

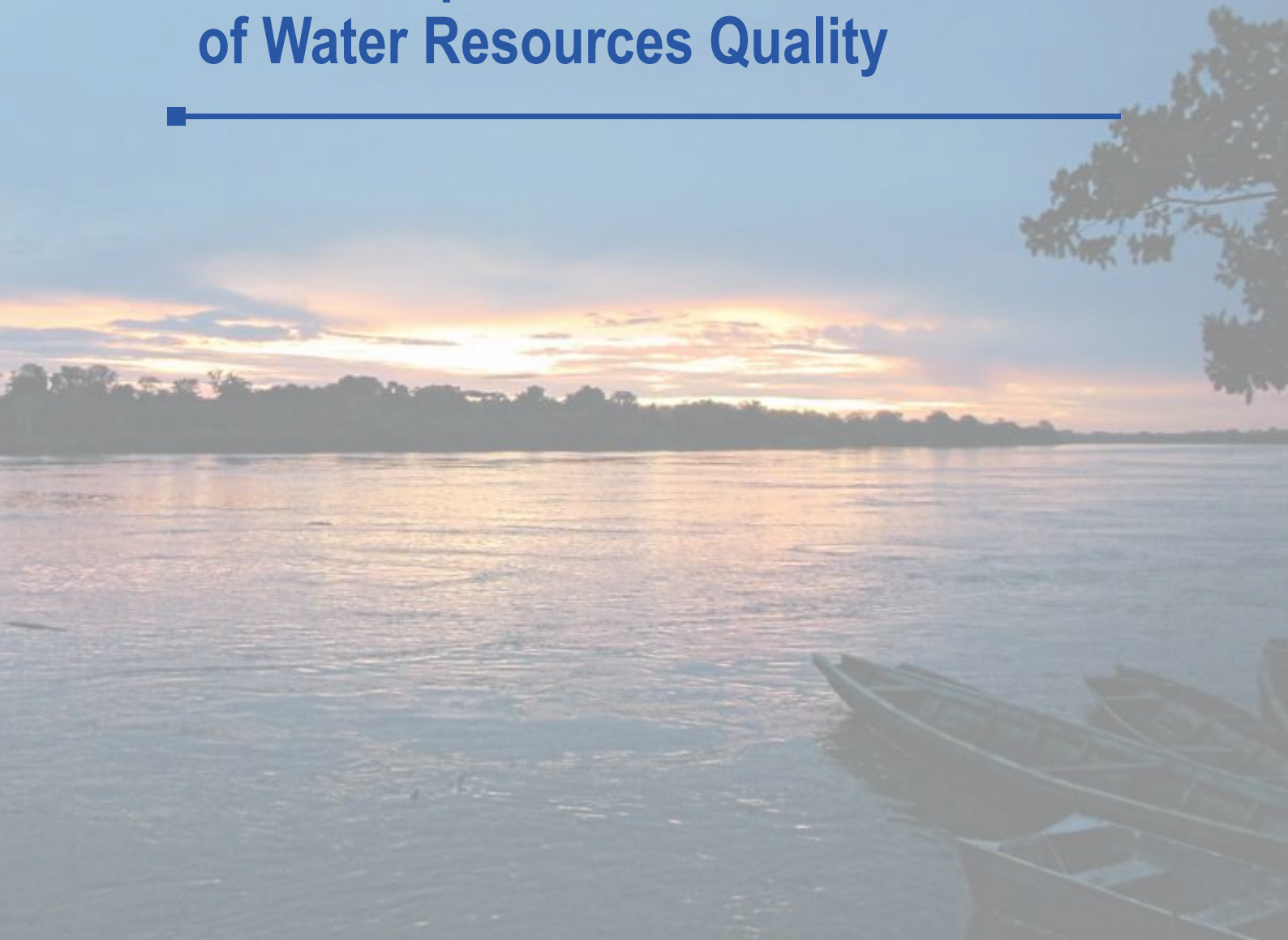
National Strategy for the Improvement of Water Resources Quality



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National Strategy for the Improvement of Water Resources Quality



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RESOLUCIÓN JEFATURAL N° 042-2016-ANA

Lima, 16 FEB 2016

VISTO:

El Memorando N° 081-2016-ANA-DGCRH de fecha 15 de enero de 2016, y el Informe Técnico N° 006-2016-ANA-DGCRH-GECRH, de fecha 15 de enero de 2016, ambos del Director de la Dirección de Gestión de Calidad de los Recursos Hídricos de la Autoridad Nacional del Agua; y,

CONSIDERANDO:

Que, el artículo 14° de la Ley N° 29338, Ley de Recursos Hídricos establece que la Autoridad Nacional del Agua es el ente rector y la máxima autoridad técnico-normativa del Sistema Nacional de Gestión de los Recursos Hídricos;

Que, por su parte, el artículo 193° del Reglamento de la Ley de Recursos Hídricos aprobado por Decreto Supremo N° 001-2010-AG, determina que la planificación de los recursos hídricos tiene por objeto promover su uso sostenible, equilibrar la oferta con la demanda del agua, la conservación y la protección de la calidad de las fuentes naturales, en armonía con el desarrollo nacional, regional y local, así como la protección e incremento de la cantidad de la disponibilidad de agua;

Que, bajo este contexto, mediante Decretos Supremos N° 006-2015-MINAGRI y 013-2015-MINAGRI se aprobaron la Política y Estrategia Nacional de Recursos Hídricos y el Plan Nacional de los Recursos Hídricos, respectivamente;

Que, asimismo, mediante Resoluciones Jefaturales N°s 112-2014-ANA, 113-2014-ANA, 117-2014-ANA, 118-2014-ANA, 119-2014-ANA y 131-2014-ANA, se aprobaron los planes de gestión de recursos hídricos de las cuencas Quilca-Chili, Chira-Piura, Tumbes, Chancay-Lambayeque, Chancay-Huancayo, y Caplina-Icumbia, respectivamente;

Que, mediante el Informe del Visto, el Director de la Dirección de Gestión de Calidad de los Recursos Hídricos de la Autoridad Nacional del Agua, señala que la "Estrategia Nacional para el Mejoramiento de la Calidad de los Recursos Hídricos" fue elaborada en un proceso participativo a través de talleres a nivel nacional en los que se socializaron la estrategia y el plan de acción que involucra acciones estratégicas técnicas, normativas y de gestión; metas a corto, mediano y largo plazo, actores, indicadores y resultados esperados en un horizonte propuesto de diez años (2016 - 2025);

Que, en ese sentido mediante Resolución Jefatural N° 234-2015-ANA, de fecha 07 de setiembre de 2015, se pro público, el Proyecto de Estrategia Nacional para el Mejoramiento de la Calidad de los Recursos Hídricos, a fin de que los interesados remitan sus opiniones y sugerencias;



Que, de igual forma, el Director de la Dirección de Gestión de Calidad de los Recursos Hídricos de la Autoridad Nacional del Agua, señala que habiéndose consolidado y analizado los reportes efectuados por los interesados, a la "Estrategia Nacional para el Mejoramiento de la Calidad de los Recursos Hídricos", y encontrándola conforme solicita su aprobación;

Que, en consecuencia, corresponde aprobar la "Estrategia Nacional para el Mejoramiento de la Calidad de los Recursos Hídricos", la misma que tiene por objetivo recuperar y proteger la calidad de los recursos hídricos, a través del fortalecimiento de la institucionalidad para la gestión integrada de los Recursos Hídricos.

Con la Conformidad de la Dirección de Gestión de la Calidad de Recursos Hídricos, los vistos de la oficina de Asesoría Jurídica, de la Secretaría General y en uso de las facultades conferidas por el artículo 11 del Reglamento de Organización y Funciones de la Autoridad Nacional del Agua aprobado por Decreto Supremo N° 008-2010-AG

SE RESUELVE:

Artículo 1°.- Aprobación

Aprobar, la Estrategia Nacional para el Mejoramiento de la Calidad de los Recursos Hídricos, como instrumento que promueve y orienta las acciones estructurales y no estructurales requeridas para la recuperación y protección de la calidad de los recursos hídricos.

Artículo 2°.- Difusión

Encargar a la Dirección de Gestión de Calidad de los Recursos Hídricos y a la Dirección de Gestión del Conocimiento y Coordinación Interinstitucional las acciones de articulación, para la adecuada difusión e implementación de la Estrategia Nacional para el Mejoramiento de la Calidad de los Recursos Hídricos.

Artículo 3°.- Gastos

Procurar que la presente resolución no imonga gasto alguno al pliego presupuestal de la Autoridad Nacional del Agua.

Artículo 4°.- Publicación

Dispóngase la publicación de la presente Resolución Estatal y de la Estrategia Nacional para el Mejoramiento de la Calidad de los Recursos Hídricos en el portal web de la Autoridad Nacional del Agua, www.ana.gob.pe.

Regístrese, comuníquese y publíquese



JUAN CARLOS SEVILLA GILDEMEISTER
Jefe
Autoridad Nacional del Agua



Executive Summary

Peru, a country privileged by its water supply, has an average annual water volume of 1'768,512 MCM; 97,2% of the total volume corresponds to the Amazon Region, where 30% of the population lives; 0,5% is located in the Titicaca Region that houses 5% of the population; and the remaining 1,8% corresponds to the Pacific Region where 65% of the population lives.

Water is a renewable natural resource that satisfies the demand of population and productive activities, and is also essential for the maintenance of aquatic and terrestrial ecosystems. The availability of this resource is affected by the population growth with its consequent territorial use that prioritizes population use over ecosystem services, the uneven spatial distribution of water by region, temporal and climatic variability and extreme events, determine significant differences in its availability.

The National Water Resources Management System (SNGRH) ensures the protection, sustainable use and recovery of water resources quality through watershed management plans that contribute to the improvement of quality of life for populations and ecosystems.

The institutional capacity of the water resources quality management has taken an important step forward by creating Watershed Water Resources Councils. They are spaces of coordination aimed at initiating a multi-sectoral management of water.

