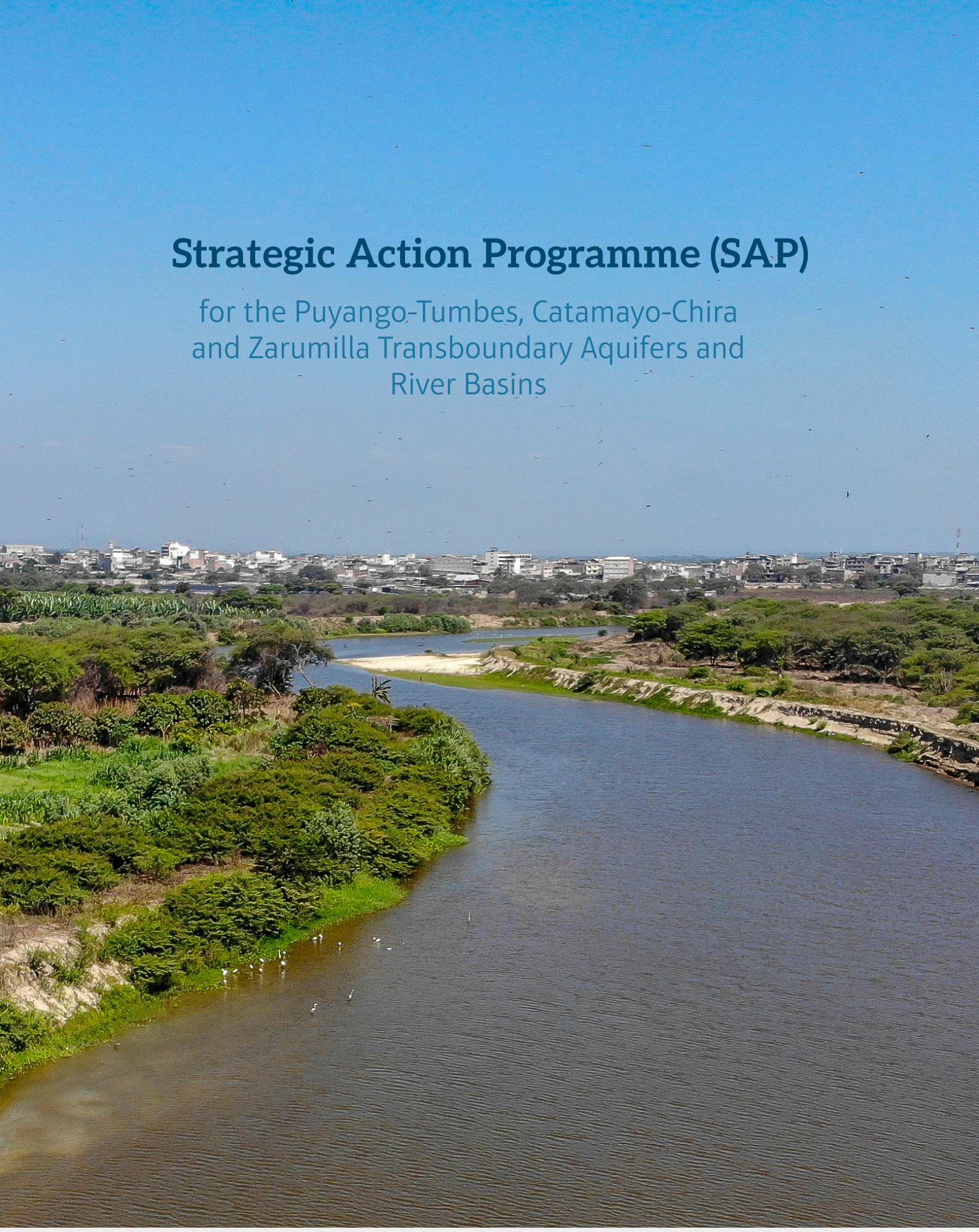
Strategic Action Programme (SAP)

for the Puyango-Tumbes, Catamayo-Chira and Zarumilla Transboundary Aquifers and River Basins



GIRH Cuencas transfronterizas
PUYANGO - TUMBES / CATAMAYO - CHIRA Y ZARUMILLA

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Strategic Action Programme (SAP)

for the Puyango-Tumbes, Catamayo-Chira and Zarumilla Transboundary Aquifers and River Basins

First edition

Quito, 2020

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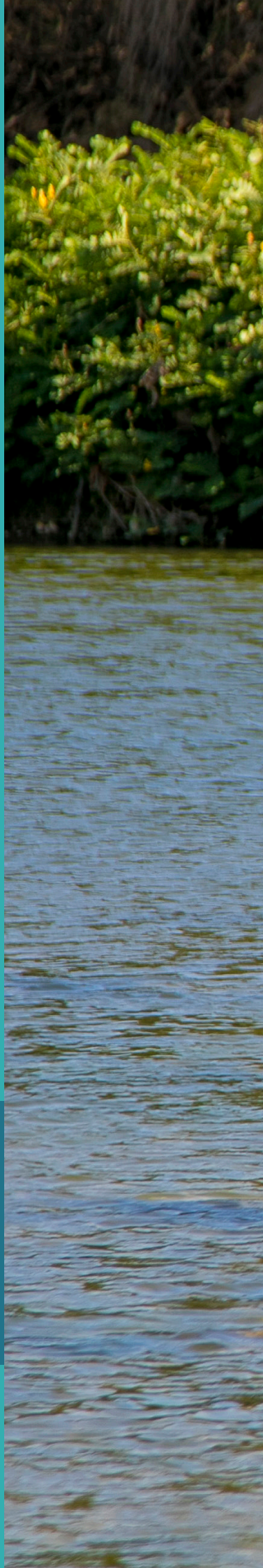
The members of the Steering Committee of the Project "Integrated Water Resources Management in the Puyango-Tumbes, Catamayo-Chira and Zarumilla Transboundary Aquifers and River Basins" , integrated by representatives of: National Water Authority of Peru (ANA), Water Secretariat of Ecuador (SENAGUA), Ministry Environment of Ecuador (MAE), Ministry Environment of Peru (MINAM), Ministry for Foreign Affairs of Peru, Ministry Foreign Affairs and Human Mobility of Ecuador and the United Nations Development Programme (UNDP) of both countries, emphasize the participatory process in the elaboration of the Strategic Action Programmes (SAPs); therefore, they express their agreement with this instrument that will guide the binational cooperation for the integrated management of transboundary water resources.

January 17th of 2020.

Strategic Action Programme (SAP)

1 Introduction



Ecuador and Peru share 9 transboundary river basins "with their respective specifications and characteristics comprised of natural sources of water in their various forms, physical states and elements including continental water; shallow; underground; and associated assets" (Agreement of the Binational Commission for the Integrated Management of Water Resources In the Transboundary Watersheds between the Republic of Ecuador and the Republic of Peru, 2017); 3 of these watersheds: Puyango-Tumbes, Catamayo-Chira and Zarumilla, empty their waters into the Pacific Ocean, while the remaining 6 flow into the Amazon River; these are: Mayo-Chinchipe, Santiago, Morona, Pastaza, Cunambo-Tigre and Napo. The combined area of the 9 transboundary watersheds is 270,740.29 km2 (ANA and SENAGUA, 2018).

The Puyango – Tumbes, Catamayo - Chira and Zarumilla transboundary watersheds occupy an area of approximately 24,173 km2, with a projected population in 2017 of 1,509,600 inhabitants settled in important places such as Tumbes, Zarumilla, Sullana, Huaquillas, Catamayo and Macará. The inhabitants are mainly engaged in productive activities related to agriculture, aquaculture, livestock, local and international trade, among others. The pressure of these activities is causing problems for water resources and their proper management, as discussed in the development of this document which provides response strategies with the aim of improving the binational actions undertaken by Peru and Ecuador to achieve Integrated Transboundary Water Resources Management (ITWRM) in the three main aquifers and watersheds of both countries.

In these transboundary watersheds, Ecuador and Peru face similar development and natural resources management problems, in particular with water. The two countries understand that the problem of water resource management in border areas is a shared problem, and therefore must also be managed in a shared and coordinated manner.

In this context, the Project "Integrated Water Resources Management in the Puyango-Tumbes, Catamayo-Chira and Zarumilla Transboundary Aquifers and River Basins" is being carried out, and aims to improve the binational actions undertaken by Peru and Ecuador for Integrated Transboundary Water Resources Management (ITWRM). It focuses on improving the common understanding of the shared water resources, their environmental and socioeconomic status; strengthening cooperation mechanisms between the two countries and implementing and disseminating ITWRM demonstrations in order to replicate them in other areas.

