GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

Naoko Ishii
CEO and Chairperson

February 10, 2016

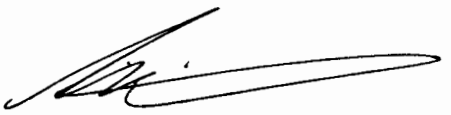
Dear Council Member:

UNDP as the Implementing Agency for the project entitled: ***Regional (Bolivia, Peru): Integrated Water Resources Management in the Titicaca-Desaguadero-Poopo-Salar de Coipasa (TDPS) System***, has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with UNDP procedures.

The Secretariat has reviewed the project document. It is consistent with the proposal approved by Council in May 2014 and the proposed project remains consistent with the Instrument and GEF policies and procedures. The attached explanation prepared by UNDP satisfactorily details how Council's comments and those of the STAP have been addressed. I am, therefore, endorsing the project document.

We have today posted the proposed project document on the GEF website at www.TheGEF.org. If you do not have access to the Web, you may request the local field office of UNDP or the World Bank to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,



Naoko Ishii
Chief Executive Officer and Chairperson

Attachment: GEFSEC Project Review Document
Copy to: Country Operational Focal Point, GEF Agencies, STAP, Trustee

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REQUEST FOR CEO ENDORSEMENT

PROJECT TYPE: Full-sized Project
TYPE OF TRUST FUND:GEF Trust Fund

For more information about GEF, visit TheGEF.org

PART I: PROJECT INFORMATION

Project Title: Integrated Water Resources Management in the Titicaca-Desaguadero-Poopó-Salar de Coipasa System (TDPS)			
Country(ies):	Bolivia and Peru	GEF Project ID:[1]	5748
GEF Agency(ies):	UNDP (select) (select)	GEF Agency Project ID:	4383
Other Executing Partner(s):	Ministry of Foreign Affairs of the Plurinational State of Bolivia, Ministry of Environment and Water (MMAyA) of the Plurinational State of Bolivia, Ministry of Environment (MINAM) of Peru, Ministry of Foreign Affairs of Peru.	Submission Date:	25 November 2015
GEF Focal Area (s):	International Waters	Project Duration(Months)	48
Name of Parent Program (if applicable): ➢ For SFM/REDD+ ☐ ➢ For SGP ☐ ➢ For PPP ☐		Project Agency Fee ($):	623,556

A. FOCAL AREA STRATEGY FRAMEWORK[2]

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount ($)	Cofinancing ($)
IW-3 (select)	Outcome 3.1: Political commitment, shared vision, and institutional capacity demonstrated for joint, ecosystem-based management of waterbodies and local ICM principles	National inter-ministry committees established; TDA & SAP programmes; local IWRM or ICM plans [National inter-ministry committees established; 1 TDA & 1 SAP; local IWRM plans]	GEF TF	2,142,050	12,629,136
IW-3 (select)	Outcome 3.2: On-the-ground modest actions implemented in water quality, quantity (including basins draining areas of melting ice), fisheries, and coastal habitat demonstrations for "blue forests" to protect carbon	Demo-scale local action implemented, including in basins with melting ice and to restore/protect coastal "blue forests" [11 pilot projects]	GEF TF	2,859,200	21,587,596
IW-3 (select)	Outcome 3.3: IW portfolio capacity and performance enhanced from active learning/KM/experience sharing	Active experience / sharing / learning practiced in the IW portfolio	GEF TF	998,750	4,847,525
		Project management Cost (PMC)[3] (including Direct Project Costs: $80,000)		563,750	1,665,143
		Total project costs		6,563,750	40,729,400

[1] Project ID number will be assigned by GEFSEC.
[2] Refer to the Focal Area Results Framework and LDCF/SCCF Framework when completing Table A.
[3] PMC should be charged proportionately to focal areas based on focal area project grant amount in Table D below.

B. PROJECT FRAMEWORK

Project Objective: To promote the conservation and sustainable use of water resources in the Titicaca - Desaguadero – Poopó - Salar de Coipasa (TDPS) transboundary system, through the updating the Global Binational Master Plan						
Project Component	**Grant Type**	**Expected Outcomes**	**Expected Outputs**	**Trust Fund**	**Grant Amount ($)**	**Confirmed Cofinancing ($)**
1. Strengthening the tools for binational and national management in the TDPS system: preparation of a Transboundary Diagnostic Analysis and updating the Binational Global Master Plan (SAP) for the TDPS system	TA	Outcome 1. The Transboundary Diagnostic Analysis (TDA) and the Strategic Action Programme (SAP) for the TDPS have been formulated and adopted. Outcome 2. Improved institutional capacity to implement IWRM in the TDPS system in both countries	1.1. Additional studies to support the preparation of a TDA for the TDPS 1.2. TDA validated by the countries. 1.3. Strategic Action Programme formulated by a participatory process, integrating an IWRM approach, adopted by both countries. 2.1. Training of key stakeholders in IWRM. 2.2. Actions to strengthen the institutional arrangement for binational management of the TDPS.	GEF TF	3,542,050	12,629,136
2. Evaluation of interventions at the pilot scale	TA	Outcome 3. Practical learning generated in pilot experiences contribute to the development of the SAP and to decision making.	3.1. Eleven pilot projects on relevant issues of the TDPS 3.2. The systematization of the results of pilot projects and the analysis of their applicability to the TDPS system are accessible and available to all stakeholders in the area.	GEF TF	1,459,200	21,587,596
3. Support system to follow up on the TDPS status and implementation of the Binational Global Master Plan	TA	Outcome 4. Updated, accurate, and relevant information on TDPS management is available and accessible to allow implementation of the SAP with an adaptively approach, including attention to social and gender variables.	4.1. TDPS monitoring program	GEF TF	349,450	3,078,632
4. Improved communication, education, and participation of key stakeholders.	TA	Outcome 5. Key stakeholders know the core issues of the TDPS, become empowered and act in the context of IWRM to advance workable solutions. Outcome 6. Key	5.1. Website for the dissemination of project results, including the exchange of experiences through IW:LEARN and participation in IWC . 5.2. Strategies for environmental education and communication for	GEF TF	649,300	1,768,893

Project Objective: To promote the conservation and sustainable use of water resources in the Titicaca - Desaguadero – Poopó - Salar de Coipasa (TDPS) transboundary system, through the updating the Global Binational Master Plan						
Project Component	**Grant Type**	**Expected Outcomes**	**Expected Outputs**	**Trust Fund**	**Grant Amount ($)**	**Confirmed Cofinancing ($)**
		stakeholders actively participate in a coordinated manner to address the core problems in the TDPS system.	IWRM in the TDPS. 6.1. Strategy for citizen participation and articulation among stakeholders in support of IWRM in the TDPS system.			
			Subtotal		6,000,000	39,064,257
			Project management Cost (PMC) (including Direct Project Costs: $80,000[4])	(select)	563,750	1,665,143
			Total project costs		6,563,750	40,729,400

C. SOURCES OF CONFIRMED COFINANCING FOR THE PROJECT BY SOURCE AND BY NAME ($)

Please include letters confirming cofinancing for the projects with this form

Sources of Co-financing	Name of Co-financier (source)	Type of Cofinancing	Cofinancing Amount ($)
National Government	Government of Bolivia	Grant	14,800,000
National Government	Government of Bolivia	In kind	1,500,000
National Government	Government of Peru	Grant	8,795,623
National Government	Government of Peru	In kind	14,803,777
Foundation	IUCN	In-kind	120,000
Foundation	CAFOD	In-kind	66,000
Local Government	IES Mariano Melgar	In-kind	229,000
GEF Agency	UNDP - Peru	Grant	50,000
GEF Agency	UNDP - Peru	In-kind	25,000
GEF Agency	UNDP – Bolivia	Grant	50,000
GEF Agency	UNDP – Bolivia	In kind	25,000
GEF Agency	UNDP Cap-Net	In-kind	265,000
Total Co-financing			40,729,400

D. TRUST FUND RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY[1]

GEF Agency	Type of Trust Fund	Focal Area	Country Name/ Global	(in $)		
				Grant Amount (a)	Agency Fee (b)[2]	Total c=a+b
UNDP	GEF TF	International Waters	Bolivia, Peru	6,563,750	623,556	7,187,306
Total Grant Resources				6,563,750	62,.556	7,187,306

[1] In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table. PMC amount from Table B should be included proportionately to the focal area amount in this table.

[2] Indicate fees related to this project.

[4] PMC should be charged proportionately to focal areas based on focal area project grant amount in Table D below.

F. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Grant Amount ($)	Cofinancing ($)	Project Total ($)
International Consultants	0	0	0
National/Local Consultants	719,000	0	719,000

G. DOES THE PROJECT INCLUDE A "NON-GRANT" INSTRUMENT? No

(If non-grant instruments are used, provide in Annex D an indicative calendar of expected reflows to your Agency and to the GEF/LDCF/SCCF/NPIF Trust Fund).