By passing Act No. 29338, the Water Resources Act (LRH) and its Regulations, a new political, regulatory and institutional framework is initiated. The National Water Authority becomes the governing body of SNGRH that leads processes of integrated management and protection of water resources, their ecosystems and associated assets in the watershed areas. This political framework is consolidated with the enactment of Supreme Decrees No. 006-2015-MINAGRI and No. 013-2015-MINAGRI, which approve the National Water Resources Policy and Strategy (PENRH) and the National Water Resources Plan (PNRH), respectively.

Since 2009, the National Water Authority has been gradually executing water resources monitoring actions that include monitoring and identification of polluting sources in order to assess the water quality conditions of various natural water bodies (rivers, lakes and ponds). These actions have resulted in some parameters exceeding the Environmental Quality Standards (ECA) for water in 41 hydrographic units. In addition, a problem associated with the dumping of untreated wastewater, an inadequate management of solid waste, environmental liabilities (mining, hydrocarbons, agricultural and population), informal and illegal mining, and others associated with the natural characteristics of watersheds.

In this sense, the National Strategy for the Improvement of Water Resources Quality defined the technical, regulatory and management actions to be taken over a ten-year period (2016-2025) and distributed them in three lines of action: recovery of water resources quality (reduction of the polluting load produced by wastewater dumping and remediation of environmental liabilities), protection of water resources and institutional strengthening for water resources management.

As the implementation process is harmonized with national planning instruments such as the National Environmental Action Plan, the National Water Resources Policy and Strategy and the National Water Resources Plan, it is expected to achieve the gradual recovery of water resources quality, establish the compliance with articulated mechanisms for the protection and strengthening of the integrated water resources management.



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INTRODUCTION

1. Introduction

Water is a national heritage and a public property (Act No. 29338, 2009) that should be used in harmony with the common good by integrating social, cultural, economic, political, and environmental values. To this end, the Government promotes the articulation of water resources policies with territory, conservation and efficient use of natural resources policies at local, regional and nationwide levels. It will also promote the development of water culture aimed at raising citizens' awareness on the issue of water resources quality.

Peru, a country privileged by its water supply, has an average annual water volume of 1'768512 MCM that concentrates 97,2% of the Amazon Region volume, where 30% of the population lives; 0,5% is located in the Titicaca Region that houses 5% of the population; and the remaining 1,8% corresponds to the Pacific Region where 65% of the population lives. (See Figure 1).



Figure 1. Water Availability

Water is a renewable natural resource that satisfies the demand of population and productive activities, and is also essential for the maintenance of aquatic and terrestrial ecosystems. The availability of this resource is affected by the population growth with its consequent territorial use that prioritizes population use over ecosystem services, the uneven spatial distribution of water by , region temporal and climatic variability and extreme events, determine significant differences in its availability.

The National Water Authority (ANA), the governing body of the National Water Resources Management System, through the coordinated action of the Directorate of Water Resources Quality Management (DGCRH) and the Water Resources Management Modernization Project (PMGRH) considers as a priority, within the framework of the National Water Resources Policy and Strategy (PENRH), as part of the National Environmental Management System (SNGA) and the National Environmental Action Plan for 2021 (PLANAA), the development of a set of strategic actions to guide stakeholders'

interventions, who are involved in water resources quality management, in order to recover and protect its quality.

The country's water resources have significant differences in terms of availability due to population growth, the land use change that prioritizes urban use, the uneven spatial distribution of water and its seasonal variability. In addition, inadequate management of wastewater, solid waste generated by the population, agrochemical residues from agricultural activities, presence of hydrocarbon and mining environmental liabilities, informal and illegal mining; deforestation activities; in addition to environmental factors and natural characteristics, show an impact on water resources quality, which is described in Technical Report No. 004-2014-ANA-DGCRH.

This document sets out an action plan that involves strategic, technical, regulatory and management actions, short-, medium-, and long-term goals, stakeholders, indicators and expected results over a ten-year period (2016-2025).

In addition, it includes the contributions made by stakeholders participating in regional and macro-regional workshops organized by ANA, as well as central government stakeholders and mining, oil, energy, agricultural, industrial, and fishery companies during 2014.





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A wide-angle landscape photograph showing a calm, blue lake in the foreground. The middle ground is a grassy, yellowish-brown plain with scattered dark rocks. In the background, there are rugged, dark mountains with some reddish-brown patches, likely volcanic. The sky is clear and blue.

LEGAL FRAMEWORK



2. Legal and Strategic Framework

- ◆ Political Constitution of Peru, 1993
- ◆ Act No. 26821, Organic Law for the Sustainable Use of Natural Resources
- ◆ Act No. 28611, General Environmental Act
- ◆ Act No. 28245, Framework Law of the National Environmental Management System
- ◆ Supreme Decree No. 012-2009-MINAM, National Environmental Policy
- ◆ Act No. 29338, Water Resources Act
- ◆ Supreme Decree No. 001-2010-AG, Water Resources Act Regulations
- ◆ Government Policy No. 33 of the National Accord
- ◆ Supreme Decree No. 014-2011-MINAM, National Environmental Action Plan 2011-2021
- ◆ Supreme Decree No. 006-2015-MINAGRI, National Water Resources Policy and Strategy
- ◆ Supreme Decree No. 013-2015-MINAGRI, National Water Resources Plan
- ◆ Administrative Resolution No. 112-2014-ANA, Approval of Water Resources Management Plan in Quilca-Chili Watershed
- ◆ Administrative Resolution No. 113-2014-ANA, Approval of Water Resources Management Plan in Chira-Piura Watershed
- ◆ Administrative Resolution No. 117-2014-ANA, Approval of Water Resources Management Plan in Tumbes Watershed
- ◆ Administrative Resolution No. 118-2014-ANA, Approval of Water Resources Management Plan in Chancay-Lambayeque Watershed.
- ◆ Administrative Resolution No. 119-2014-ANA, Approval of Water Resources Management Plan in Chancay-Huaral Watershed.
- ◆ Administrative Resolution No. 131-2014-ANA, Approval of Water Resources Management Plan in Caplina-Locumba Watershed.





**WATERSHED WATER RESOURCES
QUALITY STATUS NATIONWIDE**

3. Watershed Water Resources Quality Status Nationwide

Peru has a vast mineralogical natural wealth due to the geological conditions that affect the quality of water resources. In addition, man-made transformative actions exerted on the environment may cause positive or negative impacts, which will alter the quality of natural inland and coastal marine bodies of water due to productive and population activities.

In a first approach to water resources situation, the information on water resources quality was collected between 2000 and 2012, and a database with a total of 64 030 data from 331 monitoring in 59 hydrographic units, was established¹.

The water quality assessment considered physical and chemical parameters (pH, electrical conductivity, and biochemical oxygen demand), microbiological parameters (thermotolerant coliforms), metalloids (arsenic As), and metals (mercury Hg, cadmium² Cd, lead Pb, iron Fe, and copper Cu) due to their use as environmental indicators of impact on natural bodies of water. In addition, the uses of water were considered in accordance with the water resources classification established under Decree Law No. 17752, General Water Act in force until March 31, 2009, and the sanitary classification of surface water resources by Directorial Resolution No. 152-2005-DIGESA/SA; as well as Act No. 29338, Water Resources Act, currently in force since April 1, 2009, with the publication of the classification of natural bodies of surface and coastal marine water by Administrative Resolution No. 202-2010-ANA.

Results in water resources quality for the period 2000-2012 show that parameters based on thermotolerant coliforms, arsenic, lead, and cadmium associated with population wastewater dumping, mining environmental liabilities, informal mining, and hydrogeological characteristics have different levels of impact on water resources quality for irrigation purposes (on all three regions) and domestic use (Pacific and Amazon Regions).

¹ Information on water resources quality (2000-2012) developed by institutions such as the General Directorate of Environmental Health (DIGESA), National Institute of Environmental Resources (INRENA), Geological, Mining, and Metallurgical Institute (INGEMMET), Water Resources Management Modernization Project (PMGRH) and the Directorate of Water Resources Quality Management (DGCRH), in accordance with the Registry of surface water quality monitoring, 2012.

² Only for irrigation purposes.

In addition, thermotolerant coliforms, DBO₅, and lead (Amazon Region); DBO₅, cadmium, arsenic and lead (Pacific Region), and pH, arsenic, cadmium, lead and mercury (Titicaca Region) show different levels of impact on the quality of water resources for aquatic environment conservation. These are related to population wastewater dumping, mining environmental liabilities, informal mining, and others linked to watershed natural characteristics.

Since 2009, the National Water Authority (ANA) has been gradually implementing monitoring actions with the main objective of assessing the water quality status of various natural bodies of water (rivers, lakes, and ponds), as a basis for establishing strategies aimed at the protection and recovery of water quality.

By the end of 2015, 125 hydrographic units were monitored, which represents 84% of the total on a nationwide scale (159 hydrographic units), in addition to the monitoring of Titicaca Lake and main bays such as Sechura, Paíta, Talara and Ferrol, which are not considered as hydrographic units.

As a result of the monitoring carried out until 2014, ANA has identified 41 hydrographic units whose parameters exceed the ECA for Water.³; It is clear that the main cause of impacts on the country's water bodies is the dumping of domestic and municipal wastewater, which modifies or alter the quality of water with fecal bacteria, organic matter, ammonia, nitrites and other parameters that do not allow its use for agricultural purposes, drinking water production and aquatic environment conservation, among others⁴.

Since 2010, the National Water Authority prioritized its intervention in the identification of potential sources of water resources quality deterioration in 37 hydrographic units, including the pilot watersheds of the Water Resources Management Modernization Project⁵.

³ Supreme Decree No. 002-2008-MINAM, enforced by Supreme Decree No. 003-2010- MINAM

⁴ Technical Report No. 021-2015-ANA-DGCRH-GOCRH. Water Quality in Watersheds Nationwide.