The project carried out the "Formulation of the Strategic Action Programme (SAP) for the Puyango-Tumbes, Catamayo-Chira and Zarumilla Transboundary Aquifers and River Basins". The SAP were developed with participation of key stakeholders from each transboundary watershed, with technical visits (one in each watershed) and workshops. This study is comprised of 03 Phases: Phase I "Identification of Policy Guidelines", Phase II "Situational Strategic Analysis, Definition of Lines of Action and Identification of Projects" and Phase III "Design of Strategic Action Programme.

The SAP is aimed at identifying lines of action and strategies to address the cross-border problems identified in the Transboundary Diagnostic Analysis (TDA), and to achieve socio-economic and environmental development in the Puyango – Tumbes, Catamayo - Chira and Zarumilla transboundary watersheds while also achieving integrated management of transboundary water resources. The construction of the SAP was carried out in two stages:

1. Definition of policy guidelines: based on the problems identified in transboundary watersheds; vision; and, analysis of national (Ecuador and Peru) and international regulatory frameworks linked to IWRM. These guidelines will allow the identification of strategies, plans, programs and projects, as follows:

- Strengthen binational institutionality
- Promote the efficient and sustainable use of water resources
- Develop mechanisms for adapting to and mitigating the effects of climate change
- Managing the quantity and quality of water resources

2. Identification of lines of action and projects: these are comprised of intervention options and management alternatives to address the cross-border problems identified and prioritized in the transboundary watersheds.

2 Reasons why the SAP was developed

Reasons why the SAP was developed

- Variable water supply that is essential for the socio-economic development of the three transboundary watersheds and the integrity of their ecosystems.
- Overexploitation, pollution and inefficient management, as well as climate variability and climate change related to water resources.
- For the need to give attention to the integration of concerns about surface and ground water, as well as extreme manifestations of climate variability and climate change in the three transboundary watersheds.
- To improve Peru's and Ecuador's binational efforts for Integrated Transboundary Water Resources Management (ITWRM).

3 Challenges and opportunities

1.1 Challenges

Concerns exist about the management of the water shared in the transboundary watersheds, and the actions that need to be taken to address existing problems constituting common challenges relating to water resources use, as discussed below:

With regard to legal instruments for Integrated Transboundary Water Resources Management (ITWRM):

- Develop binational policies aimed at integrated water resource management.
- Implement processes for the modernization of water legislation within the framework of existing laws in the two countries.

With regard to institutionality for ITWRM:

- Promote the strengthening of existing institutionality related to water resources through mechanisms, procedures, legal regulations and economic instruments to promote coordination, articulation and institutional arrangements.
- Consolidate transboundary institutionality that would allow implementation of ITWRM in the watersheds, taking into account the SAP.

With regard to pollution and water resources supply:

- Reduce activities that degrade water quality in the watersheds (forest logging, extensive agriculture and ranching, mining, industries lacking technology, etc.).
- Ensure water supply in transboundary watersheds through conservation of natural sources of water resources.
- Ensure drinking water supply and improve sanitation coverage in the watersheds, as well as supply for irrigation and other uses.
- Develop infrastructure to regulate and improve the use of water resources and their associated assets.

With regard to water quality:

- Protect surface and underground water sources in the transboundary watersheds in order to reduce pollution problems that affect human health, the environment and the availability of water for different uses.
- Promote technical and administrative capacities in IWRM-related entities and organizations so that they can exercise systematic control of surface and groundwater quality.
- Ensure surface and ground water quality through approved parameters and methodologies for water quality assessment in the watersheds.

With regard to hydroclimatic risks linked to water resources:

- Reduce exposure to hydrological risks that threaten populations, productive areas and infrastructure.

With regard to knowledge and information about IWRM:

- Create a binational information system, which contributes to the establishment of measurement programmes (hydrometeorological network), water resources quality monitoring and forecasting in the watersheds.

With regard to social participation in ITWRM:

- Consolidate the participation of stakeholders and water users in the watersheds, based on cooperation and dialogue.

With regard to raising awareness of the population and stakeholders:

- Ensure that populations and authorities sensitized in IWRM can confront the effects

of water resources reduction and degradation, and gain greater awareness of the value of water.

- Establish a water culture in the population and authorities to confront the reduction in water resources availability and supply due to pollution.

With regard to technology, training and research for ITWRM:

- Promote the adoption of clean technologies to improve environmental performance while taking advantage of the watersheds´ comparative and competitive advantages in terms of their natural resources, especially water.
- Create education and training programs for water planners and users which address the new IWRM concepts.
- Promote research programs in water resources in coordination with academia (universities, research institutes, technological development and related others), oriented to solving needs in the watersheds.

With regard to social, gender, intergenerational and intercultural aspects:

- Strengthen water policies with actions aimed at rural development and poverty reduction, taking into account the allocation of water resources between its uses and users of water.
- Strengthen the participation of women and youth in the implementation of IWRM actions.
- Promote ancestral practices in water and natural resources use in the watersheds.

1.2 Opportunities

- Political will exists between the republics of Peru and Ecuador to develop IWRM.
- Existence of a binational legal framework, mechanisms and initiatives that favor IWRM.
- National interest in ensuring compliance with water regulations and extending them to the binational level.
- International and national interest in water resources investments, modernization of water management and development of infrastructure related to the application of new technologies.
- Political and technical will exist for implementing actions aimed at improving the quality and quantity of water resources at the binational level.
- Existence of planning tools for the efficient administration and management of water resources in IWRM.
- Interest in adopting and promoting a water culture and encouraging the active participation of all stakeholders and users in IWRM.
- Technological development contributes to water resources management.
- The El Niño phenomenon contributes to water availability, through increased surface runoff and aquifer recharge, as well as through the development of shrub vegetation.
- Growing interest in an agricultural policy associated with good practices for soil and forest maintenance, which improves water availability and favors biodiversity.
- Interest in implementing measures for adapting to climate variability and climate change.

4 Description of identified needs and their binational policy response

The objective of this section is to provide identified, discussed and agreed upon policy guidelines between the water governing authorities of Ecuador (SENAGUA) and Peru (ANA), institutions linked to water resources and stakeholder participation. The guidelines were formulated within the framework of the Transboundary Diagnostic Analysis (TDA) and the Strategic Action Programme (SAP) of the Puyango-Tumbes, Catamayo-Chira and Zarumilla Transboundary Aquifers and River Basins, considering the powers and perspectives of the governing authorities.

The identified needs to be given binational policy responses were developed by analyzing elements such as:

- National and binational regulations on IWRM.
- Explicit and implicit public policies in the legal systems of Ecuador, Peru and at the binational level.
- National and local planning instruments.
- International instruments within the framework of international law, international agendas and commitments.
- IWRM issues in the Puyango-Tumbes, Catamayo-Chira and Zarumilla transboundary watersheds.

The structuring, identification and subsequent proposal of the policy guidelines considered the problems substantiated by the stakeholders in the three basins:

- Deficiency in national, binational and transboundary institutional management.
- Alteration of native forests.
- Loss of soil from slopes and decrease in groundwater recharge.
- Pollution of surface and groundwater.
- Insufficient water availability and decreased natural flow over time - affecting the balance between supply and demand.
- Low availability of hydraulic infrastructure for accessing water.
- Hydrological droughts and low flow rates during the dry season.
- Impacts of climate change and climate variability.
- Overflows and flooding.

In addition, a critical analysis of public policies, national and binational regulations, as well as planning instruments, was undertaken which allowed for the identification of a number of instruments, mainly institutional, containing policies on IWRM which establish guidelines for the exercise of authority, conservation and sustainable use of water resources, and a management model for national and local planning.

The analysis demonstrated that with regard to IWRM in transboundary watersheds, Peru has policies, strategies and plans within which policy guidelines are expressly established to promote IWRM in transboundary watersheds and aquifers. As regards Ecuadorian policies and plans, although the 2017-2021 National Development Plan considers a generic guideline on IWRM in transboundary watersheds, the other policy guidelines covered by national plans and regulations do not contain specific guidelines in this area.

At the binational level, policies are contained in the bilateral mechanisms and instruments signed between Ecuador and Peru, such as the "Agreement between the Republic of Peru and the Republic of Ecuador for the establishment of the Binational Commission for IWRM of the Zarumilla transboundary watershed" and the "Agreement establishing the Binational Commission for transboundary watersheds between the Republic of Peru and the Republic of Ecuador", both of which, within the system of institutions, establish the interaction between the Binational Commission and the National Departments or Technical Secretariat, and through this establish the departments as the technical bodies that would propose policy guidelines to the Commission.

Needs were identified in IWRM policies for transboundary watersheds in areas such as:

- Management of information, risks, plans and projects.
- Citizen participation
- Strengthening of human talent
- Among others.

In addition, several opportunities for regulatory improvement were identified as binational policy responses, as follows:

- Incorporation of the perspective of "rights" in IWRM.
- Regulations on information management in IWRM.
- Regulations on shared risk management.
- Regulations on in situ conservation in the transboundary watersheds.

