PRESENTATION NOTES
Water Resources Management Plans: Beyond Grey Infrastructure

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I begin my speech sharing part of the historical and cultural heritage of my country, it has an ancient culture that preceded the Empire of the Incas, today is a matter of admiration for the whole world. Therefore, it should be mentioned that Water Management in Peru dates back more than 5000 years; according to the research of Dr. Ruth Shady, she points out that **Caral** is the oldest civilization in America (located 182 km north of Lima), under the paradigm of a peaceful society that flourished for about 1000 years. The ruling elite of this civilization, read the behavior of the weather, which allowed them to predict whether the year was going to be good or bad in terms of water availability, a vital resource for domestic use and work: agriculture, fishing and trade, mainly.

The Peruvian climate is determined by its geographical location, the presence of the Andean mountain range, the cold water current (Humboldt current) and the warm water El Niño current. This determines that the spatial and temporal distribution of rainfall is very uneven, at the same time determining 84 life zones of 117 of the world. In general terms, the Peruvian coast is a desert (1.7% of fresh water) and as we ascend in the mountains to the headwaters of the basin, the humidity is increasing where it becomes maximum. The eastern slope that drains the Amazon has high humidity (97% of freshwater) and the Titicaca slope has little more than 0.5% of freshwater.

In the current context of adaptation to climate change, we should mention that the cities of **Cairo** in Egypt and **Lima** in Peru (classified as megacities, for having a population of more than 10 million inhabitants), are located in a desert ecosystem, despite this there is a big difference with which my country must deal, While the Nile River provides an average annual flow of more than 3,000 m3/s, our main source, the Rimac River, only has an average annual flow of 27 m3/s, which determines the enormous challenge for all the actors involved in the basin in the mission of providing water security to the city of Lima, which represents a huge challenge at regional and global level.

Because of these conditions, Peru is highly vulnerable to the effects of climate change, to cite one evidence: in the last 50 years we have lost 51% of the coverage of tropical glaciers, which represented water reserves for the dry seasons. It is evident that the hydrological cycle is affected producing more frequent extreme events such as the "El Niño" phenomenon, periods of more intense rains in short periods of time and more severe and prolonged dry seasons, causing social and economic losses, which in 2017 represented **1.6%** of our GDP. (3,000 million dollars, 2021)

It is important to note that Peru has been assuming its firm commitment to the global efforts undertaken by the United Nations Framework Convention on Climate Change, the Paris Agreement of 2015, being in Peru the competent authority on the matter the Ministry of Environment and as a sectoral authority the Ministry of Agrarian Development and Irrigation, sector to which ANA is attached. In this regard, we have identified priority thematic areas to address the effects of climate change: Agriculture, Fisheries and Aquaculture, Forestry, Health, **Water,** Tourism and Transport.

In this adverse scenario, it is clear that climate change poses serious problems and challenges to water resources management, however, in the National Water Authority (ANA) we believe that it also provides opportunities to strengthen our National Water Resources Management System (SNGRH), putting into action public and private stakeholders and citizens to become aware of the serious problem we face; Therefore, we highlight the importance of our Basin Water Resources Councils, to implement a new adaptive and resilient water culture to climate change through the Basin Water Resources Management Plans.

It is important to mention as national management tools, the National Plan for Adaptation to Climate Change, which considers the implementation of 92 adaptation measures and 62 mitigation measures, as Nationally Determined Contributions (NDC), of which 31 NDC correspond to the thematic axis water, corresponding to the following uses: agricultural, population, energy and **multisectoral**. In this regard, ANA as the regulatory technical governing body of the National Water Resources Management System - SNGRH, has a roadmap in the NDCs and has prioritized the monitoring of the implementation of 08 Adaptation Measures, in Water in its multisectoral use component in basins vulnerable to climate change, being the following:

- Implementation of major hydraulic infrastructure for multi-sectoral use.
- **Conservation and recovery of natural infrastructure for the provision of water ecosystem services.**
- Implementation of Early Warning Systems for floods, droughts, floods and glacial hazards.
- Implementation of monitoring and surveillance of the quality of water resources.
- Implementation of a hydrometric network for water collection and distribution in major and minor hydraulic infrastructure.
- Modernization of the granting of water use rights.
- Promotion of multi-sectoral and multi-stakeholder articulation mechanisms for IWRM in the face of the effects of Climate Change.
- Implementation of information services for multi-sectoral water resources planning and management.