⁵ Pilot watersheds of the PMGRH: Chili, Chancay-Lambayeque, Chancay-Huaral, Tumbes, Chira- Piura, Locumba-Sama-Caplina.

During the period 2013-2014, a total of 4 147 sources of impact were identified in all three drainage regions. The Pacific Region presented 2 283 sources representing 55 %, the Amazon' Region shown 1.602 (39 %) and the Titicaca Region recorded 262 sources (6 %). Similarly, population wastewater dumping is the main source of constraint on the resources assessed (1 709 sources, 41% of the total), followed by inadequate disposal of solid waste (911 sources, 22% of the total).

3.1. Factors influencing Water Resources Quality

Water resources quality is affected by two main factors:

A. Anthropogenic factors.

It includes population and productive activities using water from its natural source, which leads to dumping of untreated wastewater (See Figure 2).

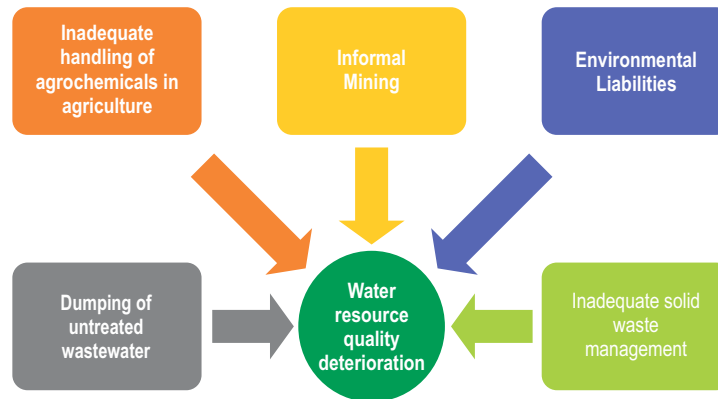


Figure 2. Anthropogenic factors affecting water sources

B. Natural factors.

It refers to what is related or produced by nature, without human intervention (See Figure 3).



Figure 3. Natural factors affecting water sources

3.2. Description of Water Resources Pollution Sources

Effluents Produced by the Population

- Wastewater generated by the population is of residential, commercial, and industrial origin that contains physiological and other waste from population activity. These contain pathogenic microorganisms, organic matter, detergents, and other chemicals.

The treatment and final disposal is carried out by sanitation service providers (EPS), municipalities and administrative boards of sanitation services (JASS).

In Peru, the sanitation sector faces two major problems:

Over 50% of wastewater treatment plants (PTAR) are overloaded.

Only 48% of wastewater is treated in some way (SUNASS, 2012)

On average, 2 59 million m³ of wastewater is dumped to sewage systems and requires treatment prior to its disposal into the environment or its reuse. (SUNASS, 2015).

Of the 253 localities within the EPS area, 164 dump all or part of their wastewater into the sewage system, which is led to a wastewater treatment plant; 89 do not have a wastewater treatment, and, in 2013, they dumped a total of 298 000 m³/day of raw wastewater directly into rivers, seas, pampas and drains, which represents 12% of all wastewater dumped into the sewage system of the EPS (SUNASS, 2015).

As of July 2014, 204 PTAR already built and under construction were identified within the EPS area, 172 of which are already built (144 PTAR operated by the EPS, 19 PTAR in transfer process, and nine 9 PTAR out of operation) and the remaining 32 PTAR are under construction (19 in process and 13 at standstill). Of the latter, 11 will replace existing PTAR and the others will expand wastewater treatment coverage (SUNASS, 2015).



- ◆ **Effluents from Agricultural Activities**

Agricultural wastewater is represented by drainage water from crop fields, which drags agrochemicals waste (pesticides and synthetic fertilizers) used in this activity, as a means to improve productivity.

At present, high-performance productive agriculture cannot be conceived without the aid of synthetic organic pesticides (Dierksmeier, 2001) and, in the case of pesticides, as with any other toxic material, its use is associated with a risk.

Pesticides can move around the earth's surface, either dragged by water through rainfall, irrigation or other sources that flow to low-lying areas, which may get dissolved while moving and penetrate the soil. Wind is another important factor for its dispersion, since the movement of both water and wind erodes soils and carries with it particles that may carry absorbed pesticides (Criswell, 1998).

Water solubility is key to the behavior of pesticides in that kind of environment, because it influences the bioconcentration and adsorption in sediment (Orta, 2002). In addition, FAO (2007) states that the ecological effects of pesticides in water are determined by the following criteria: toxicity, persistence, degraded products, and the presence of impurities in the formulation of pesticides, which are not part of the active ingredient.

In 2004, the National Agrarian Health Service reported the use of 325 active ingredients (chemical pesticides in most cases) divided into organic material with 8'602 563,91 kg and 1'261 159,36 L and formulated product with 2'361 616,34 kg and 3'607 685.86 L.

Regarding the use of fertilizers or manure, this practice contributes to the best agricultural yield; however, its excessive use leads to accumulation of nitrates and phosphates underground, which are incorporated by infiltration to groundwater and surface water. This alters its quality and causes eutrophication of lakes, ponds, rivers, and surface reservoirs due to the proliferation of algae and aquatic macrophytes that cover.

the water surface and interfere with the exchange of oxygen (O_2) between air and water, favoring the anaerobic conditions and altering the food web of aquatic organisms (Gonzales F., 2011). Likewise, the domestic supply of fertilizers in Peru has increased during the last decade. In 2007, it reached the highest supply with 902 581 tons, of which 225 898 (99,5 %) are imported and 4 356 (0,5 %) are produced in the country (INEI, 2011a).

Effluents from Mining

- Peru is home to a huge mining wealth, which is expressed by the enormous production of copper, gold, silver, lead, zinc, and tin from its mines, and complemented by the mining of other metals such as: molybdenum, iron, cadmium, mercury, selenium and indium. This supply diversification is recognized by mining investors and is the main competitive advantage compared to other countries in the region (PWC, 2013).



The growth potential of the mining activity is high, as only 1,09% of the national territory has been authorized for the exercise of this activity and 13% of the area requested in concession needs to be explored and put into operation, according to the results of the feasibility studies (MINEM, 2011).

Over the last two years, we have witnessed a decrease in international prices of metals, which have a direct impact on the behavior of the mining industry in Peru, where we noted that mining production in 2014 reflected ups and downs in certain metals compared to 2013 (Mejia, 2015).

Mining wastewater dumping contain metal traces depending on the type of minerals mined and waste from chemical inputs used in the production process, which by physicochemical treatment remove and reduce the concentrations of these components, meeting the maximum permissible limits (LMP) for liquid effluent dumping produced by metallurgical mining activities, established in Supreme Decree No. 010-2010-MINAM.

As of December 2015, ANA authorized the mining sector to dump 325,88 hm³ and reuse 7,2 hm³ of the total volume of treated wastewater.

◆ **Effluents from Informal Mining**

It is estimated that the number of informal miners could be hundreds of thousands dispersed in informal mining activities throughout the national territory (according to MINEM, there are 55 181 miners under formalization commitment) that contribute to the deterioration of water, because they use, in their artisanal processes for obtaining gold, highly polluting elements such as mercury and cyanide that are dumped directly into water bodies through mine tailings and acid drainages

Currently, informal mining takes place in 21 of the 25 regions in Peru. Informal mining in Madre de Dios stands out in a special way, not only for being the location with the highest informal mining activity, but also because of its effects on the ecosystem: Fifty thousand hectares of forests destroyed in that territory, which are equivalent to the fifth part of Lima Metropolitan Area affecting a large part of rivers in the region (Torres, 2015).



- ◆ **Mining Environmental Liabilities**

Article 2 of Act No. 28271, which regulates the environmental liabilities of mining activity, defines mining environmental liabilities (hereinafter referred to as PAM) as: "...all facilities, effluents, emissions, waste, or waste deposits produced by mining operations, which are currently abandoned or inactive and pose a risk," such as: pithead, waste rock dump, tailings dam, among others.



The Regulations on environmental liabilities of mining activity, approved by Supreme Decree No. 059-2005-EM, stipulates in Article 7 that the environmental liabilities inventory shall be approved by M.R., and updated regularly. According to MINEM's latest inventory, 7 576 PAMs have been identified throughout the country, which correspond to waste from past mining activities, most of which continue to deteriorate the quality of water bodies.

- ◆ **Hydrocarbon Environmental Liabilities**

Article 2 of Act No. 28134, which regulates the environmental liabilities in the hydrocarbon sub-sector, defines as environmental liabilities inappropriately abandoned shafts and facilities, polluted soil, effluents, emissions, waste or waste deposits located anywhere in the national territory, including the marine shelf environment, produced as a result of the operations carried out by companies that have ceased their activities in the area where those impacts occurred.

6 M.R. No. 393-2012-MEM/DM, Update the Beginning Inventory of Mining Environmental Liabilities approved by MR No. 209-2006-MEM/DM (September 2, 2012).

Supreme Decree No. 004-2011-EM approved the Regulation of the Act regulating Hydrocarbon Sub-sector Environmental Liabilities, which Article 6^o establishes the obligation to draw up an inventory of environmental liabilities of this sector.

At the end of 2014, the Ministry of Energy and Mines⁷ noted the existence of 156 environmental liabilities for the Hydrocarbon sub-sector; most of which correspond to the Pacific hydrographic region and only one (1) to the Amazon hydrographic region.



◆ **Agricultural Environmental Liabilities**

Over-irrigation water applied in many of the coastal valleys has caused the water table to rise and salinity in important agricultural areas, which are agricultural environmental liabilities that require remediation actions.

3.3. National Dumping Registry and Wastewater Dumping and Reuse Adaptation Program

Regarding current law, natural bodies of water are classified according to their natural characteristics, uses, and the progressive implementation of environmental quality standards (ECA) for water.



⁷ M.R. No. 536-2014 issued on December 11, 2014, Beginning Inventory of Hydrocarbon Sub-Sector Environmental Liabilities.

