigating the effects of climate change and combating hunger, ensuring the quality and quantity of water in the Amazon basin for this and future generations.

Item 13 of the Belém Declaration reaffirms the countries' commitment to implementing the Amazon Project and the Water Resources Situation Room at ACTO. The activities of the Amazon Project Phase II are related to the Belém Declaration in aspects concerning the strengthening of monitoring systems, the development of protocols, and adaptation to climate change.

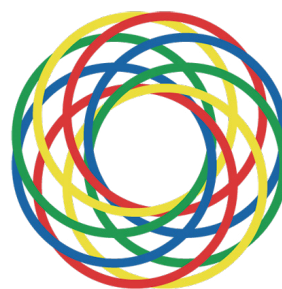
## 4.3 AMAZON NETWORK OF WATER AUTHORITIES NETWORK – ANWA

Following the Amazon Summit, the XIV Meeting of Foreign Ministers of the Member Countries of the Amazon Cooperation Treaty Organization, held on November 23, 2023, in Brasília (DF), created the Amazon Network of Water Authorities (ANWA).

ANWA has several objectives related to the Amazon Project Phase II:

- Contribute to strengthening an integrated, multilevel, and multisectoral information and monitoring system for the Amazon Basin within the framework of the Amazon Regional Observatory, with the aim of supporting decision-making in water mana-

gement in the countries, as well as monitoring capacities to ensure the sustainability of national information systems;



**ANWA**



- Encourage the creation of early warning systems, considering the needs for adaptation and mitigation due to the effects of climate change;
- Support the exchange of data and information between countries in a timely and accurate manner, in accordance with the national legislation of member countries;
- Promote adequate hydrological and water quality monitoring in the Amazon Region within the scope of the ARO (Amazon Regional Observatory) platform; and,
- Establish regional protocols for hydrological and water quality monitoring.

The ANWA Work Plan (2024-2026) established as one of its objectives the implementation of water quantity and quality monitoring protocols developed by the Amazon Project Phase II, as well as a proposal for the development of projects for the Amazon Hydrological Network and the Water Quality Network.

The protocols were approved at the III Meeting of the Amazon Network of Water Directors (ANWA) held on April 25, 2025, in Santa Cruz de la Sierra, Bolivia.


## 4.4 AMAZON REGIONAL OBSERVATORY – ORA



The [Amazon Regional Observatory \(ORA\)](#) is a reference center for information in the Amazon that promotes

the flow and exchange of information between institutions, government authorities, the scientific community, academia, and civil society in the Amazon countries that make up the Amazon Cooperation Treaty Organization (ACTO).


Two ORA modules were created under the Amazon Project Phase II: Amazonian Networks and Water Resources, described in item 3.1.2.

A dynamic splash of water in shades of blue, with numerous droplets and bubbles, set against a solid blue background.

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## **5. PROJECT MANAGEMENT AND LESSONS LEARNED**





The COVID-19 pandemic significantly impacted the activities of the Amazon Project Phase II, making it impossible to conduct in-person training and consulting work. In this scenario, three substantive revisions of the project were necessary (2020, 2022, and 2023), whose term was extended and activities were readjusted. These revisions were agreed upon by the project partners and approved by the Amazon Project Steering Committee.

In 2020, due to the pandemic, monthly virtual meetings were established for the management of the Amazon Project involving the partner institutions (ANA, ABC/MRE, and ACTO). Even after the end of the quarantine period, these monthly meetings were maintained and contributed effectively to the management of the project. In addition to these monthly meetings, annual meetings of the project Steering Committee were also held. The activity that required the most time to coordinate was the acquisition and installation of the DCPs in Bolivia and Peru. To support this process, a consultant was hired in each country, which proved to be an effective strategy, facilitating coordination with local authorities and the progress of the activity.

The project funds, executed by ACTO, were invested in Bank Deposit Certificates (BDCs). The financial income from these investments was incorporated into the project budget in its revisions, as mentioned above.

The project funds, executed by ACTO, were invested in CDs (Certificates of Deposit). The financial returns were incorporated into the project budget in its aforementioned revisions and contributed to the payment of project activities.

The second phase of the Amazon Project was evaluated by an external and independent consultant, who analyzed the implementation of the activities and the results achieved. This evaluation included a documentary analysis of the project and interviews to collect data, providing important information on the planning and execution of the actions.


This final evaluation highlighted the solid results and relevant advances for water resources management in the Amazon Basin. Conducted in a participatory manner, the evaluation confirmed the high degree of relevance, coherence, and efficiency of the project, as well as important impacts such as the institutional strengthening of ACTO, the creation of the Situation Room, the installation of monitoring equipment in Bolivia and Peru, and progress in exchanges between member countries. According to the evaluation, the Amazon Project Phase II contributed to consolidating the fundamental technical and political bases for regional cooperation on water, promoting greater integration and sustainability in water governance in the region.



A dynamic splash of water in shades of blue, with numerous droplets and bubbles, set against a solid blue background.

## --- 6. CONCLUSIONS





In the context of climate change, improving monitoring systems and facilitating the prediction of extreme hydrological events is crucial to mitigate the effects of droughts and floods in the Amazon Basin, as well as adopting adaptation measures to protect ecosystems and vulnerable communities.

The droughts of 2023 and 2024 in the Amazon Basin had several impacts on river navigation, hydroelectric power generation, the supply of isolated communities, and the preservation of aquatic ecosystems. Floods, especially in the Madeira River basin, have also had significant impacts in recent decades.

In this regard, it is essential that Amazonian countries improve their monitoring and information management systems in order to effectively promote integrated management in the region. The logistical, technical, and economic challenges of monitoring the world's largest river basin can only be overcome through cooperation among all Amazonian countries.

International cooperation plays a key role in building collaborative spaces and acts as a catalyst for coordinated actions for the protection and sustainable use of shared resources.

To enable this process, regional organizations such as ACTO are important mechanisms for implementing cooperation actions, as they provide

an environment for dialogue and support for countries' efforts to achieve common goals and objectives, as well as representing a resource for the implementation of international commitments.

The implementation of the Amazon Project Phase II played a crucial role in strengthening the shared and sustainable management of water resources, in addition to significantly improving the capacities of the Amazonian institutions involved in the issue. This strengthening has brought important gains for national policies, especially considering that the countries in the region share rivers, which means that specific actions taken in one country can have direct impacts on another.

The continuity of the actions implemented by the Amazon Project represents a challenge for the coming years. The exchange of hydrometeorological and water quality data between Amazonian countries, within the framework of the Amazon Regional Observatory, and the continuous training of technicians will certainly contribute to better management of the basin.

To ensure the permanence and sustainability of the actions and results of the Amazon Project, it is also essential to secure continuous resources for the maintenance of hydrometeorological networks and to invest

in the creation and strengthening of regional situation rooms. In addition, it is crucial to ensure that the products generated by these rooms are widely disseminated and used.

The actions of the Amazon Project Phase II should be maintained and integrated with the initiatives of the

Amazon Network of Water Authorities Network (ANWA), the GEF Amazon Basin Project, and the ACTO mandate conferred by the Amazon Summit. The convergence of these actions will contribute to improved water security, which will positively impact the population of the Amazon basin.



Photo: Rui Faquini | ANA's image database





Bolivia



Brazil



Colombia



Ecuador



Guyana



Peru



Suriname



Venezuela

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