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF[5]

A.1 National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAS, NBSAPs, national communications, TNAs, NCSA, NIPs, PRSPs, NPFE, Biennial Update Reports, etc.

NO CHANGES

A.2. GEF focal area and/or fund(s) strategies, eligibility criteria and priorities.

NO CHANGES

A.3 The GEF Agency's comparative advantage:

NO CHANGES

A.4. The baseline project and the problem that it seeks to address: The baseline project and the problem to be addressed have not changed. However, the strategy of the project was fine-tuned to be a catalyst to mainstream IWRM and stakeholder involvement and participation into local, national and binational watershed management. Multi-level dialogue and cooperation is fundamental to confront the key issues in the TDPS. Therefore, the Strategic Action Programme will be built through a bottom-up (watershed based) highly participatory process involving the key stakeholders. The number of outcomes and outputs were modified to have more precision and detail on the intervention. The PIF included the following elements: Component 1 - two outcomes and four outputs, Component 2 - three outcomes and one output, Component 3 - one outcome and one output, and Component 4 - three outcomes and one output. The outcomes were reduced from eight in the PIF to six in the PRODOC, and the outputs were increased from six in the PIF to 11 in the PRODOC. In addition, minor changes were done in the amount of resources allocated to the four components. USD201.250 were moved from components 3 and 4 to increase the funds in component 1 (i.e., add USD142.050) and component 2 (i.e., add USD119.200). In component 1 more resources were needed to sustain a highly participatory process to build the SAP. In component 2 the additional resources will be used to document and disseminate the learnings from the pilot projects and DPC to support their implementation.

A. 5. Incremental /Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project: The project will generate global benefits by catalyzing the sustainable management of the Titicaca - Desaguadero - Poopó - Salar de Coipasa water system (a transboundary endorheic watershed of 143,900 km^2) and the conservation of high value biodiversity (e.g., Titicaca giant frog, Titicaca grebe, endemic fish of the genus *Orestias*). Without this intervention, it is very likely that current deterioration will continue in the TDPS, as a result

[5] For questions A.1 –A.7 in Part II, if there are no changes since PIF and if not specifically requested in the review sheet at PIF stage, then no need to respond, please enter "NA" after the respective question.

of uncoordinated actions based on sectoral and local visions and perspectives. The key incremental actions will be to support:

(i) The preparation of a binational TDA and SAP to have an agreed framework of action. The SAP will be an updated version of what is currently called the Binational Masterplan, but incorporating (a) the conceptual basis of IWRM, (b) new considerations (e.g., climate change, biodiversity conservation), and (c) the involvement and collaboration of public and private key stakeholders at the local and national levels.

(ii) The strengthening of the binational institutional arrangements agreed by Bolivia and Peru to manage the shared water resources.

(iii) The promotion of multi-level dialogue and direct involvement of key stakeholders in each of the 14 watersheds that conform the TDPS.

(iv) The generation of learnings on IWRM within an endorheic system that will be useful at the local, national and international levels.

A.6 Risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and measures that address these risks:

Risk	Level	Mitigation Measures
Natural. ENSO. It is documented that rainfall decreases in the TDPS during El Niño. During 2015 El Niño conditions developed between weak and moderate. A strong El Niño has developed, by 8 October 2015 there was a probability of 95% that El Niño will continue through Northern Hemisphere winter 2015-16, gradually weakening through spring 2016[6].	High	The relationship between ENSO events and climate in the TDPS will be included in the preparatory analyses for the new master plan and will be shared with key stakeholders.
Natural. Occurrence of extreme weather events (hail, frost, drought, floods) that adversely affect the pilot projects. These events are common in the TDPS.	High	It has been ensured that the pilots consider this risk and include measures to prevent negative impact during implementation.
Social. Increased conflicts around the Ramis and Suches rivers due to illegal mining. In case of escalation of conflicts, this could affect the pilot projects implemented in these areas and social participation could be reduced.	High	The project team will establish and maintain direct communication and information channels with local stakeholders and will seek to establish relations of trust with them.
Social. Increased conflicts in the Coata River basin (PER) due to sewage contamination from EPS SEDAJULIACA S.A. This could reduce social participation in the project.	High	The project team will establish and maintain direct communication and information channels with local stakeholders and will seek to build trust with them.
Social. Mobilization due to decreasing captures and decreased number of members in the Fishermen Federation of La Paz with the risk of distrust and	High	The project team will establish and maintain direct communication and information channels with this key stakeholders and will try to

[6] Climate Prediction Centre, National Oceanic and Atmospheric Administration (NOAA).

Risk	Level	Mitigation Measures
inaction on the part of this key stakeholders regarding the project actions.		establish relations of trust to encourage their participation in the project.
Social. Protests of irrigation users in the Desaguadero River basin due to decreased flow of river water. This could lead to distrust among the key stakeholders in the area.	High	The project team will establish and maintain direct communication and information channels with local stakeholders and will seek to establish relations of trust to encourage their participation in the project.
Political. Persistent distrust among national and subnational stakeholders. This can motivate a disconnection among key stakeholders of the project.	High	The project will promote the development of trust and will facilitate coordination and political dialogue between stakeholders at different levels.
Political. Disinterest among local stakeholders and beneficiaries to become involved and participate in the pilot projects.	Medium	It has been ensured that the proponents of pilot projects have informed the local stakeholders and have obtained their conformity.

A.7. Coordination with other relevant GEF financed initiatives

The project will use the lessons learned from the following GEF projects:

1. The projects for the preparation and implementation of the strategic action programme for the Bermejo River Basin (GEF-ID 176 and 886), implemented by UNEP in Bolivia and Argentina.
2. The project on sustainable management of water resources in the La Plata River Basin with respect to the effects of climate variability and change (GEF-ID 2095), implemented by UNEP and executed by the Organization of American States.
3. The project on integrated and sustainable management of transboundary water resources in the Amazon River basin, implemented by UNEP and executed in the framework of the Amazon Cooperation Treaty Organization (OTCA), in which Bolivia and Peru participate.

Of particular interest will be the coordination and exchange of information with the following GEF projects:

1. Implementation of comprehensive measures to minimize mercury discharges from artisanal gold mining (GEF-ID 4799), which is being implemented by UNIDO in Peru.
2. Adaptation to climate change impact on water resources in the Andes (GEF-ID 5384), which is currently in preparation. It is being implemented by the World Bank in Bolivia, Colombia, Ecuador, and Peru.
3. Developing of risk management approaches for mercury in Latin America (GEF-ID 5494). It is a regional project implemented by UNEP in Peru.
4. Development of the initial evaluation of the Minamata Convention in Latin America and the Caribbean (GEF-ID 5879), a UNEP regional project which includes Bolivia.
5. National Biodiversity Strategy and Action Plan (GEF-ID 5888), currently implemented by the IDB in Bolivia.
6. Support to 16 eligible parties to align the National Action Programmes and reporting process under UNCCD (GEF-ID 5898), which is an international project of UNEP that includes Bolivia.
7. Support for NAP alignment and reporting of UNCCD (GEF-ID 5899), implemented by UNDP in Peru.

It will be essential to maintain close coordination with the GEF project on integrated water resources management in the Puyango-Tumbes, Catamayo-Chira and Zarumilla transboundary aquifers and river basins (GEF-ID 5284), to be implemented almost simultaneously in Ecuador and Peru by UNDP. The implementing partner of the project in Peru is

ANA, it will be important to exchange experiences in the preparation of the TDA and SAP, implementation of pilot projects, monitoring the impacts caused by gold mining, creation of watershed councils, and integrated management of water resources. In addition, courses and education and communication materials could possibly complement each other.

B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:

B.1 Describe how the stakeholders will be engaged in project implementation. During the PPG key stakeholders were identified. The project incorporates a participatory approach and has maximized the engagement of the key stakeholders of the water system. The preparation of the TDA will be done with the involvement of technical and academic stakeholders. Afterwards the draft TDA will be disseminated through electronic platforms and workshops will be organized with stakeholders in each of the four major hydrographic units (i.e., Titicaca, Desaguadero, Poopó, and Salar de Coipasa) to validate the findings. The preparation of the SAP will be done following a watershed-based bottom-up approach. Technical promoters will be hired to drive the participatory process in each of the 14 hydrographic units that make up the TDPS system, to build proposals that articulate IWRM at the local levels with an integrated perspective of the entire system. The SAP will be submitted to the consideration of both governments for their formal approval and finally will be published and disseminated to make it accessible to local stakeholders. It is expected that public and private stakeholders will internalize the SAP into their own plans and therefore will contribute to its implementation.

There are a number of actions to contribute to the development of human and social capital at all levels. For example, there will be training activities aimed both at governmental officers (local, regional and national governments) and social and productive organizations (output 2.1). Also, there will be actions, like electronic networking and in-person workshops, to promote communication and to encourage the building of trust and articulation among key stakeholders of the TDPS (outputs 5.2 and 6.1). The project will prepare and initiate the implementation of strategies for environmental education, communication, and citizen participation, it is expected that from the fourth year on, ALT will fully assume the implementation of these strategies.