Regarding the Planning of Water Resources in Peru, the last century the government focused on managing the supply and provision of water through gray infrastructure, which is why through international indebtedness large hydraulic projects are

executed, mainly for irrigation purposes, which to date operate with the participation of Regional Governments (GOREs) and Special Projects of the central government. Since 2010, the basins that have water regulation infrastructure such as dams and water diversions were prioritized by ANA's Water Resources Management Modernization Project to create Basin Water Resources Councils (CRHC) and the development of their respective Management Plans, within the framework of the Water Resources Law 29338.

Currently the basin areas that have Management Plans are the CRHCs: Tumbes, Chira-Piura, Chancay-Lambayeque, Chancay-Huaral, Quilca-Chili and Caplina-Locumba; these management plans approved in 2014 and 2015, having completed the short-term planning period (5 years), are being updated within the framework of water security, climate change adaptation, risk management and with cross-cutting approaches: gender equity, interculturality and intergenerationality.

Regarding Natural Infrastructure (NI) and nature-based solutions (NBS), significant interventions related to nature-based solutions with community participation in the high Andean watersheds began to be carried out in Peru 40 years ago. The National Programme for Watershed Management and Soil Conservation in Peru - PRONAMACHCS created in 1981 (currently called AGRORURAL) can be cited as a reference. These interventions were concentrated in the upper parts of the basins where the main actors are the peasant communities, which, due to their ethnic-cultural diversity, maintain traditions of community organization and ancestral knowledge that allow them to manage their water resources and incorporate pressurized irrigation techniques due to the topographical advantages provided by the terrain.

The main interventions of this project are: reforestation with native species, afforestation, gully control, terraces, terraces, terraces and / or soil conservation practices, infiltration ditches, and water catchment areas, among others. As for ancestral knowledge, we can cite an emblematic one called Amunas or mamanteo, which is to lead the water from a stream in the rainy season and lead it to sectors of the communal territory with geological characteristics that allow infiltration and storage which is then available in lower parts as springs that are used in summer season. The community of San Andrés de Tupicocha in the province of Huarochiri in Lima, is a reference that to date maintains the practical use of this ancestral technique.

Regarding investments in IN and SbN, we can mention that: in the National System of Multiannual Programming and Investment Management, known as INVIERTE.PE, we have identified projects related to Natural Infrastructure and SbN (GOREs, Agrorural) amounting to 120 million soles (40 million dollars). (Forest Trends, 2020)

The Authority for Reconstruction with Change (ARC), through integrated solutions, plans to intervene in 17 watersheds in 7 prioritized regions, through the G2G agreement (Peru-Ingland) for an amount of 600 million soles (150 million dollars). (ARC, 2021)

The implementation of MERESE in the Sanitation Service Provider Companies EPS (water use for population purposes), only in Lima has collected in the last 5 years the amount of 160 million soles (40 million dollars).
Regional Water Funds: Aquafondo, FORASAN, Quiroz-Chira Fund. These are financing mechanisms similar to the MERESE, but relate contributors and retributors multisectoral actors, with their investments being destined to IN and SbN projects in basin headwaters. Investments of around 1 million dollars per basin annually.

Therefore, it can be estimated that, in the next 5 years, an investment in the order of 250 million dollars will be mobilized in IN and SbN.

In conclusion, we can affirm that Peru has a marked geography due to the presence of the Andes Mountains, two main currents of the Pacific Ocean that determines a desert water regime on the Pacific coast and a tropical rainforest on the Amazon slope. The strategic natural infrastructure is located in the upper part of the basins, allowing our country to complement the major water planning with gray infrastructure with nature-based solutions for water consolidation and flood control of our big cities. Adaptive co-management of water resources, considering nature-based solutions, contributes to water security and increases the resilience of multi-sectoral stakeholders in watersheds in a context of climate change.