Additionally, there are international instruments in legislation relating to IWRM in transboundary watersheds which are part of national regulations that influence IWRM, mainly on environmental issues. Binational legislation on IWRM in transboundary watersheds has elements of environmental management, uses of transboundary water resources in a coordinated, articulated and sustainable manner, which creates, in effect, an institutionality aimed at the management of transboundary watersheds between Ecuador and Peru. In Peruvian legislation there are greater references to IWRM relating to these topics from a perspective of compliance with international conventions and strengthening of bilateral relations. On the contrary, a more explicit reference to IWRM in transboundary watersheds is necessary in Ecuadorian legislation.

Based on the analyses and the issues, the general points, as adaptive references, that the policy guidelines on IWRM should include are as follows:

- Prevention of water resources pollution and recovery of affected resources.
- Conservation of water resources and associated ecosystems in transboundary watersheds to ensure reliable water forecasting and allocation in quality, quantity and security.
- Prevention of pollution and conservation of water resources.
- Recovery of natural heritage areas for adaptation to and mitigation of climate change.
- Prevention of natural hazards and recovery of affected areas.
- Reduction of flood impacts.
- Coordination, cooperation, institutional and interinstitutional strengthening.

Considering the elements presented above and through discussion and consensus between the respective water authorities of Ecuador and Peru, four (4) policy lines were identified covering the areas of water resources quality in the transboundary watersheds; adaptation to and mitigation of climate change, incorporating a risk management approach associated with IWRM; institutional strengthening, applying approaches and principles of gender equity, multiculturality and intergenerationality; citizen participation and assistance for vulnerable groups, and conservation of water resources in transboundary watersheds through the creation of in situ conservation instruments, recovery, among others.

The policy guidelines for IWRM identified as binational policy responses are as follows:

- Management of the quantity and quality of water resources in the transboundary watersheds and aquifers, through processes of regulation, control, conservation and protection.
- Development of mechanisms for adaptation to and mitigation of the effects of climate change in the Transboundary Aquifers and River Basins, managing the associated risks.
- Strengthening binational institutionality to ensure integrated-integral management of water resources in the transboundary

watersheds and aquifers, through the participation of different levels of government, water resources users and the wider community, emphasizing a gender approach, interculturality and the participation of vulnerable groups.

- Promotion of the efficient and sustainable use of water resources in the transboundary watersheds.

The policy guidelines and their objectives, are consistent with the Sustainable Development Goals (SDGs) and responsive to the shared visions of the three watersheds. They articulate international agendas, regulations and policy, shared vision and policy guidelines for IWRM in the transboundary watersheds.

Pailas Rotas, Gonzanamá. Loja - Ecuador

5 Strategic planning

5.1. Puyango-Tumbes watershed

Vision of the watershed

The stakeholders of the aforementioned watershed, working together, developed a vision for the year 2028, which is detailed below:

Vision

By 2028, a transboundary watershed with binational and comprehensive water resources management, with innovative technical, social and participatory systems, with an emphasis on pollution control, overflow and flood mitigation and the conservation of natural water-generating ecosystems for the development of its inhabitants.

Source: Phase I binational workshop, Puyango-Tumbes transboundary watershed, Huaquillas, 2018.

The SAP developed in this document considers and acknowledges this vision.

General objectives

The key stakeholders taking part in the participatory workshops and in the processes of validation and revision carried out within the TDA-SAP process, defined four (4) general objectives resulting from this vision, the policy guidelines and the analysis carried out on the issues in the Puyango-Tumbes watershed. Each of the objectives seeks to solve priority problems:

General objectives	
GO-1.	Manage the quality and quantity of water resources in the Puyango-Tumbes transboundary watershed.
GO-2.	Promote the efficient and sustainable use of water resources in the watershed.
GO-3.	Strengthen and implement binational institutionality to ensure the integrated management of water resources in the watershed.
GO-4.	Develop mechanisms for adapting to and mitigating the effects of climate change in the watershed.

In relation to the abovementioned objectives, the stakeholders noted the following:

General objective 1: manage the quality and quantity of water resources in the Puyango-Tumbes transboundary watershed

This objective is proposed for addressing two significant problems in the transboundary watershed:

1. The alteration of the physical-chemical and/or biological characteristics of the water resources.
2. The low availability of surface and ground water to meet water demand.

General objective 2: promote the efficient and sustainable use of water resources in the watershed

This objective was developed in response to the strong connection between the availability of surface and groundwater, shaped by seasonal and year-to-year climate variability, and the uncoordinated and weakly controlled water demand associated with socio-economic activities, and the availability of hydraulic infrastructure (capture, piping and treatment), its operation and maintenance.

General objective 3: strengthen and implement binational institutionality to ensure the integrated management of water resources in the watershed

This objective proposes improving the integrated planning, administration and management of water resources in the transboundary watershed at the binational level, as well as correcting the absence of cross-border management. Weak coordination and institutional articulation and insufficient social participation results in adverse conditions for the availability (quality and quantity) of water resources and for the quality of related resources (soils and forests), limiting the sustainability of the water resources.

General objective 4: develop mechanisms for adapting to and mitigating the effects of climate change in the watershed

This objective is formulated to address five (5) problems identified in the transboundary watershed:

1. Elimination of the natural herbaceous, bushy and/or arboreal plant layer in the upper and middle watersheds, and changes in land use affecting water resources.
2. Impacts of climate change and climate variability.
3. The low availability of surface and ground water to meet water demand.
4. Surface and ground water availability during the dry season (June-December) is affected by climate variability and overexploitation of groundwater.
5. Overflows and flooding

Workshop for the revision and proposal of indicators for the Strategic Action Programmes of the three transboundary basins, July 4th and 5th of 2019. Tumbes, Peru.

Strategic objectives

General objectives		Strategic objectives	
GO-1.	Manage the quality and quantity of water resources in the Puyango-Tumbes transboundary watershed	**SO 1.1**	Implement activities and projects to conserve the water-producing ecosystems.
		SO 1.2	Develop instruments to improve water quality.
		SO 1.3	Establish capacity-building programs related to the quantity and quality of the water resources.
		SO 1.4	Determine the supply and demand of the water resources.
GO-2.	Promote the efficient and sustainable use of water resources in the watershed.	**SO 2.1**	Promote the efficient use of water and the conservation of water resources.
		SO 2.2	Implement training and awareness-raising programmes on the efficient use of water resources.
GO-3.	Strengthen and implement binational institutionality to ensure the integrated management of water resources in the watershed	**SO 3.1**	Institutionalize the Puyango-Tumbes IWRM committee.
		SO 3.2	Promote stakeholder participation in integrated water resources management.
GO-4.	Develop mechanisms for adapting to and mitigating the effects of climate change in the watershed.	**SO 4.1**	Promote mainstreaming a climate change approach and disaster risk management into the planning tools of the institutions in the watershed.
		SO 4.2	Develop training and awareness-raising programs on natural risks and adaptation to climate change, associated with water resources.
		SO 4.3	Implement management programmes for areas vulnerable to the effects of climate variability (droughts and floods).

Lines of action

Strategic objectives		Lines of action	
SO 1.1	Implement activities and projects to conserve water-producing ecosystems.	**LA 1.1.1**	Formulate and implement water conservation projects.
		LA 1.1.2	Carry out a diagnosis of the sources of pollution of the transboundary watershed.
		LA 1.1.3	Establish proposals for managing the negative impacts from mining activity in the watershed.
		LA 1.1.4	Formulate and implement a comprehensive wastewater treatment and solid waste management plan.
		LA 1.1.5	Strengthen and promote the participation of civil society in the monitoring and control of water pollution.
SO 1.2	Develop instruments to improve water quality.	**LA 1.2.1**	Articulate, coordinate and harmonize the regulations and actions that affect IWRM.
		LA 1.2.2	Establish and implement the binational protocol to monitor water quality.
		LA 1.2.3	Strengthen community management of water management, through awareness-raising campaigns and spaces for participation, integrating other stakeholders.
		LA 1.2.4	Develop and implement mechanisms for the prevention, analysis and management of conflicts related to water resources.
SO 1.3	Establish capacity-building programs related to the quantity and quality of water resources.	**LA 1.3.1**	Strengthen the institutional capacities of the entities related to water resources management.
		LA 1.3.2	Implement awareness-raising and training campaigns in water culture and IWRM aimed at stakeholders and water users in the watershed.
		LA 1.3.3	Promote a plan to systematize and disseminate work experiences related to IWRM