- ◆ **Dumping and Reuse Authorizations**

Until December 2015, ANA had 399 wastewater dumping authorizations in force, of which 242 correspond to new authorizations and 157 are renewals, representing a total volume of 868 054 MCM and 474 305 MCM, respectively.

It has also granted 92 authorizations of treated wastewater reuse, of which 73 are new and 19 are renewals from population and productive activities, such as mining, fishery and hydrocarbon activities with volumes of 63 775 MCM and 3 924 MCM, respectively.



- ◆ **Wastewater Dumping and Reuse Adaptation Program (PAVER)**

The Fourth Temporary Complementary Provision of LRH Regulations approved by Supreme Decree No. 001-2010-AG established the start of PAVER by Administrative Resolution No. 274-2010-ANA, and set out measures to have it implemented on current wastewater dumping and reuse activities that, on the effective date of the Regulations of the Act, are not authorized.

Until 2011, when the registration period ended, 416 government-administered entities were registered, of which 259 (62,26%) are from the sanitation sector and 157 (37,74%) from other productive sectors, corresponding to an annual wastewater volume of 2118 50 MCM⁸.

⁸ Technical Report No. 429-2015-ANA-DGCRH/EEIGA of the Directorate of Water Resources Quality Management.

Upon the expiration of registration certificates, 48 government-administered entities applied for treated wastewater dumping and reuse authorizations through the regular process. A total of 81 directorial resolutions authorizing 125 dumpings and 16 reuses of treated wastewater have been issued.

3.4. Institutional Capacity for Management

In this regard, ANA coordinates with stakeholders involved in water resources quality management at nationwide, regional and local levels, such as the Ministry of Agriculture and Irrigation (MINAGRI), Ministry of Health (MINSa), Ministry of Energy and Mines (MINEM), Ministry of Production (PRODUCE), Ministry of Housing, Construction and Sanitation (MVCS), Ministry of Defense (MINDEF) and the Ministry of the Environment (MINAM), public entities such as the National Meteorology and Hydrology Service of Peru (SENAMHI), Geophysical Institute of Peru (IGP), Agency for Environmental Assessment and Enforcement (OEFA), National Service of Natural Areas Protected by the Government (SERNANP), National Service of Environmental Certification (SENACE), National Superintendency of Sanitation Services (SUNASS); General Directorate of Environmental Health (DIGESA), General Directorate of Captaincy and Coastguard of Peru (DICAPI); Peruvian Institute of the Sea (IMARPE), Peruvian Amazon Research Institute (IIAP), Regional Governments (RG), Local Governments (LG), and organized civil society.

By passing Act No. 29338, the Water Resources Act (LRH) and its regulations, a new political, regulatory and institutional framework is initiated. The National Water Authority becomes the governing body of SNGRH that leads processes of conservation and integrated management of water resources, their ecosystems and associated assets in the watershed areas through SNGRH planning instruments such as the National Environmental Policy, the National Water Resources Policy and Strategy, the National Water Resources Plan, and Watershed Water Resources Management Plans (See Figure 4).

It also describes the roles and functions of the sectors responsible for water resources quality monitoring and control through coordination mechanisms that promote coordination and joint intervention protocols, the design of management tools and efficient administrative procedures. These mechanisms should also strengthen the institutional capacity at the central, regional and local levels contributing to the protection and sustainable use of water resources.

ANA, in turn, is in charge of water resources management through decentralized bodies distributed in 14 Water Management Authorities (AAA) and 72 Local Water Authorities (ALA) nationwide, which are responsible for the management of water resources and their associated assets in their respective jurisdictions.

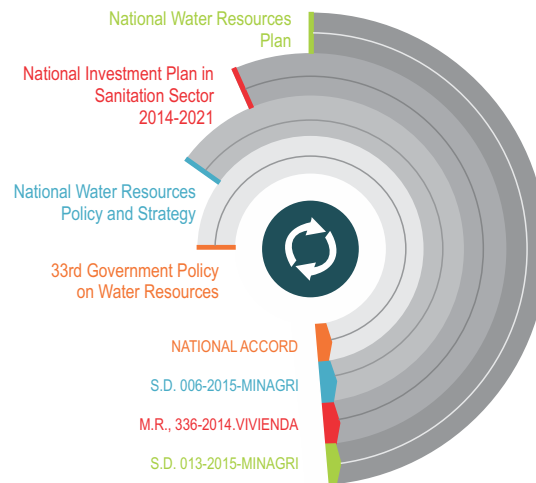


Figure 4. Main Plans and Policy Instruments





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The background is a high-angle photograph of a rugged, mountainous landscape. The mountains are characterized by distinct horizontal layers of red, orange, and brown earth, suggesting volcanic or mineral deposits. A dark blue reservoir is visible in the lower-left quadrant, surrounded by sparse, dry vegetation. A winding road or railway track is visible on the right side of the image.

NATIONAL WATER RESOURCES MANAGEMENT POLICY AND STRATEGY

4. National Water Resources Management Policy and Strategy

By Supreme Decree No. 006-2015-MINAGRI, the National Water Resources Policy and Strategy was adopted (hereinafter referred to as PENRH), in compliance with Articles No. 66, 67 and 69 of the Political Constitution of Peru pursuant to water resources current legislation.

PENRH is a conceptual and binding instrument containing public principles, guidelines, strategies and instruments, which determine the national interest objectives in order to ensure a sustainable use of water resources in the short, medium and long term.

This instrument aims at the integrated management of water resources nationwide in order to satisfy the current and future demand, as well as to ensure the conservation, quality and availability of water resources and its efficient and sustainable use.

PENRH provides for the recovery and protection of water resources quality in the natural sources and their ecosystems, as well as for the monitoring and control of pollutants from natural sources nationwide.

This document comprises five policy focuses and 18 intervention strategies each with their respective action guidelines, which in total contain 85 guidelines. The main focus of Policy No. 2 stands out because it covers aspects related to water resources quality management.

Policy No. 2 Quality Management

Promote the protection and recovery of water resources quality in natural sources and ecosystems related to hydrological processes.

Intervention Strategy 2.1

Strengthen sectoral and multi-sectoral actions in water protection management.

Action Guidelines

- 1 Integrate and articulate the sectoral and multi-sectoral regulations for compliance with water quality.
- 2 Promote compliance with national standards of environmental quality of water and maximum permissible limits for effluents produced by population and productive activities in coordination with the competent institutions or sectors. .
- 3 Promote multi-sectoral and participatory actions in anticipation of possible conflicts related to water quality.
- 4 Progressively adapt and implement environmental management instruments that allow for the implementation of national environmental quality standards for water and maximum permissible limits.
- 5 Promote the formalization of population and productive activities that have impacts on the quality of natural water sources.
- 6 Promote the formalization of the right to use water for population and productive activities that have an impact on the quality of natural water sources.
- 7 Implement incentive or penalty measures to preserve water quality at their natural sources and associated assets.

Intervention Strategy 2.2

Maintain and/or improve water quality at the natural inland marine sources and its associated assets.

Action Guidelines

- 1 Formulate and implement plans and programs for the improvement of water quality in the marine-coastal and hydrographic units.
- 2 Promote the implementation of a national network of accredited laboratories for water analysis.

3

Strengthen the supervision and monitoring of water quality in natural water sources.

4

Strengthen the control and monitoring of wastewater dumping, and prioritize those of domestic urban and rural origin.

5

Identify and make an inventory, through a participatory process led by ANA, of the pollutant sources of natural water bodies.

6

Implement actions to control the use of hazardous substances in population and productive activities that put water quality at risk.

7

Promote, jointly with the relevant sectors, the application of incentives for the treatment of wastewater generated by productive activities.

8

Create and implement, jointly with the relevant sectors, measures for the management of solid waste in order to protect the water natural sources.

9

Conduct research studies aimed to improve water quality through the application of new and/or better technologies.

10

Create and implement, jointly with the relevant sectors, measures for the remediation of environmental liabilities affecting natural water sources in prioritized watersheds.





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NATIONAL STRATEGY FOR THE IMPROVEMENT OF WATER RESOURCES QUALITY

5. National Strategy for the Improvement of Water Resources Quality

5.1 Scope of Strategic Actions

In Technical Report No. 004-2014-ANA-DGCRH that contains the diagnosis on water resources quality in Peru for 2000-2012, water resources quality issues were identified related to untreated wastewater dumping, and inadequate management of solid waste, environmental liabilities (mining, hydrocarbons, agriculture and population), informal and illegal mining, among others associated with the natural characteristics of watersheds that support the design of the National Strategy for the Improvement of Water Resources Quality (hereinafter referred to as the Strategy) developed by means of three lines of action, see Figure 5.

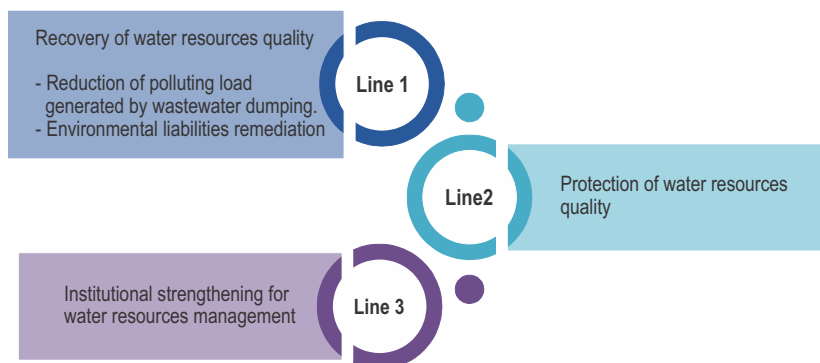


Figure 5. Lines of Action

The strategy will be implemented through an action plan that involves technical, regulatory and management actions over a ten-year period (2016-2025), which is harmonized with the National Environmental Action Plan for 2021. This is expected to gradually recover water resources quality, establish the compliance with articulated mechanisms for its protection and strengthen water resources integrated management.