Finally, the 11 pilot projects (component 2) will be an opportunity to engage public and private local stakeholders and interest groups into practical exercises to address key issues of the endorheic system. The learnings of the pilot projects will be widely disseminated for the benefit of local groups as well as international audiences.

B.2 Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF):

The Project will be a catalyst to encourage a better management of the water system, but during its foundational phase cannot solve all the pressing issues like treating urban and industrial wastewater and the proper manage of mine tailings and environmental liabilities. Therefore the full range of socioeconomic benefits and impacts of the project will not be seen immediately but over a longer time frame once the SAP is adopted and implementation scaled up. In the short-term, the TDPS resource users, including women and indigenous, would benefit from strengthening their participation in the decision-making processes and from building partnerships and trust with other stakeholders. This will, in turn, contribute to empower women by having direct involvement into governance processes for water management. Also, municipalities and other relevant authorities will identify and plan key investments under their jurisdiction to address major threats like untreated wastewater and mine tailings. In the medium-term, it is expected that local groups will benefit from access to sustainable and safe water resources, goods, and the biodiversity functions in TDPS. At the nationwide level, the project will contribute to mainstream integrated water resources management, which is central to the strategies for water resources in both countries. It will also encourage dialogue among multilevel key stakeholders to achieve their support to conservation of water resources and biodiversity. Multi-level dialogue will also contribute to engage indigenous groups and women into governance processes.

B.3. Explain how cost-effectiveness is reflected in the project design:
The project will ensure the cost-effectiveness of GEF resources through:

1. Allocate GEF funds to activities and products with high catalytic potential, such as:
    a. Participatory processes for the construction of TDA and SAP.

b. Design of a transboundary IWRM course for officials from national, regional, and local governments and an IWRM course for social and productive organizations in TDPS, including training of trainers.
c. Systematization and dissemination of experiences from pilot projects.
d. Design and implementation of strategies for environmental education, communication, and participation.
e. Use of electronic platforms to: (i) facilitate access to information for decision making (TDPS information website), (ii) disseminate lessons learned and outcomes of the project, and (iii) facilitate communication and articulation among key stakeholders.

2. Build on the lessons and experiences on management of transboundary water systems and the outcomes of other projects and initiatives.
3. Anchor the continuation of activities in the new structure of ALT and in entities at the national, regional, and local levels with competence and responsibility to address the critical issues in the TDPS (e.g., polluted water discharges).

In summary, the cost-effectiveness of the project is reflected by the fact that future major changes in the TDPS could be obtained with a relatively small investment in key catalytic strategic actions, with a high degree of synergy and replicability.

C. DESCRIBE THE BUDGETED M &E PLAN:

Type of M&E activity	Responsible partner	Budget USD Excluding project team staff time	Time frame
Inception workshop and report	CBP UNDP-COs RSC-LAC	8,000	During the first two months after project start
Quarterly progress reports	Project team Lead UNDP-CO	None	Quarterly
APR/PIR	CBP UNDP-COs	None	Annual
Field visits	Lead UNDP-CO RSC-LAC Project team	16,000	Annual
Binational Steering Committee meetings	CBP Lead UNDP-CO	24,000	Semestral
Binational Technical Committee meetings	CBP Lead UNDP-CO	32,000	At least semestral
Mid-Term Evaluation	Lead UNDP-CO RSC-LAC Project team External evaluator (international)	25,000	End of year 2
Terminal Evaluation	Lead UNDP-CO RSC-LAC Project team External evaluator (international)	28000	Three months before the end of the project
Project Terminal Report	CBP and Project team	0	Three months before the end of the project
Audits	Auditors	40,000 (10,000/audit)	Annual
Total indicative cost Excluding staff time and travel expenses of the project team and UNDP		173,000	

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT(S) ON BEHALF OF THE GOVERNMENT(S):): (Please attach the Operational Focal Point endorsement letter(s) with this form. For SGP, use this OFP endorsement letter).

NAME	POSITION	MINISTRY	DATE *(MM/dd/yyyy)*
Roberto Salvatierra	Vice-Minister, Vice Ministry of Environment, Climate Change and Forest Management and Development.	**MINISTRY OF ENVIRONMENT AND WATER (BOLIVIA)**	**19 FEBRUARY 20014**
Jose Antonio González Norris	Director of International Cooperation and Negotiations	**MINISTRY OF ENVIRONMENT (PERU)**	**27 FEBRUARY 2014**

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for CEO endorsement/approval of project.

Agency Coordinator, Agency Name	Signature	Date *(Month, day, year)*	Project Contact Person	Telephone	Email Address
Adriana Dinu, UNDP-GEF Executive Coordinator		25 Nov 2015	José Vicente Troya, Regional Technical Advisor, Waters & Oceans	+507-302-4636	Jose.troya@undp.org

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
Project objective. To promote the conservation and sustainable use of water resources in the Titicaca - Desaguadero – Poopó - Salar de Coipasa (TDPS) transboundary system, through the updating the Global Binational Master Plan[7].	Number specific of binational commitments to address critical aspects of conservation and sustainable use of water resources and advance of IWRM in TDPS	0	≥ 3 commitments 1. Water quality standards harmonized 2. Agreement to reduce the polluting load of domestic and industrial sewage 3. Agreement for optimizing the TDPS monitoring system	Binational commitments	Both countries maintain their political commitment to strengthen the binational management of the TDPS and to advance IWRM. It is a priority in the political agenda of the countries to address the major anthropogenic pressures that negatively affect the TDPS. There is good communication and collaboration among government agencies in both countries. The changes resulting from the general elections in Peru (2016) and Bolivia (2019) do not affect the binational management of the TDPS.
	Number of organizations for watershed management/ councils for basin water resources	1[8]	≥3	Instruments that establish organizations for watershed management/ councils for basin water resources	
	Government investment to control and mitigate major environmental pressures in the TDPS[9] (USD)	To be calculated at the start of the project[10]	Increase of ≥50%	State budget	
Outcome 1. The	Approval of TDA and	The original PDGB	Year 3. TDA formally	Instrument on	TDPS key stakeholders

[7] The Binational Global Master Plan for the TDPS water system is the framework for joint action agreed between Bolivia and Peru. The original PDGB was ready in 1995. The PDGB is equivalent to the Strategic Action Programme as defined by GEF within the International Waters focal area.
[8] Management entity for Katari River basin (Bolivia).
[9] Major pressures are understood to be: [1] discharge of untreated domestic sewage, [2] discharge of untreated industrial wastewater, [3] improper disposal of solid waste, [4] discharge of mine tailings and pollution due to poorly managed environmental liabilities. The indicator is measured on the basis of a constant value that uses the year 2014 as a reference.
[10] The baseline will be the investments made in 2014.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
Transboundary Diagnostic Analysis (TDA) and the Strategic Action Programme (SAP) for the TDPS have been formulated and adopted.	SAP. The SAP is based on IWRM and watershed management	does not include the IWRM perspective. Both countries have adopted the concept of watershed management.	approved by both governments. Year 4. SAP formally approved by both governments.	binational recognition[11] of TDA and SAP	are involved and actively participate in the development of SAP.
			Year 4. SAP incorporates IWRM strategies for each hydrographic unit, (levels 3 and 4) in the TDPS (14 units)	SAP	
Outcome 2. Improved institutional capacity to implement IWRM in the TDPS system in both countries.	Number of officials of national, regional, and local governments trained on IWRM (people/ hydrographic unit of levels 3 and 4)	0	Year 2. >10 staff/ hydrographic unit, levels 3 and 4 Year 4. > 25 officials / hydrographic unit, levels 3 and 4	Memoirs of training events, including registry of participants[12].	TDPS key stakeholders are motivated to implement IWRM. Political factors do not limit collaboration among key stakeholders in national, regional, and local governments. Social and productive organizations are actively involved in TDPS management.
	Number of social and productive organizations trained in IWRM (people / hydrographic unit of levels 3 and 4)	0	Year 2 > 20 persons/ hydrographic unit, levels 3 and 4 Year 4 > 50 persons/ hydrographic unit, levels 3 and 4		
Outcome 3. Practical learning generated in pilot experiences contribute to the development of the SAP and to decision making.	Number of municipal, regional and national policies based on the outcomes of pilot projects	0	Year 3. > 2 Year 4. > 10	Decisions by public bodies that explicitly refer to the outcomes of the pilot projects.	Key stakeholders in national, regional, and local governments and social and productive groups value the results of the pilot projects and use them for their decision- making.

[11] Approval by the Project Steering Committee will be sufficient.