SO 1.4	Determine the supply and demand of water resources	**LA 1.4.1**	Implement approved methodologies to determine water supply and demand in the watershed.
		LA 1.4.2	Design and implement a georeferenced database containing hydrometeorological information integrated into the binational information system for ITWRM.
		LA 1.4.3	Establish a binational network of hydrometeorological, piezometric and hydrogeochemical monitoring.
		LA 1.4.4	Update user registration, use authorizations and water use.
SO 2.1	Promote the efficient use of water and the conservation of water resources	**LA 2.1.1**	Develop and implement the watershed`s IWRM plan.
		LA 2.1.2	Optimize the infrastructure for use and conservation of water resources.
		LA 2.1.3	Promote water culture and the application of ancestral knowledge.
SO 2.2	Implement training and awareness-raising programmes on the efficient use of water resources	**LA 2.2.1**	Design and implement a training plan in IWRM for officials and professionals of the institutions and organizations related to water management.
		LA 2.2.2	Design and implement a training and awareness-raising plan in IWRM aimed at users and different interest groups.
		LA 2.2.3	Strengthen professional trainers to implement and execute training programs in IWRM.
SO 3.1	Institutionalize the Puyango-Tumbes IWRM Committee.	**LA 3.1.1**	Make up, set up and put into effect, the watershed`s IWRM Committee, within the framework of the Nine Watershed Commission.
		LA 3.1.2	Strengthen institutional capacities in entities related to water resources management.
		LA 3.1.3	Implement a binational information system for integrated water resource management in the watershed.
		LA 3.1.4	Strengthen the Watershed Councils and Water Resources Councils of Cuenca, through administrative, legal, technical and financial mechanisms that guarantee their operation and participation in IWRM.
		LA 3.1.5	Estimate, obtain and optimize public investments for the implementation of IWRM policy.

SO 3.2	Promote stakeholder participation in integrated water resources management.	**LA 3.2.1**	Involve stakeholders in the watershed in programmes and projects linked to IWRM, utilizing approaches to gender, interculturality and intergenerationality.
		LA 3.2.2	Strengthen community management of water management, through awareness-raising campaigns and spaces for participation and integration of other stakeholders.
		LA 3.2.3	Develop and implement mechanisms for the prevention, analysis and management of conflicts related to water resources.
SO 4.1	Promote mainstreaming a climate change approach and disaster risk management into the planning tools of the institutions in the watershed.	**LA 4.1.1**	Design and implement adaptation measures to reduce vulnerability to the effects and consequences of climate variability and climate change related to water resources.
		LA 4.1.2	Design and implement a monitoring, follow-up and evaluation program on the risks associated with climate variability and climate change and the actions implemented for their prevention, adaptation to and mitigation.
		LA 4.1.3	Generate guidelines that involve co-responsibility by key stakeholders to reciprocate with actions to prevent and reduce the effects of climate change, related to water resources.
SO 4.2	Develop training and awareness-raising programs on natural risks and adaptation to climate change, associated with water resources	**LA 4.2.1**	Develop and implement a training program in water risk management and adaptation to climate change.
		LA 4.2.2	Schedule and carry out information campaigns on the prevention and reduction of the effects of climate change in the watershed.
SO 4.3	Implement management programmes for areas vulnerable to the effects of climate variability (droughts and floods).	**LA 4.3.1**	Identify and characterize the critical areas, vulnerability and risks associated with climate variability and climate change on water resources.
		LA 4.3.2	Design and implement a communication and early warning system for extreme water events.
		LA 4.3.3	Design and implement programs to mitigate the effects of climate variability and climate change in the watershed.
		LA 4.3.4	Identify and quantify areas for restoration of degraded ecosystems or those in process of being degraded.
		LA 4.3.5	Develop and implement a program for restoring vegetation: reforestation, forest enrichment and natural regeneration.

Source: Phase V binational workshop, Puyango-Tumbes transboundary watershed, Tumbes, 2018.

Monitoring and evaluation indicators

General objectives		Indicators		Strategies	
GO-1.	Manage the quality and quantity of water resources in the Puyango-Tumbes transboundary watershe	**I-GO-1.1**	Number of parameters that meet the standards established in the binational water quality protocol.	**S 1.1.1**	Implement activities and projects to conserve the water-producing ecosystems.
				S 1.1.2	Develop instruments to improve water quality.
		I-GO-1.2	Percentage of the area of "water-generating ecosystems" under conservation actions.	**S 1.2.1**	Establish capacity-building programs related to the quantity and quality of the water resources.
				S 1.2.2	Determine the supply and demand of the water resources.
GO-2.	Promote the efficient and sustainable use of water resources in the watershed.	**I-GO-2.1**	Percentage of users that have flow measurement systems.	**S 2.1.1**	Promote the efficient use of water and the conservation of water resources.
		I-GO-2.2	Number of water users with right to use water, granted.	**S 2.2.1**	Implement training and awareness-raising programmes on the efficient use of water resources.
GO-3.	Strengthen and implement binational institutionality to ensure the integrated management of water resources in the watershed	**I-GO-3.1**	Number of binationally agreed upon instruments implemented in the watershed.	**S 3.1.1**	Institutionalize the Puyango-Tumbes IWRM committee.
				S 3.1.2	Promote stakeholder participation in integrated water resources management.
GO-4.	Develop mechanisms for adapting to and mitigating the effects of climate change in the watershed.	**I-GO-4.1**	Percentage of vulnerable areas with adaptation and mitigation measures.	**S 4.1.1**	Promote mainstreaming a climate change approach and disaster risk management into the planning tools of the institutions in the watershed.
				S 4.1.2	Develop training and awareness-raising programs on natural risks and adaptation to climate change, associated with water resources.
				S 4.1.3	Implement management programmes for areas vulnerable to the effects of climate variability (droughts and floods).

Source: Binational indicators workshop, Tumbes, 2019.

5.2. Catamayo-Chira watershed

Vision of the watershed

As a basic element of the Strategic Action Programme (SAP) for the Catamayo-Chira transboundary watershed, this visión encompasses principles of management and sustainable development of water resources, and was formulated by the stakeholders of the aforementioned watershed, as transcribed below:

Vision

By 2028, a transboundary watershed with institutionalized binational management, applying integral and participatory approaches, which promotes innovative systems for optimizing the use and exploitation of water, mitigation of extreme events, reduction of erosion and improvement of water quality.

Source: Phase I binational workshop, Catamayo-Chira transboundary watershed, Macará, 2018.

The SAP developed in this report considers two scenarios: on the one hand, recognition of the current situation of the watershed, becoming aware of the problems that the SAP seeks to confront; and, on the other hand, the construction of an ideal or desired model to rise up to for the future of the watershed.

General objectives

Four (4) general objectives for developing solutions to the priority issues were developed collectively the stakeholders, these are:

General objectives	
GO-1.	Strengthen binational institutionality to ensure the integrated management of water resources in the Catamayo-Chira transboundary watershed.
GO-2.	Manage the quality and quantity of water resources in the Catamayo-Chira transboundary watershed.
GO-3.	Develop mechanisms for adapting to and mitigating the effects of climate change in the watershed.
GO-4.	Promote the efficient and sustainable use of water resources in the Catamayo-Chira transboundary watershed.

General objective 1: strengthen binational institutionality to ensure the integrated management of water resources in the Catamayo-Chira transboundary watershed

This objective seeks to address the identified deficiencies in the planning, administration and integrated management of water resources in the transboundary watershed at the binational level, as well as the absence of cross-border management. This weakness results in a lack of coordination and institutional articulation and poor social participation, leading to adverse situations with respect to the availability of water resources and the quality of related resources (soils and forests), conditions that undermine the sustainability and viability of water resources.

General objective 2: manage the quality and quantity of water resources in the Catamayo-Chira transboundary watershed

This objective is proposed for addressing two significant problems in the transboundary watershed:

1. The alteration of the physical-chemical and/or biological characteristics of the water resources.
2. The low availability of surface and ground water to meet water demand.

General objective 3: develop mechanisms for adapting to and mitigating the effects of climate change in the watershed

This objective is formulated to address five (5) problems identified in the transboundary watershed:

1. Elimination of the natural herbaceous, bushy and/or arboreal plant layer in the upper and middle watersheds, and changes in land use affecting water resources.
2. Impacts of climate change and climate variability.
3. The low availability of surface and ground water to meet water demand. This issue was discussed in general objective 2.
4. Surface and ground water availability during the dry season (June-December) is affected by climate variability and overexploitation of groundwater.
5. Overflows and flooding

General objective 4: promote the efficient and sustainable use of water resources in the watershed

This objective relates to the availability of surface and groundwater that is strongly dependent on seasonal and year-to-year climate variability, by uncoordinated and weakly controlled water demand associated with socio-economic activities, and by the availability of hydraulic infrastructure (capture, piping and treatment), and its operation and maintenance.

IWRM training needs diagnosis workshop, December 12th of 2018. Tumbes, Peru.