Strategic actions are binding on the members of the National Water Resources Management System (SNGRH) as part of the National Environmental Management System (SNGA) for carrying out coordinated and articulated actions aimed at improving and restoring water resources quality nationwide.

In this context, the National Water Authority, as governing body of SNGRH, becomes the coordinating body for sectoral management for the implementation of actions aimed at improving and restoring water resources quality.

All actions and measures for the improvement and recovery of water quality will be carried out with the participation of organized and informed civil society, and private and public sector on a nationwide, regional and local government scale.

5.2. Objective

To restore and protect the quality of water resources by strengthening the institutional capacity for the integrated water resources management.

5.3. Methodology

The methodology for the Strategy design has considered the phases described below (See Figure 6).



Figure 6. Strategy Design Phases

◆ **Analysis and Formulation Phase**

Based on the document entitled Diagnosis of Water Resources Quality in Peru for 2000-2012, which consolidates and analyzes data from various sectors such as the National Institute of Environmental Resources - INRENA (2000-2003), General Directorate of Environmental Health - DIGESA (2001-2011), Geological, Mining, and Metallurgical Institute - INGEMMET (2005-2007), Drinking Water and Sewage Services - SEDAPAL (2005-2011), and the National Water Authority - ANA (2010-2012), it was possible to determine the issues on water resources quality in Peru.

It was possible to identify those variables that affect and/or impair water resources quality, such as untreated wastewater dumping, inadequate management and disposal of solid waste, mining, hydrocarbons, agricultural and population environmental liabilities, informal and illegal mining, among others related to the natural characteristics of watersheds.

With this analysis, the Strategy was designed and implemented through an action plan of three (3) lines of action including technical, regulatory and management actions with their respective goals and expected results in order to guide the interventions of stakeholders involved and thus address the issues on water resources quality in the country.

◆ **Dissemination, Contributions, and Improvements Phase**

Once the Strategy was formulated, a program of dissemination activities was established on a macro-regional, regional and local scale, with the aim of sharing and introducing the Strategy with its corresponding action plan.

This stage was participative. Stakeholders related to water resources management made comments and important contributions on potential activities for each strategic action considering the reality of their watersheds, perspectives and vision on water management. (See Chart 1).

As part of this process, thirteen workshops have been carried out at the regional level within AAA areas (Arequipa, Huancayo, Ica, Piura, Tarapoto, Puno, Cusco, Iquitos, Pucallpa, Tacna Trujillo, Tumbes and Huánuco), which were attended by 1,131 people including officers from the public and private sector, the academic sector, among others. .

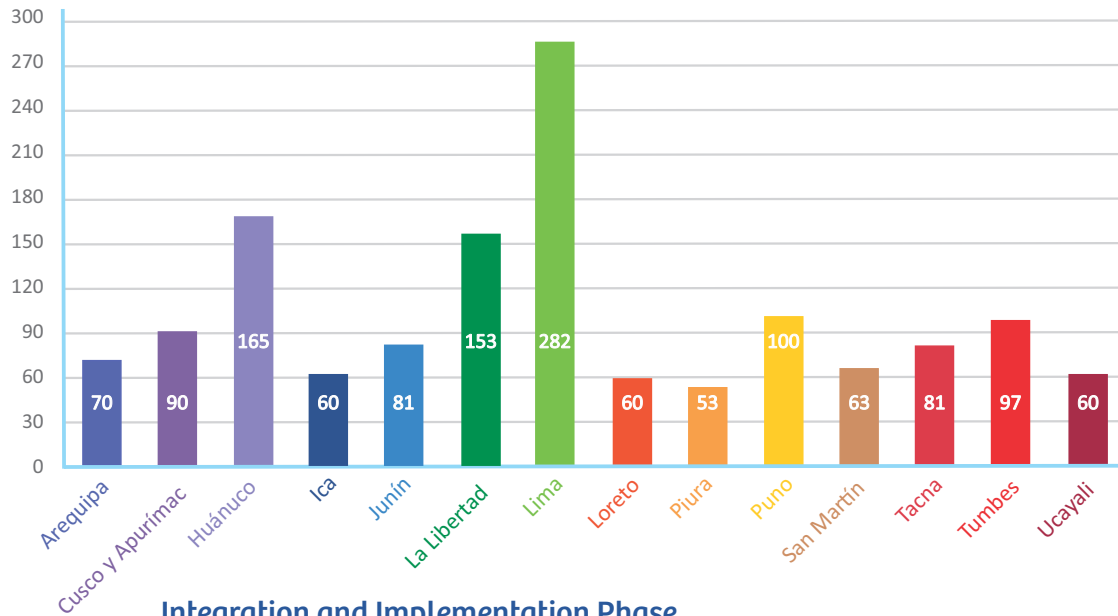
At the local level, two (2) meetings with the main business associations (National Society of Mining, Petroleum and Energy, National Fisheries Society and National Industries Society) took place.

A National Workshop was also held and attended by officers and members of ANA's Board of Directors, representatives of the Ministry of the Environment, Ministry of Economy and Finance, Ministry of Health, Ministry of Housing, Construction and Sanitation, Regional Government, Municipalities, National Irrigation Districts Users Board, Drinking Water and Sewage Service Companies, National Superintendency of Sanitation Services, National Society of Sanitation Services Providers, business associations, among others.

In addition, in order to receive comments and proposals for the Strategy, the "National Strategy for the Improvement of Water Resources Quality Project" was pre-published by Administrative Resolution No. 234-2015-ANA dated September 7, 2015.



Chart 1. Number of participants in the events held by region.



Integration and Implementation Phase

- It includes a time-consuming and complex phase that consisted of compiling contributions, comments and/or suggestions collected during the dissemination activities planned, and sorting them by line of action and type of contribution.

Once the information was consolidated, each proposal was systematically reviewed and classified as shown in Figure 7.

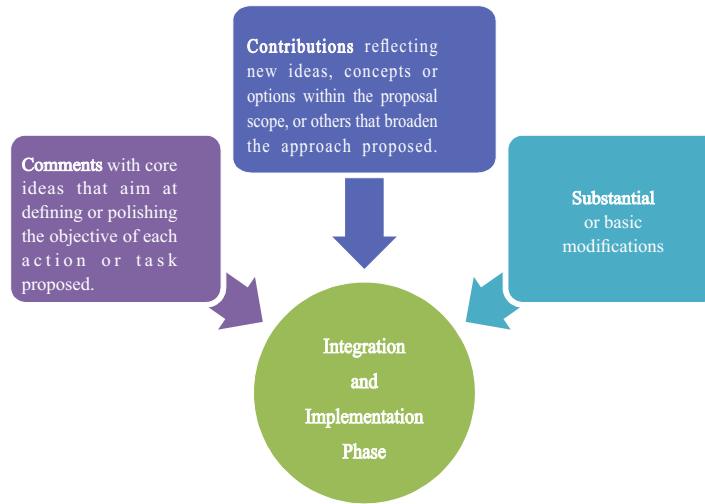


Figure 7. Data Classification

An assessment and analysis of this information was carried out to ensure consistency with the definition and objective of the proposal, including those that are harmonized with the planning instruments of the National Water Resources Management System recently adopted as the National Water Resources Policy and Strategy⁹ (action guidelines described in Policy No. 2 on quality management), and the National Water Resources Plan¹⁰ (Strategy programs for the improvement of water quality).

At the same time, all of them are part of the National Environmental Policy and the National Environmental Action Plan 2011-2021.

⁹ Supreme Decree No. 006-2015-MINAGRI

¹⁰ Supreme Decree No. 013-2015-MINAGRI

Finally, the information was consolidated in a comprehensive document entitled National Strategy for the Improvement of Water Resources Quality with an action plan carried out through three major lines of action. Each line brings together under a specific objective several strategic actions designed to respond to each challenge.

5.4. Lines of Action

The Strategy includes three major lines of action:

Line 1. Recovery of water resources quality.

Line 2. Protection of water resources quality.

Line 3. Institutional strengthening for water resources management.



Figure 8. Lines of Action

Line 1: Recovery of Water Resources Quality

Strategic Action

Progressively reduce the polluting load through the proper management, handling and treatment of wastewater in watershed areas.

Tasks

- ◆ Identify, locate, classify, and define the polluting sources, and determine the polluting load from population and productive activities in surface, underground and coastal-marine water resources of watershed on a national scale.
- ◆ Formalize water users of population and productive activities that dump unauthorized wastewater, by means of coordinated and efficient procedures.
- ◆ Formulate and implement, at hydrographic unit level, comprehensive sustainable programs and projects for the efficient treatment of wastewater, by prioritizing their reuse and sewage systems financed with public and private funds.
- ◆ Formulate, implement, monitor and control, at the hydrographic unit level, programs for integrated management of solid waste financed by public and private funds.
- ◆ Promote, establish and differentiate economic compensation for formalized wastewater dumping according to the polluting load.
- ◆ Establish grant funds and economic incentives for the co-financing of projects aimed at reducing the polluting load in the natural bodies of water.

Strategic Action

Remedy and recover areas affected by mining, hydrocarbon, agriculture and population environmental liabilities.

Tasks

- ◆ Update and classify the inventory of mining and hydrocarbon environmental liabilities and prioritize their remediation.
- ◆ Remedy and recover areas affected by mining and hydrocarbon environmental liabilities, financed by public and private funds.
- ◆ Remedy and recover areas affected by agricultural environmental liabilities, financed by public and private funds.

Line 2: Protection of Water Resources Quality

Strategic Action

Protect the quality of water resources, aquatic ecosystems and natural assets related to it.