[12] It must include at least the following information: (1) full name, (2) personal identification number, (3) organization, and (4) signature.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
Outcome 4. Updated, accurate, and relevant information on TDPS management is available and accessible to allow implementation of the SAP with an adaptively approach, including attention to social and gender variables.	Level of satisfaction[13] with the quality of information and accessibility for national, regional and local authorities, and social and productive organizations.	0	Year 2. > 50% satisfied Year 4. > 80% satisfied.	Survey among representative samples in each hydrographic unit, levels 3 and 4 (14 hydrographic units)	The target groups[14] have the means to access information. The target groups are interested in using TDPS information for their activities and decision-making processes.
Outcome 5. Key stakeholders know the core issues of the TDPS, become empowered and act in the context of IWRM to advance workable solutions.	Level of knowledge of public authorities and social and productive leaders about the issues in the TDPS and on existing instruments for binational management of the system.	60%	Year 2 = >70% Year 4 = >80%	Survey among representative samples in each hydrographic unit, levels 3 and 4 (14 hydrographic units)	The target groups have the means to access information websites TDPS key stakeholders are interested in the issues present in the system.
Outcome 6. Key stakeholders actively participate in a coordinated manner to address the core problems in the TDPS system.	Number of platforms[15] with active involvement from public authorities and social and productive leaders.	2[16]	Year 2 $\geq$ 4 Year 4 $\geq$ 8	Assessment on continued presence of key stakeholders in each platform in years 2 and 4.	Political differences and particular interests do not limit the involvement and participation of key stakeholders in the platforms. There is a fluid and constructive dialogue between stakeholders from both countries.

[13] To be assessed by using a four-point scale: [1] dissatisfied, [2] somewhat satisfied [3] satisfied [4] very satisfied.
[14] i.e., national, regional and local authorities, as well as social and productive organizations.
[15] At least the following platforms will be evaluated: (1) Management body for Katari River Basin [Bolivia], (2) Platform for Poopó Basin [Bolivia], (3) Multisectoral Commission for Environmental Prevention and Recovery of Lake Titicaca Basin and its Tributaries [Peru], (4) Water Resources Council of Titicaca watershed [Peru] [when consolidated], (5) Binational Technical Commission on Suches River (Bolivia – Peru), (6) Binational Technical Commission on Maure-Mauri River, (7) National Commissions for ALT Affairs (CONALT Peru and CONALT Bolivia).
[16] Water Resources Council of Titicaca Basin [Peru] and Inter-institutional Platform for the Master Plan of Katari Basin [Bolivia].

Results framework of the pilot projects (outcome 3)

01-B-01. Application of ancestral technologies for sedimentation control at the source. San Andrés de Machaca.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
Objective: Identifying, implementing and evaluating the intervention measures for integrated management and conservation of basins and water based on ancestral technologies that contribute to control of sediment in source.	Application of 10 measures of intervention for integrated management and conservation of basins and water based on ancient technologies.	In the area of the project, there is no intervention measure for integrated management and conservation of basins and water based on ancient technologies that contribute to sediment in source control.	Ancestral practices or technologies have been identified and applied.	Systematization of documents on ancestral practices.	
Outcome 1: Application of ancestral practices, allowing the reduction of the rate of erosion in the basin and decrease in sediment production.	Indicator 1.1: Ten ancestral practices implemented. Indicator 1.2: Five sediment trapping demonstration plots established.	Soils in the Jacha Mauri basin have high levels of moderate, severe, and very severe erosion, mostly from human action, which generates the production of sediments. Ancestral practices of erosion control and sediment yield are not applied. Estimates of erosion and sediment transport in this basin include: Moderate erosion: 894.1 km^2 (53%). Severe erosion: 205.7 km^2 (12%) Very severe erosion 57.0 km^2 (3%), with a	In the two years of the project, 10 ancestral practices have been implemented erosion control and 5 demonstrative plots for sediment retention.	Documents with systematization of ancestral practices and control of sediment.	Lack of interest from local experts to share their knowledge.

		total of 1.156.8 km^2 (68%).			
Outcome 2: Installed capacities in the 12 participating communities have been developed.	Indicator 2.1: Ten events for exchange of experiences, dialogue of knowledges, and training. Indicator 2.2: One officer of the Technical Office trained. Indicator 2.3: A team of community leaders, with 30% of women, trained for replication.	Technical Office has no capacities in the subject area. Community members have no capacity to replicate experiences.	In the two years of the project, 5 documents have been published and 10 events for exchange of experiences, dialogue, knowledge, and training have been conducted. Also, one officer from the municipality has been trained as well as a team of community members.	Documents and publications. Name of officer trained. List of community members trained.	Low interest in participating in events on the part of the community, municipality, and other local stakeholders. Low participation of women.

02-B-02. Revitalization of bofedales to contribute to water availability. Charaña municipality

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
Objective: Revitalization of bofedales to protect their biodiversity and ensure sustainable use and management.	Three pilot bofedal areas revitalized. Sustainably managed bofedales 90 community members trained in bofedal and vicuna herd management.	Degraded bofedales with issues related to overgrazing, water shortages, and biodiversity loss.	16 ha of bofedales are revitalized after three years of the project.	Increased amount of plant material. Community members trained in the management of bofedales and camelids.	
Outcome 1: Bofedales revitalized and improved as living ecosystems.	1.1. Three areas delimited by type of bofedales and description of the sites: (Slope, topography, vegetation, and other site features).	There is no description of bofedal sites for delimitation.	Delimitation of areas according to types of bofedales completed.	Report on features related to slope, relief, types of vegetation in the three areas of bofedales.	
	1.2. Preparation of three maps for pilot sites with information on types associations related to the bofedales.	There are no maps of pilot sites with information on the types of associations related to the bofedales.	Development of three maps on pilot sites with information about associations related to bofedales completed.	Thematic maps completed.	
	1.2.	There is some	Years 1 and 2:	Soil base map.	The reports on physical

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
	Soil characterization (physical and chemical soil characteristics) in the three areas of bofedales.	secondary physicochemical information and soil analysis for the Charaña Municipality	Pre-field stage (base soil map). Fieldwork stage (mapping and soil sampling).	Soil samples collected in the field. Report on physical and chemical analyses by the laboratory. The soils are characterized.	and chemical features of soil are not delivered by the laboratory. The laboratory is not certified.
	1.1. Determination of water features of the bofedales: volumes and quality.	There is no information on volumes and quality of water in the bofedales.	The assessment on the capacity of streams and surface runoff is completed. The examination of water quality is completed.	Water samples collected for analysis. Laboratory reports on water quality. Results of gauging of streams.	Lack of material and non-standardized equipment for gauging the capacity of rivers.
	1.6 Characterization of the floristic composition and productivity of the three bofedal sites (condition of the bofedales in rainy and dry seasons, determination of the chemical composition of native prairie, estimation of the productivity, and animal load.)	There is some secondary information on the floristic composition of the bofedales.	Years 1, 2 and 3: The characterization of the floristic composition of the bofedales is completed. The determination of the chemical composition of grasslands with bofedales is completed. The estimation of productivity of bofedales is completed.	▪ Experimental units installed. ▪ Report on the characterization of the floristic composition. ▪ Report on the productivity of bofedales.	
Outcome 2: The bofedales have a plan for water use (water demand for optimum use).	2.1 Determination of water consumption or demand by alpacas with 6 animals per pilot site for 10 days in each month for 6 months (3 months/season) on the basis of dry matter intake.	There is no information on consumption or demand for water by animals in the area.	Information related to the planning on water demand by local animals has been collected.	Report on water consumption by livestock. Reports on forage consumption (dry matter under free grazing in bofedales).	Droughts due to climate change. El Niño and La Niña.
Outcome 3: Local capacities are achieved.	3.1. Staff at the Technical Office of the Charaña Municipality	• Technical Office staff not trained.	All the regular meetings of the Replication Inter-	List of attendees.	

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
	trained. 3.2. A team of 90 community members trained on the subject of sustainable management and use of bofedales.	Team of community members not trained.	institutional Team were carried out.		