Strategic objectives

General objectives		Strategic objectives	
GO-1.	Strengthen binational institutionality to ensure the integrated management of water resources in the Catamayo-Chira transboundary watershed.	**SO 1.1**	Institutionalize the Catamayo-Chira IWRM Committee
		SO 1.2	Strengthen and promote the participation of stakeholders involved in the Catamayo-Chira IWRM Committee.
GO-2.	Manage the quality and quantity of water resources in the Catamayo-Chira transboundary watershed.	**SO 2.1**	Characterize the state of water sources and associated ecosystems.
		SO 2.2	Establish programmes for the protection, recovery and conservation of the quality and quantity of water resources.
		SO 2.3	Determine the supply and demand of water resources.
GO-3.	Develop mechanisms for adapting to and mitigating the effects of climate change in the watershed.	**SO 3.1**	Establish strategies for adaptation to and mitigation of climate change within the framework of water conservation.
		SO 3.2	Implement programmes for the management of areas vulnerable to the effects of climate variability.
GO-4.	Promote the efficient and sustainable use of water resources in the Catamayo-Chira transboundary watershed.	**SO 4.1**	Develop proposals to promote efficient water use.
		SO 4.2	Promote the implementation of interventions or projects for exploitation, efficient use and conservation of water resources.
		SO 4.3	Implement training and awareness-raising programmes on the efficient use of water resources.

Lines of action

Strategic objectives		Lines of action	
SO 1.1	Institutionalize the Catamayo-Chira IWRM Committee	**LA 1.1.1**	Strengthen the institutional capacities of entities related to water resources management.
		LA 1.1.2	Make up, set up and put into effect, the watershed`s IWRM Committee, within the framework of the Nine Watershed Commission.
		LA 1.1.3	Generate and implement binational instruments and mechanisms that enable the implementation of IWRM in the watershed.
		LA 1.1.4	Implement a binational information system for integrated water resource management in the watershed.
SO 1.2	Strengthen and promote the participation of stakeholders involved in the Catamayo-Chira IWRM Committee.	**LA 1.2.1**	Involve stakeholders in the watershed in programmes and projects linked to IWRM, utilizing approaches to gender, interculturality and intergenerationality.
		LA 1.2.2	Strengthen community management of water management, through awareness-raising campaigns and spaces for participation, integrating other stakeholders.
		LA 1.2.3	Develop and implement mechanisms for the prevention, analysis and management of conflicts related to water resources.
SO 2.1	Characterize the state of water sources and associated ecosystems.	**LA 2.1.1**	Implement a water resources quality monitoring plan for the basin.
		LA 2.1.2	Identify sources of water pollution
		LA 2.1.3	Identify and evaluate ecosystems affected by anthropic activities that alter the quality and quantity of water resources.
SO 2.2	Establish programmes for the protection, recovery and conservation of the quality and quantity of water resources.	**LA 2.2.1**	Formulate and implement projects to improve the quality of water sources.
		LA 2.2.2	Implement a binational network for monitoring water quality in the basin.
		LA 2.2.3	Formulate and implement proposals for controlling and monitoring water source pollution.
		LA 2.2.4	Implement technologies for efficient and responsible use of water.
		LA 2.2.5	Formulate and implement projects to regulate and improve water infiltration and surface runoff.

SO 2.3	Determine the supply and demand of water resources.	**LA 2.3.1**	Implement approved methodologies to determine supply and demand for groundwater and surface water.
		LA 2.3.2	Evaluate the hydrometeorological network in order to define modernization, supplementation, implementation and optimization needs.
		LA 2.3.3	Establish a binational network of hydrometeorological monitoring.
SO 3.1	Establish strategies for adaptation to and mitigation of climate change within the framework of water conservation.	**LA 3.1.1**	Identify and characterize the critical areas, vulnerability and risks associated with climate variability and climate change on water resources.
		LA 3.1.2	Design and implement adaptation measures to reduce vulnerability to the effects and consequences of climate variability and climate change.
SO 3.2	Implement programmes for the management of areas vulnerable to the effects of climate variability.	**LA 3.2.1**	Design and implement a programme of structural and non-structural measures for the management of vulnerable areas and risks associated with water resources.
		LA 3.2.2	Establish water protection zones in the margins along water bodies in the watershed.
SO 4.1	Develop proposals to promote efficient water use.	**LA 4.1.1**	Establish campaigns to formalize water users with water use and regulations.
		LA 4.1.2	Update the database of authorizations for the use and exploitation water resources.
SO 4.2	Promote the implementation of interventions or projects for exploitation, efficient use and conservation of water resources.	**LA 4.2.1**	Formulate and implement projects for the sustainable use of surface and underground water resources.
		LA 4.2.2	Implement water consumption measurement systems for water users in the watershed.
		LA 4.2.3	Identify and obtain funding for water resources use and conservation projects.
SO 4.3	Implement training and awareness-raising programmes on the efficient use of water resources.	**LA 4.3.1**	Raise awareness, sensitize and train water users in IWRM and water culture.
		LA 4.3.2	Strengthen ANA and SENAGUA training professionals to implement and execute training programs.
		LA 4.3.3	Incorporate water culture into the curricula of the educational institutiones in the watershed.
		LA 4.3.4	Establish a monitoring plan for follow-up and evaluation of the training activities for stakeholders in the watershed.

Source: Phase V binational workshop, Catamayo-Chira transboundary watershed, Piura, 2018.

Monitoring and evaluation indicators

General objectives		Indicators			Strategies
GO-1.	Strengthen binational institutionality to ensure the integrated management of water resources in the Catamayo-Chira transboundary watershed.	**I-GO-1.1**	Percentage of national institutions (Ecuador and Peru) involved in IWRM in the Catamayo-Chira transboundary watershed.	**S 1.1.1.**	Institutionalize the Catamayo-Chira IWRM Committee
		I-GO-1.2	Number of binationally agreed upon instruments implemented in the watershed.	**S 1.2.1.**	Strengthen and promote the participation of stakeholders involved in the Catamayo-Chira IWRM Committee.
GO-2.	Manage the quality and quantity of water resources in the Catamayo-Chira transboundary watershed.	**I-GO-2.1**	Number of parameters that meet the standards established in the binational water quality protocol.	**S 2.1.1.**	Characterize the state of water sources and associated ecosystems.
				S 2.1.2.	Establish programmes for the protection, recovery and conservation of the quality and quantity of water resources.
		I-GO-2.2	Percentage of the area of "water-generating ecosystems" under conservation actions.	**S 2.2.1.**	Determine the supply and demand of water resources.
GO-3.	Develop mechanisms for adapting to and mitigating the effects of climate change in the watershed.	**I-GO-3.1**	Percentage of vulnerable areas with adaptation and mitigation measures.	**S 3.1.1.**	Establish strategies for adaptation to and mitigation of climate change within the framework of water conservation.
				S 3.1.2.	Implement programmes for the management of areas vulnerable to the effects of climate variability.
GO-4.	Promote the efficient and sustainable use of water resources in the Catamayo-Chira transboundary watershed.	**I-GO-4.1**	Percentage of users that have flow measurement systems.	**s 4.1.1.**	Develop proposals to promote efficient water use.
				S 4.1.2.	Promote the implementation of interventions or projects for exploitation, efficient use and conservation of water resources.
		I-GO-4.2	Number of water users with the right to use water, granted.	**S 4.2.1.**	Implement training and awareness-raising programmes on the efficient use of water resources.

Source: Binational indicators workshop, Tumbes, 2019.

5.3. Zarumilla watershed

Vision of the watershed

This vision recognizes the current situation of the watershed and the construction of a desired model to be achieved. It was formulated by the stakeholders of the aforementioned watershed, as transcribed below:

Vision

By 2028, the Zarumilla River transboundary watershed is a model of integrated water resources management (IWRM), having policies, regulations and binational institutionality that guide and regulate the quantity, quality and availability of water resources, and the balance between supply and demand, which promotes the protection and management of natural ecosystems, the operation and maintenance of hydraulic infrastructure, the reduction of hydrological risks in the face of climate change and the sustainable use of water resources. This contributes to improved quality of life and border integration for the populations in the two countries.

Source: Phase I binational workshop, Zarumilla transboundary watershed, Huaquillas, 2018.

General objectives

The stakeholders participating in the workshops carried out within the TDA-SAP process, defined the general objectives for the Zarumilla transboundary watershed. These objectives are an outcome of the analysis carried out on the issues, the aforementioned watershed vision and policy guidelines. The general objectives are:

General objectives	
OG-1.	Strengthen binational institutionality to ensure the integrated management of water resources in the watershed and address pressures on ecosystems.
OG-2.	Ensure the quantity, quality and availability of water resources.
OG-3.	Promote the efficient and sustainable use and exploitation of water resources in the Zarumilla transboundary watershed.
OG-4.	Develop mechanisms for adapting to and mitigating the effects of climate variability and climate change.

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General objective 1: strengthen binational institutionality in order to ensure the integrated management of water resources in the watershed and address pressures on ecosystems.

This objective proposes addressing the identified deficiencies in the planning, administration and integrated management of water resources in the watershed at the binational level, as well as the nascent transboundary management.