Tasks

- ◆ Implement the National Monitoring Plan for the recovery and protection of water resources quality.
- ◆ Implement economic tools and instruments to ensure an integrated management and sustainable use of water resources as an ecosystem service in hydrographic units.
- ◆ Review and update the classification of inland and marine bodies of water, as well as the Environmental Quality Standards for Water, according to the watershed situation.
- ◆ Establish and implement decentralized reference laboratories for water quality analysis.
- ◆ Build and/or strengthen nationwide capacities on issues related to wastewater treatment through sustainable technologies and water resources quality management.
- ◆ Monitor, control and supervise water resources quality of cross-border watersheds.
- ◆ Establish the vulnerability of water quality in hydrographic units.

Línea 3: Institutional Strengthening for Water Resources Management

Strategic Action

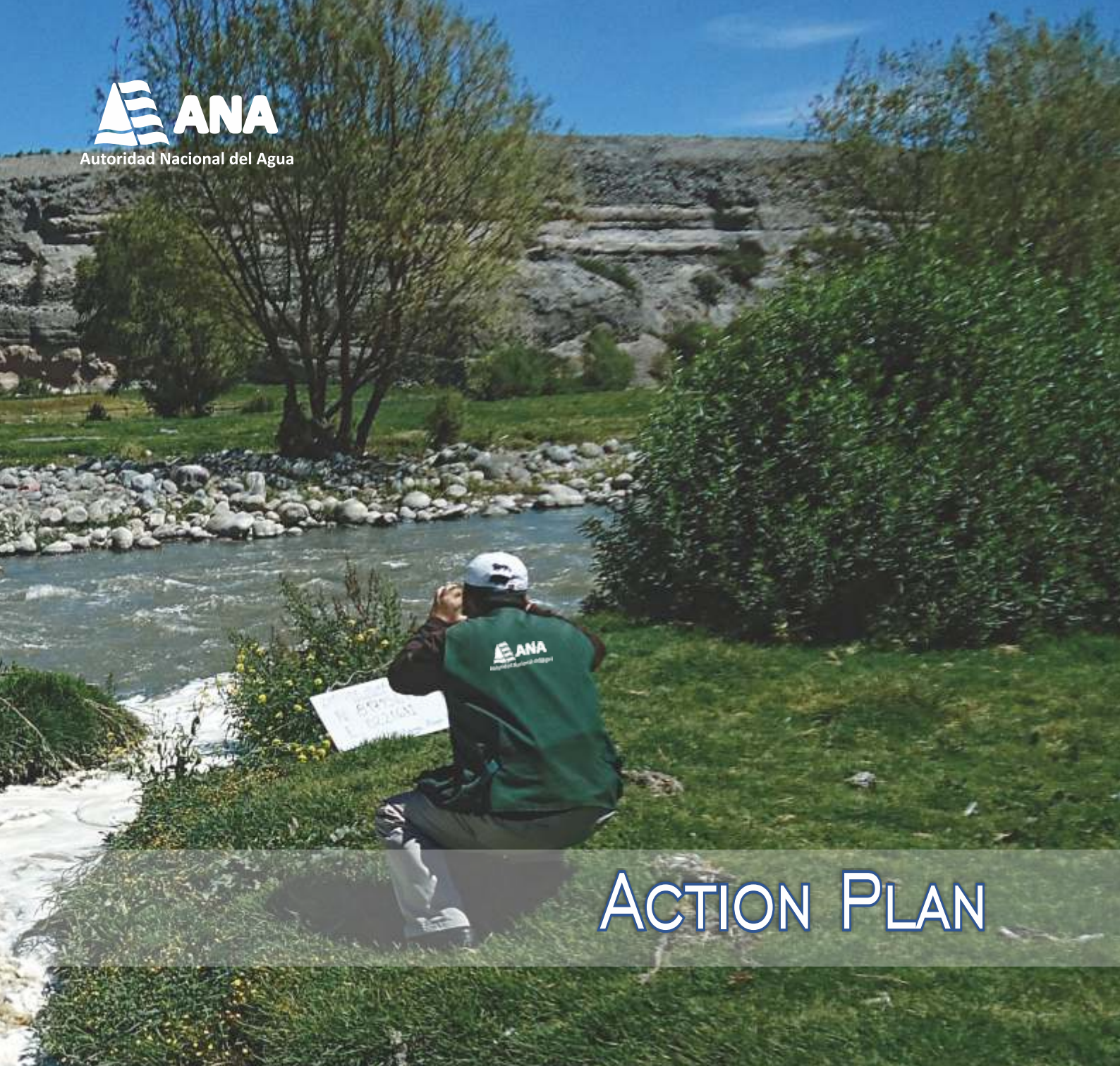
Improve the governance in water resources quality management.

Tasks

- ◆ Analyze, propose and regulate in a participatory manner the adaptation or creation of rules specifying roles, functions and administrative procedures of the entities that make up the National Environmental Management System, in order to optimize the management of water resources.
- ◆ Adapt and implement the regulations that promote comprehensive water development projects for the population, with advanced technology, if any, sewage, treatment and disposal of effluents system.
- ◆ Strengthen the National Water Resources Information System in the area of quality through comprehensive management of information.
- ◆ Promote the creation and strengthening of Watershed Water Resources Councils.
- ◆ Promote, implement and disseminate a line of scientific research and technological innovation in the field of water resource quality, and strengthen existing entities.
- ◆ Improve the inter-institutional coordination to facilitate the flow of updated, accessible, and timely information on water resources quality.
- ◆ Strengthen education at all levels (early, primary, secondary and higher education) on water resources quality.
- ◆ Strengthen the management of regional and local governments for the design and implementation of programs and projects for the protection and recovery of water resources quality through technical assistance for the implementation of comprehensive programs and/or projects.
- ◆ Establish bilateral mechanisms for the improvement of water resources quality in responsible cross-border watersheds.



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ACTION PLAN

Line 1: Recovery of Water Resources Quality

Results: 75% of dumping from services and economic-productive activities are authorized by ANA and dumpers do not exceed the permitted polluting load.

STRATEGIC ACTION	TASKS	GOALS		STAKEHOLDERS
		2016-2021	2022-2025	
Progressively reduce the polluting load through the proper management, handling and treatment of wastewater in watershed areas.	Identify, locate, classify, and define the polluting sources, and determine the polluting load from population and productive activities in surface, underground and coastal-marine water resources of watersheds on a national scale.	Inventory of polluting sources at 100% in pilot watersheds, at 50% in Titicaca Region and 20% in the Pacific and Atlantic Regions	Inventory of polluting sources at 100% in Titicaca region and at 50% in the Pacific and Atlantic Regions	Entities Responsible ANA (AAA, ALA, CRHC) Participants Sectors
	Formalize water users of population and productive activities that dump unauthorized wastewater, by means of coordinated and efficient procedures.	100% of formalized wastewater dumpers in pilot watersheds, 50% in Titicaca Region and 30% in the Atlantic and Pacific Regions	100% of formalized wastewater dumpers in Titicaca Region and 50% in the Atlantic and Pacific Region	Entities Responsible ANA (AAA and ALA) Participants RG, LG and wastewater dumpers
	Formulate and implement, at hydrographic unit level, comprehensive sustainable programs and projects for the efficient treatment of wastewater, by prioritizing their reuse and sewage systems financed with public and private funds.	35% additional sewage and wastewater treatment projects implemented	50% additional sewage and wastewater treatment projects implemented	Entities Responsible ANA (AAA, ALA, CRHC) and MVCS Participants RG, LG, MINSA, MINAGRI
	Formulate, implement, monitor and control, at the hydrographic unit level, programs for integrated management of solid waste financed by public and private funds.	Pilot watershed with 50% implementation of integrated wastewater management programs. 20% in Titicaca Region and 10% in Amazon and Pacific Regions.	Pilot watershed with 100% implementation of integrated wastewater management programs, 50% in Titicaca Regions and 20% in Amazon and Pacific Regions	Entities Responsible MINAM and RG, LG Participants ANA (AAA, ALA, CRHC)
	Promote, establish and differentiate economic compensation for formalized wastewater dumping according to the polluting load.	Implementation of the specific polluting load per dumping Awareness and dissemination of economic compensations for 100% dumping in pilot watersheds, 50% in Titicaca Region, and 20% in Amazon and Pacific Regions.	Implementation of economic compensations in pilot watersheds. Awareness and dissemination of economic compensations for 100% formalized wastewater dumping in Titicaca Region and 50% in Amazon and Pacific Regions	Entities Responsible ANA (DGCRH and DARH) Participants MEF, MINAM, MINAGRI, MINEM, MVCS, PRODUCE, SUNASS, EPS, LG, SNI and SNMPE
	Establish grant funds and economic incentives for the co-financing of projects aimed at reducing the polluting load in the natural bodies of water.	Co-financing of 10 million soles per year	Co-financing of 30 million soles per year	Entities Responsible MEF, ANA and PROINVERSION Participants MINAM, MVCS, LG, SUNASS and SNI

INDICATOR (S)	RESULT
<p>Number of polluting sources by watersheds identified, located, classified and defined. Percentage of the hydrographic unit area covered. Percentage of watersheds defined at 100%. Periodic calculation of polluting load at control points.</p>	<p>Watersheds with natural sources and defined polluting load.</p>
<p>Number of wastewater dumpers in formalization process. Number of formalized wastewater dumpers. Volume of formalized dumping. Number of unformalized untreated wastewater dumpers. Number of users that reuse treated wastewater.</p>	<p>Formalized water users carrying out population and productive activities.</p>
<p>Volume of treated wastewater. Volume of reused wastewater. Percentage of reduction in polluting load based on base line. Number of wastewater treatment plants implemented complying with the current MPL and ECA. Percentage of sewage system coverage based on base line. Projects in progress and unfinished before implementing the strategy. Number of projects financed for water reuse and sewage system with public and private funds. Number of wastewater reuse projects implemented.</p>	<p>Reduction of polluting load in hydrographic units. Wastewater treatment plants and sewage system projects executed with public and private funds.</p>
<p>Inadequate solid waste disposal areas on banks or intangible strips of water resources. Volume of illegal solid waste disposal on banks or intangible strips of water resources Number of integrated solid waste management programs. Number of integrated solid waste management plants implemented. Number of secure solid waste landfills. Volume of plant leachate from controlled sanitary landfills. Number of projects financed for sanitary plants and landfills with public and private funds Number of integrated solid waste management projects and/or programs implemented in watersheds.</p>	<p>Reduction of polluting load in water resources caused by solid waste Reduction in the number of solid waste dumps in water resources banks and strips.</p>
<p>Number of dumping with reduced polluting load. Reduction of polluting load based on the amount paid. Price per cubic meter of treated wastewater dumped into the natural body of water. Number of plants with innovative technology. Number of events allowing to know the economic compensation per dumping.</p>	<p>Polluting load of authorized dumping reduced by the implementation of economic compensations.</p>
<p>Number of agreements or PIPPs approved and implemented through the grant funds. Decrease in polluting load and volume per investment. Number of agreements signed, not implemented. Number of users benefited by the agreement. Public and private investment with preventive strategies.</p>	<p>Reduction of polluting load in natural bodies of water.</p>