03-B-03. Bioremediation of Huatajata and Cohana Bay areas in Lake Titicaca and economic and cultural revaluation of totora reeds.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
General objective: Proposing two innovative techniques to reduce the contamination of Katari River and the shores of Huatajata on Lake Titicaca by bioremediation of waters with added socio-economic and cultural benefits for local communities.	Reduction of the concentrations of phosphate, dissolved organic carbon (DOC), impoverishment of the $\delta^{15}N$ and enrichment of $\delta^{13}C$ in filters and sediments. Number of communities, municipalities and governmental organizations informed and systematized data on the use of totora reed and its economic potential.	In Katari, phosphate of 25 ppm, DOC of 23 ppm, $\delta^{15}N$ in filters 12.20, a level of $\delta^{13}C$ of - 30 in sediments. In Huatajata, phosphate 0.062 ppm, 11 ppm COD, and $\delta^{15}N$ average of 1.17. No community, municipality, or organization has these data to be generated.	After one and a half years of implementation of the treatments: in the effluent of Katari there will be a reduction of phosphate to 15 ppm, 12 ppm COD, and $\delta^{15}N$ in filters 9, and a level of $\delta^{13}C$ -10 in sediments. In Huatajata, phosphate to 0.03 ppm, 8 ppm COD, and an average $\delta^{15}N$ of 0.6. By the end of the project at least two communities, two municipalities, ALT and MMAyA will have systematic data on the use of totora and its socio-economic potential.	Laboratory results, reports to financiers, and scientific publications.	In Katari River, we assume that a community will be willing to provide space and support the activities. We assume that in Huatajata extreme weather will not alter the functioning of the system.
Outcome 1: Reduction of the levels of contamination of water passing through the decontamination system in Katari River.	Phosphate concentrations, dissolved organic carbon, impoverishment of δ15N and enrichment δ13C in sediments.	In Katari, phosphate of 25 ppm, COD of 23 ppm, δ15N in filters is 12.20, a level of δ13C - 30 in sediments.	After one and a half years of implementation of the treatments, in the effluent of Katari, there will be a reduction of phosphate to 15 ppm,	Technical and scientific reports.	We hope to reach an agreement with some of the communities to use part of their land and use it for a reasonable time.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
			COD to 12 ppm and δ15N in filters will be 9, and a level of δ13C will be - 10 in sediments.		
Outcome 2: Reduction of the average concentration of pollutants in the shores of Huatajata.	Phosphate concentrations, dissolved organic carbon, impoverishment δ15N.	In Huatajata, 0.062 ppm phosphate, COD 11 ppm and average of 1.17 in δ15N.	In Huatajata, phosphate to 0.03 ppm, 8 ppm COD, and average of 0.6 in δ15N at the end of the second year.	Technical and scientific reports.	The construction of the reed stands will be completed in reasonable time with the support of local stakeholders.
Outcome 3: Revaluation of the utilization and conservation of Schoenoplectus californicus ssp. tatora by local communities, as part of a socio-economic study on the feasibility and sustainability of replication of these initiatives.	Number of communities, municipalities, and governmental organizations informed; and systematized data on the use of totora and its economic potential.	None known	At the end of the project at least two communities, two municipalities, ALT, and MMAyA will have systematic data on the use of totora and its socio-economic potential.	Technical reports to the financier, publication for dissemination of results, ALT, MMAyA.	Local communities will be interested in sharing their knowledge and information about the use of totora reeds.

04-B-04. Water quality monitoring system in the Suches River basin. Bolivian section.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and assumptions
Objective Contribute to improving the quality of life of riverine residents with timely, adequate, and relevant information, obtained permanently, on the quality and quantity of water along the course of Suches River to plan and implement prevention, mitigation and/or remediation	Coefficient of percentage (%) variation of heavy metal concentration in the water	2014 Monitoring Results	By 2016, the concentration of heavy metals and critical elements in the various monitoring points is identified.	Lab analysis results	The timeframe for implementation of prevention and/or mitigation measures is not sufficient. Implemented measures are not effective.

measures to address negative environmental impacts on human health and the environment.					
Outcome 1: Monitoring system established with participation of national, departmental and local stakeholders.	Number of monitoring teams established.	No monitoring teams are established.	By 2016, there are 6 monitoring teams established and fully equipped and they have trained staff who conduct two monitoring campaigns per year	Analysis results, technical reports of municipalities, maps, database, geodatabase	
Outcome 2: Improved water quality of Suches River resulting from implementation of prevention, mitigation, and remediation measures to address negative environmental impacts in the short, medium and long term.	Number of prevention, mitigation and/or remediation measures applied.	No proposals for any prevention and/or mitigation measures to be applied	By 2016, there is an action plan that proposes measures to prevent and/or mitigate negative environmental impacts.	Applied measures.	The cost of prevention, mitigation, or remediation measures identified exceeds the budgeted amount. There is a lack of consensus among stakeholders regarding implementation of measures.
Outcome 3: Capacity building at different levels of government	Interinstitutional platform for quality measurement established	There is no interinstitutional committee.	By 2016, meetings of the Interinstitutional Platform are held regularly	Minutes of meetings	Lack of commitment on the part of entities in the interinstitutional platform

05-B-05. Permanent observatory of Lake Titicaca.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and assumptions
General objective: Understanding the hydro-chemical and biological dynamics of Lake Titicaca on the basis of the implementation of a sustainable scheme for	No. of key factors identified for the daily, seasonal, and annual variability.	The TITICACA SENSORS project by IRD and UMSA preliminarily identified some factors to observe.	Confirm the daily variability observed in the first observatory; identify the seasonal variability in a period of 2 years, and annual variability based on the data for 4 years (2 years	Databases in Geoportal; reports to financiers; and scientific publications.	We assume that extreme weather events in Huatajata or boat accidents in the area will not alter the functioning of equipment.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and assumptions
automated monitoring coupled to a routine sampling program.			from this project and 2 from the previous one). Identify at least 4 key variables that must be monitored in other sites of Lake Titicaca and the appropriate frequency for data collection.		
Outcome 1: Improvement of knowledge about the biogeochemical dynamics inside Lake Titicaca on the basis of high frequency data from Huatajata.	No. of physic-chemical and biological variables identified to experience significant fluctuations and No. of publications.	Main daily, seasonal, and annual variables identified and observed for two years.	Daily and seasonal variation patterns will be identified after two years of the project. At the conclusion of the project there will be annual patterns of variation and clear trends. It is expected that a scientific publication will be developed.	Technical and scientific reports	We expect no technical difficulties with the equipment that may hinder or interrupt monitoring.
Outcome 2: Relationship among different factors and specific phenomena in Lake Titicaca identified to prevent, or at least anticipate, the emergence of "blooms" of algae and other phenomena of great relevance to life and services provided by Lake Titicaca.	No. of relationships between physic-chemical and biological variables identified and number of publications.	No relationship has been identified.	At the end of the project there will be knowledge about the determining factors of at least 2 phenomena that are important to ecosystem, such as algae bloom and temporary eutrophication of the lower Lake. It is expected that a scientific publication will be developed.	Technical and scientific reports.	There will be sufficient information to establish the correlations between variables.
Outcome 3: Technical personnel of MMAyA and the governor's office of La Paz are capable of taking and interpreting monitoring data as well as sharing	No. of the technical staff in the governor's office and MMAyA, trained in this type of surveys and workshops in communities.	There are no technical staff trained in this type of monitoring.	At the end of the program there will be at least 10 technical staff trained in each institution. A teaching manual will be developed to extend the	Training records.	The permanence of the technical staff from the beginning to the end of the project is secured.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and assumptions
the generated information with local communities.			training. Also, at least 2 workshops to share the experience will have been carried out with the communities.		

06-P-01. Techniques for the reduction of sediment and mercury discharges from mining activities at the head of the Ramis River basin.

	Indicator	Baseline	Targets at the end of the project	Source for verification	Risks and assumptions
Objective Propose and validate a technique for bioremediation of sediments contaminated with waste originated in mining activities in the headwaters of tributaries of Lake Titicaca.	Increased number of validated techniques for bioremediation of sediments in the headwaters of tributaries of Titicaca.	Zero (0) validated techniques	At the end of the project, there is one validated technique for bioremediation of sediments.	Supporting document for technique validation.	No organism adapted to the climatic conditions in the region.
Outcome 1 Reduced sediment loads and levels of impact as well as environmental recovery of sediments at the head of Ramis River Basin.	% of reduction in sediment load. % of removal of harmful substances and heavy metals: Arsenic (As) Lead (Pb) Copper (Cu) Zinc (Zn) Chromium (Cr) Mercury (Hg)	Values exceeding the guidelines of the Canadian Ministry of Environment (Canadian Environmental Quality Guidelines - CEQG), according to reports.	At the end of the project there is a reduction of the polluting load in the sediments at a level lower than the benchmark value provided in the guidelines of the Canadian Ministry of Environment (Canadian Environmental Quality Guidelines - CEQG)	Laboratory analysis results	Rainfall above the average values for the last ten years.
Outcome 2 Validated techniques for bioremediation of sediments in water bodies affected by discharges of industrial wastewater.	Number of techniques under experimentation	No validated technique	3 validated (efficient) bioremediation techniques that are replicable in other bodies of water in the Altiplano region (TDPS)	Implementation and supervision reports	Rainfall above the average values for the last ten years.

07-P-02. Phytoremediation techniques in water bodies affected by domestic sewage. Inner Puno Bay.

	Indicator	Baseline	Targets at the end of the project	Sources of verification	Risks and assumptions
Objective: Propose and validate a phytoremediation technique for water polluted by domestic wastewaters discharges.	Number of validated phytoremediation techniques.	Zero (0) validated phytoremediation techniques in the area.	At the end of the project there will be at least three validated phytoremediation techniques.	Supporting documents on validation techniques.	At least one of the applied techniques can achieve positive results.
Outcome 1: Reduction of eutrophication and recovery of water quality of the Inner Bay of Puno on Lake Titicaca.	Impact indicators % of removal of nutrients (ammoniacal nitrogen and phosphorus) in the water column.	Ammoniacal nitrogen between 0.313 and 2.127 mg/L Total phosphorous (total P) between 596 ug/L and 905 ug/L.	Reduction regarding ECA Cat. 4 for Ammoniacal Nitrogen: <0.02 mg / L) in twelve months.	Monitoring reports.	Rainfall above the average values in the past ten years.
Outcome 2: Phytoremediation techniques validated in water bodies affected by domestic wastewaters.	Number of experimental techniques	No validated technique.	2 phytoremediation techniques validated (efficient) and replicable in other high plateau areas (TDPS)	Implementation and monitoring reports.	