General objective 2: ensure the quantity, quality and availability of water resources

This objective is proposed for addressing two significant problems in the transboundary watershed:

1. The alteration of the physical-chemical and/or biological characteristics of water resources.
2. The low availability of surface and ground water to meet water demand.

General objective 3: promote the efficient and sustainable use and exploitation of water resources in the Zarumilla transboundary watershed

This objective relates to the availability of surface and groundwater that is strongly dependent on seasonal and year-to-year climate variability, to the uncoordinated and weakly controlled water demand associated with socio-economic activities, as well as to the scarce hydraulic infrastructure (capture, piping and treatment), and the weaknesses in its operation and maintenance.

General objective 4: develop mechanisms for adapting to and mitigating the effects of climate variability and climate change

This objective is formulated to address five (5) problems identified in the transboundary watershed:

1. Elimination of the natural herbaceous, bushy and/or arboreal plant layer in the upper and middle watersheds, and changes in land use affecting water resources.
2. Impacts of climate change on the availability of water resources.
3. The low availability of surface and ground water to meet water demand.
4. Surface and ground water availability during the dry season (June-December) that is affected by climate variability and overexploitation of water resources.
5. Overflows and flooding

Strategic objectives

General objectives		Strategic objectives	
GO-1.	Strengthen binational institutionality to ensure the integrated management of water resources in the watershed and address pressures on ecosystems.	**SO 1.1**	Develop and implement instruments for integrated water resources management in the watershed.
		SO 1.2	romote and link the participation of stakeholders involved in ITWRM.
GO-2.	Ensure the quantity, quality and availability of water resources.	**SO 2.1**	Characterize the state of water sources and associated ecosystems.
		SO 2.2	Formulate and execute programs and projects that improve the quality and quantity of water resources.
GO-3.	Promote the efficient and sustainable use and exploitation of water resources in the Zarumilla transboundary watershed.	**SO 3.1**	Determine the supply and demand of water resources.
		SO 3.2	Regulate water use through the legal instruments established in both countries.
		SO 3.3	Define a training plan for stakeholders in the watershed related to the efficient and sustainable use of water resources.
		SO 3.4	Promote the implementation of projects for exploitation and conservation of water resources.
GO-4.	Develop mechanisms for adapting to and mitigating the effects of climate variability and climate change	**SO 4.1**	Include lines of action for water security in the watershed in ITWRM planning.
		SO 4.2	Define ecosystem restoration programs for conserving water resources in the watershed.

Lines of action

Strategic objectives		Lines of action	
SO 1.1	Develop and implement instruments for integrated water resources management in the watershed.	**LA 1.1.1**	Strengthen the institutional capacities of the entities related to water resources management.
		LA 1.1.2	Generate and implement binational instruments that enable the implementation of IWRM in the watershed.
		LA 1.1.3	Implement a binational information system for integrated water resource management in the watershed.
SO 1.2	Promote and link the participation of stakeholders involved in ITWRM.	**LA 1.2.1**	Involve stakeholders in the watershed in programmes and projects linked to IWRM, utilizing approaches to gender, interculturality and intergenerationality.
		LA 1.2.2	Strengthen community management of water management, through awareness-raising campaigns and spaces for participation and integration of other stakeholders.
		LA 1.2.3	Develop and implement mechanisms for the prevention, analysis and management of conflicts related to water resources.
SO 2.1	Characterize the state of water sources and associated ecosystems.	**LA 2.1.1**	Implement a binational monitoring plan for water resource quality for the watershed.
		LA 2.1.2	Identify sources of water resources pollution.
		LA 2.1.3	Identify ecosystems affected by anthropic activities that alter the quality and quantity of water resources.
SO 2.2	Formulate and execute programs and projects that improve the quality and quantity of water resources.	**LA 2.2.1**	Formulate and implement projects to improve water quality for human consumption, irrigation and other sectoral uses.
		LA 2.2.2	Design and implement projects for wastewater treatment and solid and liquid waste management.
		LA 2.2.3	Formulate and implement proposals for controlling and monitoring water source pollution.

SO 3.1	Determine the supply and demand of water resources.	**LA 3.1.1**	Implement approved methodologies to determine supply and demand for groundwater.
		LA 3.1.2	Characterize and evaluate the hydrometeorological, piezometric and hydrogeochemical network in order to define modernization, supplementation, implementation and optimization needs.
		LA 3.1.3	Establish a binational network of hydrometeorological, piezometric and hydrogeochemical monitoring.
SO 3.2	Regulate water use through the legal instruments established in both countries.	**LA 3.2.1**	Establish campaigns to formalize water users with water use and regulations
		LA 3.2.2	Apply administrative procedures to legalize illegal water users, according to the regulations of each country.
		LA 3.2.3	Update the database of authorizations for the use and exploitation of water resources.
SO 3.3	Define a training plan for stakeholders in the watershed related to the efficient and sustainable use of water resources.	**LA 3.3.1**	Design and implement a continuous training program in IWRM for stakeholders in the basin.
		LA 3.3.2	Strengthen ANA and SENAGUA training professionals to implement and execute training programs.
SO 3.4	Promote the implementation of projects for exploitation and conservation of water resources.	**LA 3.4.1**	Formulate and implement projects for the sustainable use of water resources.
		LA 3.4.2	Design and implement conservation programs for water ecosystems.
SO 4.1	Include lines of action for water security in the watershed in ITWRM planning	**LA 4.1.1**	Identify and characterize the critical areas, vulnerability and risks associated with climate variability and climate change on water resources in the watershed.
		LA 4.1.2	Structure a georeferenced database containing information on the risks and effects related to climate variability and climate change in the watershed.
		LA 4.1.3	Design and implement an effective communication and early warning system for extreme water events.
		LA 4.1.4	Design and implement programs to mitigate the effects of climate variability and climate change in the watershed.
SO 4.2	Define ecosystem restoration programs for conserving water resources in the watershed.	**LA 4.2.1**	Identify and quantify areas for restoration of degraded ecosystems or those in process of being degraded.
		LA 4.2.2	Develop and implement a program for restoring vegetation: reforestation, forest enrichment and natural regeneration.

Source: Phase V binational workshop, Zarumilla transboundary watershed, Tumbes, 2018.

Monitoring and evaluation indicators

General objectives		Indicators			Strategies
GO-1.	Strengthen binational institutionality to ensure the integrated management of water resources in the watershed and address pressures on ecosystems.	**I-GO-1.1**	Number of public and private institutions involved in ITWRM decision-making.	**S-1.1.1**	Develop and implement instruments for integrated water resources management in the watershed.
				S-1.1.2	Promote and link the participation of stakeholders involved in ITWRM.
GO-2.	Ensure the quantity, quality and availability of water resources.	**I-GO-2.1**	Percentage of the population with access to safe quality water.	**S-2.1.1**	Characterize the state of water sources and associated ecosystems.
		I-GO-2.2	Number of pollutant points needing mitigation measures.	**S-2.2.1**	Formulate and execute programs and projects that improve the quality and quantity of water resources.
GO-3.	Promote the efficient and sustainable use and exploitation of water resources in the Zarumilla transboundary watershed.	**I-GO-3.1**	Volume of water available in the basin	**S-3.1.1**	Determine the supply and demand of water resources.
				S-3.1.2	Regulate water use through the legal instruments established in both countries
		I-GO-3.2	Number of water users in the watershed with the right to use water, granted and updated.	**S-3.2.1**	Define a training plan for stakeholders in the watershed related to the efficient and sustainable use of water resources.
		I-GO-3.3	Number of users trained in IWRM in the watershed.	**S-3.3.1**	Promote the implementation of projects for exploitation and conservation of water resources
GO-4.	Develop mechanisms for adapting to and mitigating the effects of climate variability and climate change	**I-GO-4.1**	Number of public and private institutions applying lines of action in water security.	**S-4.1.1**	Include lines of action for water security in the watershed in ITWRM planning.
					Define ecosystem restoration programs for conserving water resources in the watershed.

Source: Binational indicators workshop, Tumbes, 2019.

6 Funding options

In order to reduce vulnerability from dependence on government budgets, which are usually limited and variable, potential funding sources and mechanisms have been identified to channel economic resources for the implementation of the SAP. Potential sources and financing mechanisms include:

- Public funds.
- International cooperation funds.
- Self-management funds (economic remuneration and fees).
- Other financing mechanisms.