Line 1: Recovery of Water Resources Quality

Results: 75% of dumping from services and economic-productive activities are authorized by ANA, and dumpers do not exceed the permitted polluting load

STRATEGIC ACTION	TASKS	GOALS		STAKEHOLDERS
		2016-2021	2022-2025	
Remedy and recover the areas affected by environmental liabilities	Update and classify the inventory of mining and hydrocarbon environmental liabilities and prioritize their remediation.	70% of mining and hydrocarbon environmental liabilities are listed with a feasibility study and estimate remediation cost, and 5% execution.	50% of mining and hydrocarbon environmental liabilities listed have remediation plans and 30% are under execution.	<p>Entities Responsible MINEM and Mining Assets</p> <p>Participants MINAM, ANA, FONAM and RG (DREM)</p>
	Remedy and recover areas affected by mining and hydrocarbon environmental liabilities, financed by public and private funds.	30% of pilot watershed environmental liabilities have been remedied with complementary funds and private sector funds.	70% of pilot watershed environmental liabilities have been remedied with complementary funds and private sector funds.	<p>Entities Responsible MINEM and Mining Assets</p> <p>Participants MINAM, ANA, FONAM and RG (DREM)</p>
	Remedy and recover areas affected by agricultural environmental liabilities with public and private funds.	30% of pilot watershed agricultural environmental liabilities have been remedied with complementary funds and private sector funds.	70% of pilot watershed environmental liabilities have been remedied with complementary funds and private sector funds.	<p>Entities Responsible MINAGRI and ANA</p> <p>Participants MINAM, FONAM and RG (DREM)</p>

INDICATOR(S)	RESULT
<p>Number of watersheds with mining and hydrocarbon environmental liabilities listed in terms of area and volume. Number of watersheds with mining and hydrocarbon environmental liabilities prioritized for remediation. Number of mining and hydrocarbon environmental liabilities with remediation plans and at profile level.</p>	<p>Hydrographic units with mining and hydrocarbon environmental liabilities identified and prioritized with remediation plans and their implementation.</p>
<p>Number of economic resources collected from the public and private sector to be invested in the remediation of mining and hydrocarbon environmental liabilities. Number of mining and hydrocarbon environmental liabilities remedied with public and/or private funds. Number of economic resources collected by binational agreement in order to invest in the remediation of mining and hydrocarbon environmental liabilities.</p>	<p>Mining and hydrocarbon environmental liabilities remedied with public, private and/or binational funds.</p>
<p>Number of economic resources collected from the public and private sector in order to invest in the remediation of agricultural environmental liabilities. Number of agricultural environmental liabilities remedied with public and/or private funds.</p>	<p>Agricultural environmental liabilities remedied with public and/or private funds.</p>

Line 2: Protection of Water Resources Quality

Results: Water resources quality protection is developed and strengthened.

STRATEGIC ACTION	TASKS	GOALS		STAKEHOLDERS
		2016-2021	2022-2025	
Preserve the natural water sources, aquatic ecosystems and natural assets related to it.	Implement the National Monitoring Plan for the recovery and protection of water resources quality.	Monitoring plan implemented at 100% in pilot watersheds and 50% in hydrographic units of the Titicaca Region, 30% in the Pacific region and 10% in the Amazon region. Surface and groundwater quality monitoring is carried out at 100% in pilot watersheds and 50% in hydrographic units of the Titicaca Region, 30% in the Pacific Region and 10% in the Amazon region.	Monitoring plan implemented at 100% in hydrographic units of Titicaca Region, 100% in the Pacific Region and 50% in the Amazon Region. Surface and groundwater quality monitoring is carried out at 100 % in hydrographic units of the Titicaca Region, 100 % in the Pacific Region and 50 % in the Amazon Region.	Entities Responsible ANA (AAA, ALA, CRHC) Participants Sectors
	Implement economic tools and instruments to ensure an integrated management and sustainable use of water resources as an ecosystem service in hydrographic units.	Compensation mechanisms implemented in selected pilot watersheds; as well as gradually at 10% in hydrographic units of the Pacific and Amazon Regions, and 20% in hydrographic units of the Titicaca Region in coordination with LG and sectors.	Compensation mechanisms gradually implemented at 30% in hydrographic units of the Pacific and Amazon Regions, and 50% in hydrographic units of the Titicaca Region in coordination with LG and sectors	Entities Responsible MINAM and ANA(AAA, ALA, CRHC) Participants MINAGRI, RG, LG, EPS and cooperation agencies
	Review and update the classification of inland and marine bodies of water, as well as the Environmental Quality Standards for Water, according to the watershed situation.	60% of natural bodies of water with up-to-date classification. ECA for water established under the specific sensitivity of natural bodies of water.	90 % of natural bodies of water with up-to-date classification. ECA for water updated based on water quality information from watersheds.	Entities Responsible MINAM and ANA(AAA, ALA, CRHC) Participants Sectors
	Establish and implement decentralized reference laboratories for water quality analysis.	Implementation of reference Laboratories at 60%.	Implementation of reference Laboratories at 100%.	Entities Responsible ANA (AAA y ALA) Participants Sectores
	Build and/or strengthen nationwide capacities on issues related to wastewater treatment with sustainable technologies and water resources quality management.	1 000 professionals and technicians specialized in wastewater treatment and water resources quality management.	2 000 professionals and technicians specialized in wastewater treatment and water resources quality management.	Entities Responsible ANA (AAA y ALA) Participants RG and sectors
	Monitor, control and supervise water resources quality of cross-border watersheds.	Agreed elaboration of monitoring, control and supervision plans for 40% of cross-border watersheds. Implementation of 25% of monitoring, control and supervision plans in cross-border watersheds.	Agreed elaboration of monitoring, control and supervision plans for 80 % of cross-border watersheds. Implementation of 50 % of monitoring, control and supervision plans in cross-border watersheds.	Entities Responsible MINAM, RREE, ANA, FEMA, GORE, and similar foreign entities Participants LG, Civil Organizations, Users Associations.
	Establish the vulnerability of water quality in hydrographic units.	Development of vulnerability models for water quality in 50% of Titicaca's hydrographic units and 20% of Pacific hydrographic units.	Development of vulnerability models for water quality in 100% of Titicaca's hydrographic units and 40% of Pacific hydrographic units.	Responsables ANA, INDECI and CENEPRED Participantes RG, LG and NGOs

INDICATOR(S)	RESULT
<p>Annual coverage percentage of the Plan by hydrographic unit. Number of hydrographic units with an approved monitoring network. Number of critical parameters by hydrographic unit. Number of agreements signed for the recovery of hydrographic units. Percentage of recovery by hydrographic unit. Number of management instruments to strengthen the national Plan.</p>	<p>Hydrographic units in the process of water resources quality recovery.</p>
<p>Identifying experiences in the implementation of ecosystem services. Number of economic tools and instruments established by hydrographic unit. Number of hydrographic units carrying out a comprehensive integrated management with a sustainable use of water resources. Percentage of users associations implementing economic instruments.</p>	<p>Integrated management and sustainable use of water resources in hydrographic units.</p>
<p>Number of hydrographic units characterized by water resources quality. Number of natural bodies of water classified. Number of hydrographic units characterized with updated ECA for water. Number of hydrographic units with EEZ.</p>	<p>Natural bodies of water identified and classified as per ECA for water, reviewed and updated according to the watershed situation.</p>
<p>Percentage of laboratory progress and implementation. Number of agreements for laboratory implementation.</p>	<p>National and decentralized reference laboratory implemented</p>
<p>Number of users trained in wastewater treatment and water resources quality management. Number of strategic alliances with national and international academic institutions. Number of instruments developed and socialized related to management or wastewater treatment topics. Number of events held on topics related to wastewater treatment and water resources quality management. Number of professionals specialized in wastewater treatment and water resources quality management by hydrographic unit. Number of projects formulated on topics related to wastewater treatment and water resources quality management by hydrographic unit.</p>	<p>Population with skills in water resources quality management and wastewater treatment.</p>
<p>Number of monitoring events in cross-border watersheds. Number of control and monitoring plans in cross-border watersheds. Number of national and international agreements for the recovery of water resources quality in cross-border watersheds.</p>	<p>Cross-border watershed in recovery process</p>
<p>Number of hydrographic units with risk assessment related to water quality. Number of risk management plans.</p>	<p>Water quality vulnerability model in the Titicaca and Pacific Hydrographic Units.</p>

Line 3: Institutional Improvement for Management

Results: SNGRH gets stronger; ANA works in a coordinated and expeditious manner with the various stakeholders involved, is able to provide technical assistance and fulfills its objectives and institutional goals; information becomes transparent and accessible; and the population is made aware of the quality of water resources.