08-P-03. Creation of the water resources management system for the Ilave River-Titicaca region in Puno.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
Objective. Reduce environmental risks to the development of the residents of the Ilave – Titicaca basin	Increase of GDP of Puno Region.			INEI Statistical compendium for Department of Puno	Coordinated sectoral actions.
Improved hydro-meteorological information on Ilave - Titicaca basin.	- Availability of hydro-meteorological information center for the area of Ilave River basin at the end of the project. - Number of public and private institutions involved in the environmental information system.	0	1 Information centre.	- Registry of environmental information system of the basin. - Registry of the national environmental management system - Hydro-meteorological reports	- Political will and technical capacity to strengthen the information centre of Titicaca AAA. - Public, private and international agencies prepared to continue supporting technically and financially the development of environmental policies.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
Outcome 1: Adequate infrastructure for the information centre	Facilities for the information centre running and implemented.	0	1 facility	Inventory of ANA infrastructure	
Outcome 2: Suitable equipment for conservation, management of water resources and information services.	- Implementation of meteorological, hydrometric, and water quality stations with an automatic transmission system. - Purchase and installation of a communication system. - Purchase and installation of computers, software, and materials.	1 (SENAMHI)	3 automated stations 1 system 1 module	- Acquisitions - Institutional inventory records	- Involved institutions maintain formal commitment to inter-agency cooperation for the implementation and operation of the project. - Suppliers meet technical requirements. - The population is aware of the importance of the project.
Outcome 3: Technical and administrative training for professionals in the information centre.	50% of SDCPRH, SDGCRH and SDUSNIR staff trained.	0	6 people	Registry of trained professionals.	
Outcome 4: Strategies and communication materials for the development of an environmental culture in the basin.	100% of the residents sensitized on water culture.	0	1,200	Registry of participating beneficiary residents	

09-P-04. Monitoring of the impact on water quality in areas of high pressure from fish farming by means of automated stations. Larger Puno Bay.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
Objective: Preventing the deterioration of water quality in the Bay of Puno - Lake Titicaca as	Number of measures taken to prevent, remedy and/or mitigate environmental impacts generated by the trout	No measure of prevention, mitigation and/or remediation adopted.	At the end of the project impacts generated by the trout farming have been identified and measures	Implemented measures.	The lifespan of the project is sufficient to implement measures.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
a result of intensive trout farming.	farming.		for prevention, mitigation and/or remediation have been implemented.		
Outcome 1: There is timely, adequate, and relevant information on water quality in an area used for trout faming.	Alteration of water quality parameters: pH, DO, t°, C.E., Chlorophyll "a", turbidity, BOD_5, COD, NH_3, N_{total}, P_{Total}, NO_3, PO_4.	Water quality parameters determined at the beginning of the implementation of the pilot project and monitoring targets.	At the end of the project, information from automatic stations is available online.	Monitoring reports in real-time and test reports issued by an accredited laboratory.	Extreme weather events.
Outcome 2: Sustainable development of aquaculture in Lake Titicaca.	Number of producers (men and women) with strengthened capabilities in practices for sustainable aquaculture.	Number of producers currently operating in the area of the project.	At project completion, 200 producers (men and women) develop sustainable aquaculture practices.	Lists of participants and surveys, evaluations of learning.	People demand immediate results

10-P-05. Strengthening of citizen capacities for integrated management of water resources through community-based environmental monitoring in the micro-basin of the Chacas lagoon - Juliaca.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
Objective: Prevent, mitigate or remedy negative environmental impacts caused by anthropogenic activities in the lagoon and its Chacas area, starting from environmental monitoring as a mechanism for citizen participation with emphasis on water resources	Number of remediation / mitigation measures implemented.	Zero implemented measures.	4 prevention, mitigation or remediation measures implemented (solid waste, sewage); municipal resolutions.	Assessments according to baseline. In Situ verification.	Local and institutional stakeholders work in coordination and financing for the project is secured.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
Outcome 1. Organizational structure strengthened through the creation of a water management committee for the Chacas micro- basin and renewal of the Community-based Environmental Surveillance and Monitoring Committee (CVMAC) in the schools.	A committee for water and land management established in the Chacas lagoon hydrographic unit.	Currently, there is no stakeholders' organization for water and territory management in the Chacas lagoon micro-basin.	A committee for water and land management created in the first quarter into the project.	Training records. Internal regulations/ bylaws of management committee.	Local stakeholders support organizational processes in the micro-basin.
Outcome 2. Strengthened local stakeholders with individual and collective capacities generate information and local knowledge for water and land management in the micro- basin of Chacas lagoon.	Annual increase in number of trained and certified environmental monitors. Diagnosis on water and land management in the micro-basin.	The annual average of environmental monitors trained and certified by SUMA MARKA is 30. Currently, there is no diagnosis of water and land management.	By the end of the project, it is expected to have: 60 students trained and certified by Suma Marka. Certification from by Global WaterWatch for monitors in charge of biomonitoring and total solids in suspension and discharge. Access to GWW information and reporting system on a monthly basis during the two years of project intervention. A diagnosis on water and land social management in the Chacas lagoon basin.	Certification issued by SUMA MARKA. Certification issued by GWW. Reports on monitoring data to the GWW system. Diagnostic document.	Appropriate training is provided according to the needs of stakeholders in terms techniques for community-based environmental surveillance and monitoring and for water and land management.
Outcome 3. Land management improved through water governance among local	A water and land management plan.	There are no plans for land management.	Upon completion of the Project, there is one water management plan for the basin and one implemented	Document of the micro-basin management plan.	Local and institutional stakeholders are committed to improving water management in Andean

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
stakeholders and institutions that respond to the main local needs and to a collective vision for the Chacas lagoon basin.			action.		territories.
Outcome 4. Operational capabilities of Suma Marka DNGO strengthened for the implementation, administration, systematization of processes and lessons learned regarding the pilot project; these will allow engaging various social stakeholders in the TDPS system to replicate the experience in the short and medium term.	Method for certification of monitors validated and method for formulation of plans validated.	Currently, there is no validation for any of the methods.	By the end of the project there is a guide for the certification of monitors and a guide on water and land management plans. A pre-feasibility study for project replication. Production and dissemination of audio-visual material.	Developed guides. Dissemination reports Staff participation in Suma Marka training for IWRM.	There is enough time to perform validation and development of methodological guidelines for certification of monitors and plans for social water management.

11-P-06. Measures to address unsustainable practices and promotion of sustainability of the Titicaca-Desaguadero-Poopó-Salar de Coipasa water system (TDPS), through the implementation of activities and management technologies and reduction of mercury use in areas dedicated to artisanal and small-scale gold mining aiming to a more integrated watershed management.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
Objective: Implementing a pilot project that ensures the reduction of Hg in the extractive activity of gold through the implementation of new technologies.	Percentage of reduction of mercury per gram of extracted gold.	Current amount of Hg used (to be defined after the baseline study).	At the end of the project the use of mercury has been reduced in 10% or more.	Records on the project implementers.	Implemented technologies have not contributed to the reduction of mercury.
Outcome 1 Improved knowledge and capacity of men and women miners and mining organizations for better mining,	Number of cooperatives that have implemented cleaner production projects.	No cooperative has clean technologies in the area of implementation of the project.	By the end of the project at least 1 cooperative will have implemented technologies that ensure the reduction of	Records on quantities of gold extracted and mercury used.	Distrust of miners toward agencies and governmental entities (and affiliates) that attempt to support the adaptation of the ASM

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
environmental, health, and social practices.			mercury in their processes.		sector and working conditions of miners. Level: high
Outcome 2: Training program for miners in the region implemented.	% of trained miners.	Not even one trained miner.	90% of the miners working in the cooperative that will implement the project have been trained by the end of the project.	Attendance lists for training sessions. Technical reports on the training process.	Risk: Lack of collaboration from miners. Risk: medium
Outcome 3: Greater capacity of regional and local governments to integrate international agreements and imperatives related to ASGM into plans or programs for sustainable development. Improved access to support services for all the stakeholders involved in the ASGM sector.	The Development Plan of the Regional Government of Puno incorporates guidelines established in international agreements on mercury use.	Currently, the Regional Development Plan of Puno does not incorporate guidelines in international agreements on mercury.	The Regional Development Plan of Puno, formulated after the implementation of the project includes guidelines of international agreements on mercury.	Regional development plan.	Risk: Lack of participation from the Regional Government in the implementation of the project. Risk: low
Outcome 4: Increased responsible artisanal gold trade in national and international gold markets.	Percentage of increase in the amount of gold sold direct to international refiners at greater value.	Amount of gold sold locally at a lower value (to be defined in the baseline study).	10% more revenue per unit of gold sold at the conclusion of the project.	Sales records of the cooperative that will participate in the project.	Lack of buyers.