Table 1 shows possible sources for financing the SAP with public funds and the institutions implementing the investment:

Table 1. Forms of financing

Sources of funding		Ecuador	Peru
Public funds	Ministry and sectoral institution budgets	*Source of funding*	
		Ministry of Economy and Finance	Ministry of Economy and Finance
		Ministries and sectoral institutions implementing the funds	
		Water resources management	
		Water Secretariat (SENAGUA by its Spanish acronym)	National Water Authority (ANA by its Spanish acronym)
		Environmental management and water resources quality	
		Ministry of Environment (MAE by its Spanish acronym)	Ministry of Environment (MINAM by its Spanish acronym)
		Irrigation and agricultural development	
		Ministry of Agriculture (MAG by its Spanish acronym)	Ministry of Agriculture and Irrigation (MINAGRI by its Spanish acronym)
		Water risk management	
		Secretariat for Risk Management (SGR by its Spanish acronym)	Secretariat for Disaster Risk Management (SGRD by its Spanish acronym)
		Generation and transfer of hydrometeorological information	
		National Institute of Meteorology and Hydrology (INAMHI by its Spanish acronym)	National Meteorology and Hydrology Service (SENAMHI by its Spanish acronym)
	Budgets of sectional and local bodies	**Autonomous Decentralized Provincial Government of Loja** Provincial planning, environmental management, management of irrigation infrastructure, agricultural and productive development	**Piura Regional Government** Designs and executes regional watershed and river defense programs
		Autonomous Decentralized Cantonal Governments of Zapotillo, Celica, Pindal, Macará, Paltas, Sozoranga, Calvas, Gonzanamá, Quilanga, Espíndola and Catamayo Provide public drinking water and sanitation services	**Province of Ayabaca, Piura, Sullana, Paita y Talara** Plan provincial development, guide urban growth actions and coordinate the delivery of interdistrict public services

Source: Phase V binational workshop, 2018.

While projects should be funded from a country´s own resources, co-funding is often necessary, and can come from international agencies and cooperating countries that are giving high priority to investments and commitments linked to integrated water resources management.

Table 2 displays the potential sources of external funding identified by key stakeholders and the entities eligible for accessing and implementing projects with these funds:

Table 2. Potential sources of funding

Country or head-quarters*	Name	Theme	Resource modality	Eligible entity
Germany	PPP, GIZ, DEG or SEQUÍA	Preparation and training for staff, use of clean and sustainable technologies, improvement of production standards, among others	Technical cooperation	Private enterprises
Germany and Latin American or Caribbean country	Regional Fund for the Promotion of Triangular Cooperation in Latin America and the Caribbean; GIZ	Sustainable development, third world countries	Technical cooperation, exchange of experts and knowledge	Public institutions
Germany	Savings Banks for International Cooperation Foundation	Support for financial institutions that promote sustainable economic and social development	Financial support	Financial institutions
Germany	Scientific Research Foundation Program (DFG)	Supports the realization of reserach ideas	Research funds	Non-university research institutions, scientific associations and science academies, government entities, individuals with scientific research projects
Ibero-America	South-South Experience Exchange Facility	Multi-donor trust fund that enables the exchange of experiences and knowledge development among World Bank countries	Technical cooperation, exchange of experts and knowledge	Public institutions
Canada	Grand Challenges Fund International Development Research Center (IDRC)	Inclusive economic growth, innovation; equitable access to health services; sustainable use of natural resources; development	IDRC offers scholarships, funding and awards to researchers and institutions	Research centers and researchers in Canada with developing countries, Ecuador and Peru are included

Country or head-quarters*	Name	Theme	Resource modality	Eligible entity
Canada	Canadian Fund for Local Initiatives	Multisectoral, Informacion	Small projects	Associations, NGOs
Spain	Water and Sanitation Cooperation Fund (FCAS), Spanish Coope-ration	Water and sanitation projects under a co-fi-nancing regime with national authorities in Latin America and the Caribbean	Targeted Loans (non-re-fundable)	Public adminis-trations: national, regional or local with sufficient ins-titutional capacity. Civil society: civil society organiza-tions, cooperatives and water and sa-nitation providers
United States	NASA Innovation Fund (NIF)	Professional instruction and training, volun-teering (science and technology)	Research funds	National bodies, D-NGOs
United States	Program for Research in Education	Education, development of scientific research	Research funds	D-NGOs, non-profit higher education institutions, priva-te higher educa-tion institutions, small businesses
United States	ACDI/VOCA	Support for sustainable agroproductive projects and local economies	Budgetary aid	Public institutions, organized legal institutions
South Korea	Green Climate Fund (GCF)	Mitigation and adapta-tion to climate change in the international community	Budgetary aid	International, regional, national or subnational institutions, public or private, that meet the Fund's standards
United States	Global Environment Facility (GEF)	Biodiversity, climate change, international waters, sustainable fo-rest management, land degradation, chemicals and waste in the context of development projects and programmes	Budgetary aid	Implemented through 18 imple-menting partners, including: UNDP, UNEP, World Bank, regional develo-pment banks and other specialized United Nations agencies

Country or head-quarters*	Name	Theme	Resource modality	Eligible entity
Japan	Non-refundable financial assistance from the Government of Japan	Basic infrastructure: drinking water system, sewerage, electricity, community bridges, retaining walls	Budgetary aid	Legally organized, non-profit and socially beneficial institutions; including sectional governments, as well as other institutions that work for the public welfare
New Zealand	Latin American Development Assistance Funds	Health, education, productive economy, local and/or regional development, gender equality, environmental sustainability, conflict prevention and management	Research funds	Public sector, private entities and D-NGOs
Belgium	Belgium Technical Cooperation (ENABEL)	Support in the construction of water treatment and supply facilities (retention basins, wells and treatment plants), capacity building in water management and urban sanitation, methods for saving water	Financial support	Public sector, private entities and D-NGOs
France	Farmers and veterinarians without borders (AVSF)	Creation and monitoring of a watershed committee for the protection and equitable distribution of water resources among local farmers in the central Andes	Research funds and technical training	Public administrations: national, regional or local with sufficient institutional capacity, civil society
Germany	German Association for Adult Education (DVV)	Education for sustainable development through training courses and eco-awareness-building events; environmental education	Research funds and technical training	Public administrations, schools, universities
United States	Water for People	Promote projects for access to quality drinking water and sewerage	Financial support	Public administrations, communities, private entities

Country or headquarters*	Name	Theme	Resource modality	Eligible entity
Spain	ETEA Foundation for Development and Cooperation	Promotion of human development and scientific research for development in developing countries, particularly in border areas	Research funds	Public and private administrations
Belgium	Islands of Peace	Promotion of self-management capacities through training programmes for populations in disadvantaged areas where development potentials exist	Training funds	Public administrations, populations and communities
Spain	Engineering Without Borders	Ensure access to basic services through citizen empowerment	Research funds and financial support	Public administrations, communities, universities
United States	CEIBA: Foundation for Tropical Conservation	Promote the protection of biodiversity and ecosystems	Research funds, training	Public administrations, communities
Chile	Latin American Center for Rural Development (RIMISP)	Support for territorial development, sustainable agriculture, responsible consumption and participatory governance	Financial support, research and training	Public administrations at national and territorial scale
United States	International Fund for Agricultural Development (FIDA)	Diversification in the rural economy	Financial support	Public administrations
United States	Conservation International Foundation (CI)	Development of technical and financial cooperation programmes and projects according to Ecuador's priorities, in the Coastal zone	Technical and financial support	Public administrations
Ecuador-Peru	Consortium for Sustainable Development of the Andean Ecoregion (CONDESAN)	Conservation of mountain ecosystems and the well-being of rural communities in the Andean region	Financial incentives supports, and research	Public administrations, communitites, universities

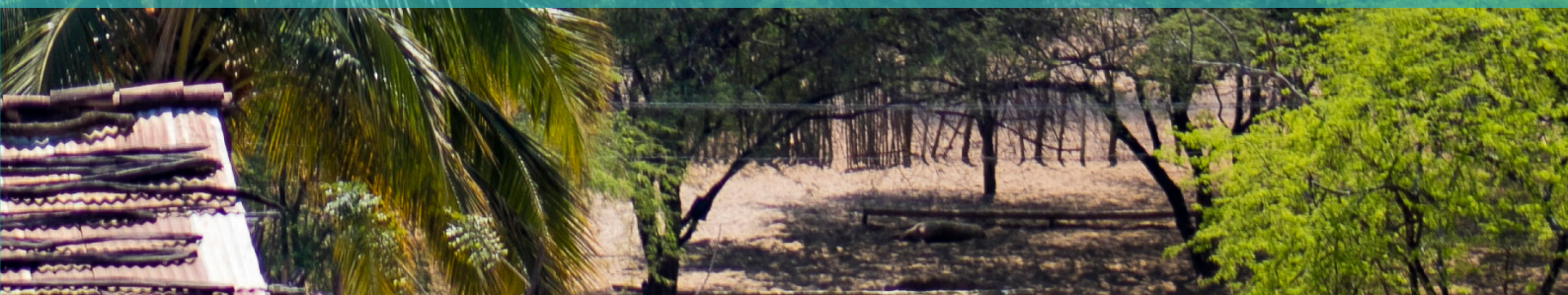
* Headquarters corresponds to the place of operation of the cooperating partner and is included only when the cooperating partner groups together several countries.