STRATEGIC ACTION	TASKS	GOALS		STAKEHOLDERS
		2016-2021	2022-2025	
Improve the governance in water resources quality management.	Analyze, propose and regulate in a participatory manner the adaptation or creation of rules specifying roles, functions and administrative procedures of the entities that make up the SNGA, in order to optimize the management of water resources.	Regulations and ROF of the institutions implemented at the central level.	Regulations and ROF of the institutions implemented at the regional level.	Entities Responsible ANA, MINAM Participants PRODUCE, MVCS, MINEM, MINSA, OEFA, DICAPI and other stakeholders
	Adapt current rules and propose new regulations to promote comprehensive water development projects for the population, with advanced technology if any, sewage, treatment and disposal of effluents system.	Comprehensive water development projects for the population in pilot watersheds at 100%, 50% of drinking water projects in hydrographic units of the Titicaca Region and 30% in the Atlantic and Pacific regions.	70% of comprehensive water development projects for population in hydrographic units of the Titicaca Region and 50% in the Atlantic and Pacific Regions.	Entities Responsible ANA and MVCS Participants MINSA, MINAGRI, RG and LG
	Strengthen the National Water Resources Information System in the area of quality through the comprehensive management of information.	100% of pilot watersheds already have an information system and priority watersheds of the Pacific and Titicaca have comprehensive information management processes.	100% of hydrographic units of the Titicaca Region and 50% of Pacific and Atlantic Regions have comprehensive information management processes.	Entities Responsible ANA Participants Watershed Councils and sectors
	Promote the creation, formation and strengthening of Watershed Water Resources Councils (CRHC).	100% of CRHC created. 50% of CRHC in Titicaca's region, 30% in Atlantic and Pacific region have an approved and financed management plan.	100% of CRHC in the Titicaca Region 70% in the Atlantic and Pacific Regions have an approved management plan. 50% of CRHC with a management plan approved execute the management plan in a sustainable way.	Entities Responsible GORE and ANA Participants Sectors
	Promote, implement and disseminate a line of scientific research and technological innovation in the field of water resource quality, and strengthen existing entities.	100% implemented research line. 30% of research on water resources quality.	100% of research on water resources quality. 50% of technological application of scientific research.	Entities Responsible ANA, Public scientific institutions Participants MINEDU and national and international research institutions


INDICATOR (S)	RESULT
<p>Number of simplified regulatory processes executed. Number of regulations proposed that specify or delimit SNGA institutions responsibilities. Number of standards implemented that specify or delimit SNGA institutions responsibilities. Number of citizen participation mechanisms for the design and implementation of regulations specifying roles, functions and administrative procedures of SNGA institutions. Percentage of population that participates in the analysis and proposal process. Percentage of solved conflicts involving duplication of functional responsibilities.</p>	<p>A regulatory framework that arranges, accelerates, and improves water resources management.</p>
<p>Number of proper regulations, directives, and ordinances that promote comprehensive projects. Number of comprehensive water development projects for the population, sewage, treatment and disposal systems, proposed by SNGA institutions. Number of treatment systems that operate efficiently</p>	<p>Comprehensive water development projects for the population, sewage, treatment and disposal systems, complying with the new regulations and providing a sustainable quality service.</p>
<p>Number of watersheds that have and implement comprehensive information management processes Number of hydrographic units reporting to the water resources information system. Number of built-in reports to the water resources information system. Number of public and private institutions by hydrographic unit feeding information into the system</p>	<p>SNIRH strengthened on the basis of water resources quality information.</p>
<p>Number of CRHCs created, formed, strengthened and implemented. Number of CRHCs with an approved management plan. Percentage of progress for CRHCs management plan. Number of activities executed to promote the formation of CRHCs. Number of committees formed, strengthened and implemented. Number of agreements reached by the CRHC.</p>	<p>CRHCs promote the proper management of water resources by complying with the management plan. CRHCs perform 70% of the functions assigned in the water resources regulations.</p>
<p>Number of agreements with universities and institutions, public-private association, international cooperation. Number of professionals conducting scientific and technology research on water resources quality. Number of entities conducting scientific and technology research on water resources quality by hydrographic unit. Number of water quality issues solved by research. Percentage of annual budget allocated to water resources research.</p>	<p>Organizations conduct scientific and technology research on water resources quality addressing current issues.</p>

Line 3: Institutional Improvement for Management

STRATEGIC ACTION	TASKS	GOALS		STAKEHOLDERS
		2016-2021	2022-2025	
Improve the governance in water Resources quality management.	Improve the inter-institutional coordination to facilitate the flow of updated, accessible, and timely information on water resources quality.	Population with updated information on water resources quality at 70% in pilot watersheds and 30% in other watersheds.	Population with updated information on water resources quality at 100% in pilot watersheds and 50% in other watersheds.	<p>Entities Responsible ANA, use sectors</p> <p>Participants MINEM, MINSA, MVCS, RG and LG</p>
	Strengthen education at all levels (early, primary, secondary and higher education) on water resources quality.	Educational programs are implemented at 100% in pilot watersheds, at 50% in hydrographic units of the Titicaca Region and at 30% in the Pacific and Atlantic Regions.	Educational programs are implemented at 100% in hydrographic units of the Titicaca Region and at 50% in the Pacific and Amazon Regions.	<p>Entities Responsible ANA (AAA and ALA)</p> <p>Participants MINEDU, MEF, MINSA, MVCS, RG and LG.</p>
	Strengthen the management of regional and local governments for the design and implementation of programs and projects for the protection and recovery of water resources quality through technical assistance for the implementation of comprehensive programs and/or projects.	50% of comprehensive projects prioritize the efficient use, protection and recovery of water resources in pilot watersheds and 20% in other watersheds.	100% of comprehensive projects prioritize the efficient use, protection and recovery of water resources in pilot watersheds and 40% in other watersheds.	<p>Entities Responsible ANA, RG and LG</p> <p>Participants MINAM, MINSA and MEF</p>
	Establish bilateral mechanisms for the improvement of water resources quality in responsible cross-border watersheds.	20% of cross-border watersheds have bilateral mechanisms.	400 % of cross-border watersheds have bilateral mechanisms.	<p>Entities Responsible RREE, ANA and similar international entities</p> <p>Participants Sectors</p>

INDICATOR (S)	RESULT
<p>Number of institutions with updated, timely and standardized information on water resources quality. Number of institutions coordinated to facilitate the flow of information.</p>	<p>Coordinated public entities provide updated, accessible, timely and standardized information on water resources quality.</p>
<p>Number of implemented educational programs on water quality. Number of educational institutions that have implemented the curricula including water resources quality management. Number of educational publications on water resources.</p>	<p>Population educated and trained on water quality.</p>
<p>Number of regional and local governments with comprehensive programs and projects on protection and recovery of water resources quality. Number of strengthening mechanisms for the implementation of comprehensive programs in regional and local governments.</p>	<p>Regional and local governments with strengthened skills in protection, implementation and recovery of water resources quality.</p>
<p>Number of mechanisms implemented by cross-border watershed. Number of joint initiatives in cross-border watersheds.</p>	<p>Improvement of water resources quality in the cross-border watershed.</p>





CONCLUSIONS AND
RECOMMENDATIONS

6. Conclusions

- ◆ The National Strategy for the Improvement of Water Resources Quality includes prioritized tasks articulated in an action plan, which considers the specific activities for the various stakeholders (public and private entities), which are grouped in a functional manner, under a general line of action and a policy guideline, in accordance with their established powers and functions.
- ◆ The implementation of the action plan of the National Strategy for the Improvement of Water Resources Quality will make it possible to achieve sectoral objectives in line with the National Water Resources Management Policy and Strategy, the National Water Resources Plan, and the National Environmental
- ◆ In addition, the implementation process of the action plan includes a responsibility shared between several stakeholders in the same hydrographic unit, considering the short (2016-2021) and medium-term (2022-2025) implementation periods.

7. Recommendations

- ◆ The National Strategy for the Improvement of Water Resources Quality is a management tool that should be reviewed, assessed and agreed upon, allowing for transparent management with citizen participation. These are essential requirements for the improvement of public procedures.
- ◆ All actions and measures for the improvement and recovery of water quality should involve the participation of organized and informed civil society, and private and public sector at the national, regional and local government level.



ANNEXES

References

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Acronyms and Abbreviations

Acronyms

AAA	Water Management Authorities
ALA	Local Water Authorities
ANA	National Water Authority
CENEPRED	National Center for the Estimation, Prevention and Reduction of Disasters
DGCRH	Directorate of Water Resources Quality Management
DICAPI	General Directorate of Captaincy and Coastguard
DIGESA	General Directorate of Environmental Health - Ministry of Health
DREM	Regional Directorate of Energy and Mines
ECA	Environmental Quality Standard
EPS	Sanitation Services Provider
FEMA	Specialized Supervisory Body on Environmental Issues
FONAM	National Environmental Funds
INDECI	National Institute of Civil Defense
IGP	Geophysical Institute of Peru
LG	Local Government
RG	Regional Government
MINAM	Ministry of Environment
MINAGRI	Ministry of Agriculture and Irrigation
MEF	Ministry of Economy and Finance
MINEM	Ministry of Energy and Mines
MINEDU	Ministry of Education
MINSA	Ministry of Health
MVCS	Ministry of Housing, Construction, and Sanitation
OEFA	Agency for Environmental Assessment and Enforcement
NGO	Non-Governmental Organization
PAVER	Wastewater Dumping and Reuse Adaptation Program

PCM	Presidency of the Cabinet Council
PLANAA	National Environmental Action Plan
PMGRH	Water Resources Management Modernization Project
PNA	National Environmental Policy
PENRH	National Water Resources Policy and Strategy
PRODUCE	Ministry of Production
RREE	Ministry of Foreign Affairs
SENAMHI	National Meteorology and Hydrology Service of Peru
SNGA	National Environmental Management System
SNGRH	National Water Resources Management System
SNI	National Industry Society
SNMPE	National Society of Mining, Petroleum and Energy.
SUNASS	National Superintendency of Sanitation Services

Units

hm ³	Cubic hectometers
MCM	Million cubic meter



Autoridad Nacional del Agua