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

Secretariat comments at PIF

The PIF was not entirely clear, yet we understand that the Global Binational Master Plan (GPMP) containing 'vision, mission, objectives and main lines of action" as well as project profiles IS the equivalent of the SAP. This makes sense and it would not make sense to duplicate such effort. Please confirm before CEO endorsement. Further, if the GPMP is the SAP equivalent, then we would also need to have this endorsed at Ministerial level.	Addressed. During PPG it was confirmed with both governments that the Global Binational Master Plan (GPMP) is equivalent to the SAP. Both the TDA and the SAP will be formally approved by both governments. This is mentioned in the PRODOC.
Please assure that the updated GPMP assures and builds on inter-sectoral cooperation on national and regional level to address nexus of water-food environment (and energy) discussed in the PIF. Also, please assure that climate resilience is addressed given the vulnerability of the ecosystem to anticipated decreases in water flows.	Addressed. The SAP will be built through a highly participatory process to include views from local groups, water users and municipal, provincial and regional governments. Climate change and resilience have been incorporated into the processes of preparing the TDA and the SAP. This was an element that was not part of the existing GPMP.
TDA - we note that the "Environmental Outlook for For the TDPS-GEO Titicaca is relatively recent as well as some other key relevant national and regional environmental analysis and planning document mentioned in the PIF. Please assure that the TDA makes full use of these and essentially expands and builds on existing work/updates existing information/efforts. Again, lets please avoid duplication. It is not important to use the GEF terminology of TDA-SAP in each circumstance if quasi equivalents exist that can be updated and/or expanded (see e.g. PIF para 27 and 39).	Addressed. The government of Bolivia does not recognize GEO Titicaca as an official document. Nonetheless, the information it contains has been used for the preparation of the PRODOC and will be used during TDA preparation. The situation analysis (i.e., preparation of TDA) will use all information available, there will be a number of very specific studies to complement information and to address topics not addressed previously (e.g., climate change, endangered species conservation). See section “additional studies required for TDA development” in the PRODOC. GEF terminology has been introduced and will be used during project implementation.
It is appreciated that the PPG will commence with a mapping of ongoing relevant activities and partners to assure coordination (incl. those funded by bilaterals and MFIs). . Please attach a summary to the prodoc.	Addressed. A summary table is included in Annex 20 of the PRODOC.
Please outline in that how and by who and how sustainable fisheries management is addressed in Lake Titicaca. The PIF is not entirely clear on this and it is an important aspect.	Addressed. See paragraphs 70 to 76, 95, 100, and 114. Fisheries are not jointly managed. This matter has been included in the project, there will be baseline studies and it is foreseen to reach a binational agreement.
We note the mention of FPIC in project design. Yet, beyond due diligence: please explore opportunities for benefitting indigenous communities through at least one of the pilot measures.	Addressed. The following pilot project will work directly with indigenous groups: 01-B-01 and 02-B-02. Please see Annex 9.
Women - the PIF addresses at this stage women and their participation	Addressed. During PPG, key

well. As artisinal mining is an issues in the region, please in project design pay attention to gender and age distribution of miners. Is mercury an issue (and hence may be among one of pilot measures building on previous successful GEF finance in other regions)?	stakeholders were mapped and the role of women and indigenous groups in the different production activities was analyzed. There is scant information on social structure in small scale mining mostly because it is unregulated or illegal. Two pilot projects in Peru will directly address pollution from small-scale gold mining (i.e., 06-P-01 and 11-P-06)
While the private sector is mentioned in the PIF as stakeholder and target group (e.g. mining operations), the private sector is absent in the stakeholder table (A.2)	Addressed. During PPG, key stakeholders were mapped. Private sector will be part of the participatory processes to build the TDA and the SAP.
Co-finance - please assure that the indicative/ approximate level of grant (vs. in-kind) co-finance remains realistic and can be shown at CEO endorsement.	Addressed. Co-finance was confirmed.

STAP Scientific and Technical screening of the PIF

1. STAP understands that this proposal is aimed at strengthening the existing bilateral agreement and action plan for the Titicaca watershed shared by Peru and Bolivia. In particular the PIF states that project intends to strengthen institutional capacity to improve the integrated transboundary management of their water resources in the TDPS system. However, the PIF does not clearly set out a strategic gap analysis regarding the present assumed deficiencies in the existing Global Binational Master Plan; therefore the overall needs and likely incremental global environmental benefits are not clearly outlined. For this and other reasons discussed below, STAP requests that minor revision be performed so that STAP's advice is reflected in the full project brief.	Addressed. During PPG, a rapid assessment of the level of implementation of Global Binational Master Plan was performed. Gaps were identified and a number of very specific studies were identified to complement information and to focus on topics not addressed previously.
2. Regarding the proposed intervention logic, STAP advises that a full TDA/SAP is unnecessary, given the advanced state of binational cooperation, substantive baseline information and existence of the Global Binational Master Plan. That being the case, STAP suggests that the project should, beyond bringing the Plan up to date and improving the capacity to deliver, invest more directly in replication of catchment management good practices and innovation towards shared benefit generation. UNEP already produced a substantive environmental review in 2011, called GEO Titicaca, which in itself can serve as a TDA.	The focus of the project is not just updating the master plan, but to contribute to build governance. The central element will be to foster highly participatory processes and multi-level dialogue to build the TDA and SAP. Involvement of local groups and governments (i.e., municipal, provincial, departmental) has been a major drawback in the past. Therefore, stakeholders seldom collaborate, and there is obvious distrust among key user groups. Updating the situation analysis (i.e., TDA) and the master plan (i.e., SAP) is the means to build social and human capital in support of IWRM and biodiversity conservation at TDPS system-level. The current situation of the TDPS is severe. The system has serious issues which threaten valuable biodiversity. To address these problems will require a major multi-level intervention. Therefore the project is aimed to be a catalyst to build social capital and a plan which

	will provide a system-wide perspective.
3. The PIF states that the project could â€˜â€¦coordinate activities with the proposed GEF-UNDP project on integrated management, entitled "Integrated Water Resources Management in the Puyango-Tumbes, Catamayo-Chira and Zarumilla Transboundary Aquifers and River Basins", particularly on common problems related to the institutional framework in Peru, and on learning and sharing of experiencesâ€¦' STAP supports this statement while noting that the project referred to is now under implementation. STAP requested that that project, which addresses shared catchments of Ecuador and Peru, consider the economics of benefit generation and the strengthening of socio-economic understanding and community based management. That recommendation applies equally to the present project.	The recommendation has been acknowledged, the project will focus on building the social foundation in support of IWRM. There will be strong coordination with the Ecuador – Peru GEF project, in particular on addressing the impacts of small-scale gold mining.
4. From a regional governance perspective, longer term sustainability of the investment and considering the several cycles of GEF support STAP advises that the project develops an exit strategy for future GEF support taking into the account the functions of well-established Binational Autonomous Authority for the Water System of Lake Titicaca, Desaguadero River, Lake PoopÃ³ and Salar de Coipasa (ALT) and national action.	The project will concentrate on fostering the conditions to sustain improved governance of the TDPS. This will require participation, articulation and contribution from all the spectrum of stakeholders, from local water users to the Ministries of Foreign Affairs. A key approach will be to promote watershed councils, nested within a system-wide binational governance structure. This will allow to face the pressing local issues, while maintaining a system-wide perspective. However, the project will not directly address pressing issues like the discharge of untreated municipal and industrial wastewater or land degradation caused by erosion. It is foreseen that these investments will be made by user groups, local governments and sectoral authorities within the framework of the agreed upon SAP.
5. It is also advised that the project takes an innovative focus on green growth during the project preparation phase and explores how that could support an agenda of sustainable economic growth and poverty alleviation which is at the heart of the problem of managing the water resources in the basin.	Poverty is, certainly, a key factor in the TDPS. The project has emphasized that production activities must be sustainable. Some activities will be addressed, like fisheries, trout farming and small-scale gold mining. Also, it is planned to contribute to empower women and indigenous groups by ensuring their involvement into multi-level dialogue and construction of the TDA and SAP. However, the project will not directly address poverty alleviation which a complex matter well beyond the scope of the proposed intervention.

Comments submitted by Council Members

Germany approves the following PIFs in the work program, but asks that the following comments are taken into account: Germany supports the comments made by STAP. Given the long nature of the binational cooperation which started in 1992, sufficient baseline information should be available to update the Binational Master Plan of 1991. Germany agrees that a full TDA is not necessary.	Despite the decades of binational cooperation the management of shared resources need strengthening. Both countries have recognized that the current structure of ALT is insufficient for the current needs and challenges. There is an ongoing process to update ALT´ structure.