Prepared by: MAP&GIS Consultores Cía. Ltda., 2018.

A potential source of funding is through the implementation of financial mechanisms based on payment for the environmental services provided by transboundary watersheds. Other sources of funding to consider are water funds or trusts that can be capitalized with public funds, international cooperation funds, debt exchange resources and donations. This financial mechanism allows for planned resources to be obtained and handled directly and in a shorter time.

Workshop for the strategic situational analysis, definition of lines of action and identification of management initiatives in the Catamayo-Chira transboundary basin, October 11th of 2018. Piura, Peru.

7 Proposed governance structure



Peru and Ecuador have been reinforcing commitments and agreements in order to strengthen the governance of transboundary water resources. To this end it is essential to incorporate the different actors, internalize sustainable water management and develop coordination mechanisms at different levels.

Governance in the field of IWRM, between Ecuador and Peru, has made great strides, mainly through the establishment of the Peru-Ecuador Binational IWRM Commission, which establishes a new institutional framework on which governance modes will be devised for IWRM at the binational level.

The Peru-Ecuador Binational IWRM Commission is the body in which binational agreements are defined and consists of five representatives appointed by Peru and five representatives appointed by Ecuador, from institutions linked to water resources management and administration. It has a Binational Technical Secretariat and one IWRM Committee for each watershed.

In this context, the Technical Secretariat has the powers of articulation and coordination between the IWRM Committees for the implementation of policies and other instruments for planning and management of water resources in each watershed. In this sense, it has intra-institutional coordination powers within the framework of bilateral institutionality.

The IWRM Committees by watersheds have the functions of formulating, executing and implementing IWRM plans and coordinating with the relevant authorities for the implementation of socialization, dissemination, mutual cooperation, and awareness-raising actions. The Comittees receive recommendations from the Technical Secretariat for the settlement of disputes that could arise from the implementation of the plans.

Internal governance requires the specification of operational regulations for the respective Commission bodies, identification of interinstitutional coordination mechanisms including the development and management of information, as well as monitoring and evaluation mechanisms regarding compliance with policies and strategies.

External governance involves the coordination and participation of the different social, public and private stakeholders in the construction and implementation of the planning instruments for ITWRM. Three areas were identified in which coordination with the different actors should be made:

Development and exercise of strategies to promote integrated water resources management in the transboundary watersheds.

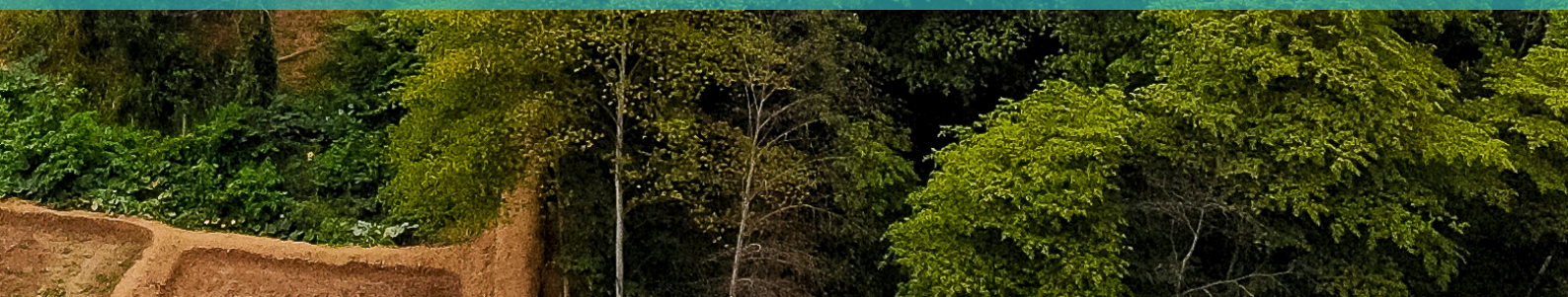
- Preparation and implementation of IWRM plans by Watersheds.
- Development and implementation of mechanisms for monitoring, joint follow-up and evaluation for the protection and conservation of natural water sources and water ecosystems proposed by the Binational Technical Secretariat.

The IWRM Committees by watershed, as the instances of the Commission that actually implement strategies and plans in the field, are considered the effective bodies for developing coordination with the different stakeholders. This coordination should establish the participatory mechanisms for the Committee to collect proposals from the stakeholders and report their criteria oriented at strengthening these instruments, for later approval by the Binational Commission.

The IWRM Committee by watershed, will, where possible, consider the interrelationships among the following sectors for the conservation and sustainable management of water resources: private, community, non-governmental organizations and academia.

For the implementation of governance, the Peru-Ecuador Binational IWRM Commission should have management tools to develop information and communication mechanisms (ICTs); and capacity building, which would allow them to know the scope and importance of the strategies and plans issued by the Peru-Ecuador Binational IWRM Commission.

8 Stakeholders and their participation in the implementation and review process



Stakeholder	Country	Function	Representation
Peruvian National Water Authority (ANA)	Peru	National Water Authority: manages, conserves and protects the water resources of the different watersheds.	National
Ecuadorian Water Secretariat (SENAGUA)	Ecuador	Governing body for the comprehensive and integrated management of water resources in watersheds	National
Puyango-Catamayo Hydrological District Jubones Hydrological District	Ecuador	Ensures the comprehensive and integrated management of water resources in the hydrological district, through decentralized planning, organization and implementation of policies, objectives, standards and technical instruments established by SENAGUA	Regional
Regional Water Fund of Southern Ecuador (FORAGUA)	Ecuador	Manages the economic resources for an environmental fee that are collected by each of the 12 municipalities affiliated with this trust. These resources are invested exclusively in the conservation, recovery and protection of environmental services and biodiversity of fragile and threatened ecosystems.	Regional
Piura Regional Government	Peru	Promotes and regulates environmental activities and/or services; it is the exclusive authority for the design and implementation of regional programmes for watersheds, economic corridors and medium-sized cities, and shares authority for the sustainable management of natural resources and improvement of environmental quality.	Regional
CRHC San Lorenzo	Peru	Coordinates the active participation of the members of the National Water Resources Management System.	Local
ALA San Lorenzo ALA Tumbes	Peru	Manage the water resources in their respective territorial areas.	Local

9 Contact points for the implementation authority in each country

Ecuador

- Water Secretariat, Undersecretary Social and Articulation of Water Resources
  Dr. Manuel Norberto Núñez Núñez
- Director of Territorial and Intersectoral Articulation
  Sr. Luis Arturo Cevallos Salas
- Technical Analyst for Territorial and Intersectoral Articulation
  Ing. José Oswaldo Ganzhi

Peru

- National Water Authority, Water Resources Planning and Development Directorate
  Ing. José Ramos Abasolo Tejada.
- Specialist in Water Resources Management in Transboundary Watersheds
  Ing. Hanny María Quispe Guzmán

10 Photographic record

Workshop for situational analysis, definition of lines of action and identification of management initiatives in the Zarumilla transboundary basin, October 16th and 17th of 2018. Tumbes, Peru

Workshop for the analysis and proposal of the logical framework matrix and indicators for the Strategic Action Programmes (SAPs) of the three transboundary basins, July 4th and 5th of 2019. Tumbes, Peru.

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Acronyms

Peru	
ALA	Local Water Administration
ANA	National Water Authority
CRHC	Basin Water Resources Council
MINAM	Ministry of Environment
MINAGRI	Ministry of Agriculture and Irrigation
SENAMHI	National Meteorology and Hydrology Service
SGRD	Secretariat for Disaster Risk Management

Ecuador	
FORAGUA	Regional Water Fund
GAD	Decentralized Autonomous Government
INAMHI	National Institute of Meteorology and Hydrology
MAE	Ministry of Environment
MAG	Ministry of Agriculture
SENAGUA	Water Secretariat
SGR	Secretariat for Risk Management

Others	
ACDI/VOCA	Agricultural Cooperative Development International / Volunteers in Overseas Cooperative Assistance
AVSF	Agronomes et veterinaires sans frontieres
CI	Conservation International Foundation
CONDESAN	Consortium for Sustainable Development of the Andean Ecoregion
DEG	German Investment Corporation
DFG	Scientific Research Foundation Program
DH	Hydrological District
DVV	German Association for Adult Education
ENABEL	Belgian Development Agency
FCAS	Water and Sanitation Cooperation Fund
FIDA	International Fund for Agricultural Development
GCF	Green Climate Fund
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IWRM	Integrated Water Resources Management
ITWRM	Integrated Transboundary Water Resources Management
RIMISP	Latin American Center for Rural Development
SAP	Strategic Action Programme
TDA	Transboundary Diagnostic Analysis
UNDP	United Nations Development Programme

"…consolidate bilateral cooperation for the better use and management of water resources in transboundary river basins"

(Art. 3 of the Agreement establishing the IWRM Commission Peru - Ecuador, October 2017)

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