Germany is of the opinion that the project should not focus on updating the Master Plan, but on addressing the gaps and current insufficiencies while promoting and replicating good practices.	However, a key issue is that key stakeholders have not been involved in the governance process. Therefore, the project will contribute to build the social basis in support of IWRM in the TDPS. It is planned to have highly participatory processes to build the TDA and the SAP with the purpose to contribute to develop social capital, trusting relationships and multi-level dialogue among key stakeholders. Therefore building the TDA and SAP is the means to foster an improved governance of the binational watershed. To update the situation analysis specific studies have been selected, to cover topics that have not been properly addressed, like climate variability and change, and use of fishery resources.

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS[17]

A. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES FINANCING STATUS IN THE TABLE BELOW:

PPG Grant Approved at PIF: **150,000**			
Project Preparation Activities Implemented	***GEF/LDCF/SCCF/NPIF Amount ($)***		
	Budgeted Amount	***Amount Spent To date***	***Amount Committed***
Process of generation of consensus and validation	40,000.00		23,148.95
Technical review	78,400.00	51,381.80	27,634.02
Institutional Agreements and commitments, monitoring and evaluation	20,300.00	36,249.69	
Financial planning and cofinancing	5,000.00	1,086.27	
Consolidation of final document	6,300.00	10,499.27	
Total	150,000.00	99,217.03	50,782.97

[17] If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for the activities.

United Nations Development Programme
Country: Bolivia and Peru
PROJECT DOCUMENT[1]

Project Title:	Integrated Water Resources Management in the Titicaca-Desaguadero-Poopó-Salar de Coipasa System (TDPS)
GEF Project ID: 5748	GEF Agency Project ID: 4383
UNDAF Outcome(s):	Bolivia. UNDAF 4. Promote and support the conservation and sustainable use of the environment. To this end, the priority will be to support government and community action to expand and improve the management of forests, conservation areas and protected areas, support for actions to reduce environmental degradation and desertification, and strenghtening the sustainable management of water resources. Peru. UNDAF ED4. The State, with the participation of civil society, the private sector, scientific and academic institutions, will have designed, implemented and / or strengthened policies, programs and plans, with a focus on environmental sustainability, for the sustainable management of natural resources and the conservation of biodiversity.
UNDP Strategic Plan Environment and Sustainable Development Primary Outcome: Outcome 2: Citizen expectations for voice, development, the rule of law and accountability are met by stronger systems of democratic governance. Output 2.5: Legal and regulatory frameworks, policies and institutions enabled to ensure the conservation, sustainable use, and access and benefit sharing of natural resources, biodiversity and ecosystems, in line with international conventions and national legislation. Indicator 2.5.2: Number of countries implementing national and local plans for integrated Water Resource Management.	
Expected CP Outcome(s): Bolivia: CPAP Outcome 4.2. Sustainable integrated management systems of Mother Earth developed in priority areas of intervention. Peru: CPAP Outcome 4. The State, with the participation of civil society, the private sector, scientific and academic institutions, will have designed, implemented and / or strengthened policies, programs and plans, with a focus on environmental sustainability, for the sustainable management of natural resources and the conservation of biodiversity.	
Expected CPAP Output (s): Bolivia: Output 4.2.1. Proposal for the national strategy for sustainable integrated management systems of Mother Earth in priority areas of intervention developed by the Ministry of Environment in coordination with other key government agencies. Peru: Output 4.4. Management tools to improve environmental quality, prepared, agreed and beign implemented at national, regional and local levels	
Executing Entity/Implementing Partner: Ministry of Foreign Affairs of the Plurinational State of Bolivia, Ministry of Environment and Water (MMAyA) of the Plurinational State of Bolivia, Ministry of Environment (MINAM) of Peru, Ministry of Foreign Affairs of Peru.	
Implementing Entity/Responsible Partners: UNDP	

[1] For UNDP supported GEF funded projects as this includes GEF-specific requirements

Brief description: The Titicaca-Desaguadero-Poopó-Salar de Coipasa water system (TDPS) is an endorheic transboundary watershed that is very valuable for Bolivia and Peru and the about 3.6 million people that live in the area. The TDPS also sustain valuable and endemic biodiversity like the Titicaca giant frog and the Titicaca grebe. Water resources and biodiversity are threatened by natural and anthropogenic pressures, the condition of the TDPS has deteriorated and there are evident symptoms of severe problems in several areas of the system. This has occurred despite decades of multiple efforts by the governments of Bolivia and Peru and the existence of the Binational Autonomous Authority for the Water System of Lake Titicaca, Desaguadero River, Lake Poopó, and Salar de Coipasa (ALT), which was established almost 20 years ago. This project will be a catalyst that will contribute to: (i) build a common vision based on IWRM, (ii) establish common planning (i.e., SAP) to guide actions at the binational, national, and local levels, and (iii) mobilize and involve key stakeholders for the integrated management of the system. The project will allocate GEF resources strategically to (1) develop a participatory process to generate an integrated diagnosis on the current situation of the TDPS (i.e., TDA) and an updated master plan agreed by both countries (i.e., SAP), (2) generate practical learning on managing TDPS resources by means of eleven pilot projects, (3) consolidate a comprehensive monitoring program that will be accessible to local technical staff and key stakeholders, and (4) build human and social capital through communication actions for environmental education and citizen participation and coordination in support of IWRM.

BOLIVIA

Programme Period:	2016-2019	Total resources required (US$)	17,937,500
Atlas Award ID	00082995		
Project ID	00092875		
PIMS #	4383	Total allocated resources:	
Start date	MARCH 2016	GEF (USD)	1,430,000
End date	MARCH 2020	Co-financing (USD)	
Management Arrangements	NIM	• National Government	16,300,000
PAC Meeting Date		• UNDP Bolivia	75,000
		• UNDP Cap-Net	132,500

Agreed by (Government):
Date/Month/Year

Agreed by (Executing Entity/Implementing Partner):
Date/Month/Year

Agreed by (UNDP):
Date/Month/Year

HOST COUNTRY - PERU

Programme Period:	2016-2019	Total resources required (US$)	5,253,750
PIMS	4383	Total allocated resources	
Start date	2016	▪ GEF (USD)	5,133,750
End date	2019	▪ Co-financing (USD) (NGO)	120,000
Management Arrangements	NIM		
PAC Meeting Date			

Agreed by (Government):
Date/Month/Year

Agreed by (Executing Entity/Implementing Partner):
Date/Month/Year

Agreed by (UNDP):
Date/Month/Year

Contents

List of tables

List of figures

Acronyms and abbreviations

AAAT	Water Management Authority – Titicaca *Autoridad Administrativa del Agua – Titicaca*
AdP	Project Manager *Administrador del proyecto*
ALT	Binational Autonomous Authority for the Water System of Lake Titicaca, Desaguadero River, Lake Poopó, and Salar de Coipasa *Autoridad Binacional Autónoma del Sistema Hídrico del Lago Titicaca, Río Desaguadero, Lago Poopó, y Salar de Coipasa.*
ANA	National Water Authority *Autoridad Nacional del Agua*
APMT	Plurinational Authority on Mother Earth *Autoridad Plurinacional de la Madre Tierra*
APR	Annual Project Report *Reporte Anual del Proyecto*
ATLAS	UNPD Institutional Resources Planning System *Sistema de Planificación de Recursos Institucionales del PNUD*
AWP	Annual Work Plan *Plan Anual de Trabajo*
BOL	Plurinational State of Bolivia. Abbreviation according to ISO 3166-1, Alpha-3 Code.
BPCU	Binational Project Coordination Unit *Unidad Binacional de Coordinación del Proyecto*
BPSC	Binational Steering Committee *Comité Directivo Binacional*
BRIDGE	Building Dialogue and Good Governance of Water in Rivers Project *Proyecto Construyendo Diálogos y Buena Gobernanza del Agua en los Ríos*
Bs	Boliviano (Bolivian currency)
BTC	Binational Technical Committee *Comité Técnico Binacional*
CAN	Andean Community of Nations *Comunidad Andina de Naciones*
CBD	Biological Diversity Agreement *Convenio sobre la Diversidad Biológica*
CBP	Binational Project Coordinator *Coordinador binacional del proyecto*
CN	National Coordinator
COMIBOL	Bolivian Mining Corporation *Corporación Minera de Bolivia*
CONAF	National Forestry Corporation [Chile] *Corporación Nacional Forestal [Chile]*

CPAP	Country Programme Action Plan
CPD	Country Programme Document
CTB Maure-Mauri	Binational Technical Commission on Maure-Mauri River
CTB Suches	Binational Technical Commission on Suches River (Bolivia – Peru)
DPS	Direct UNDP Project Services
ECLAC	Economic Commission for Latin America and the Caribbean
ECOM	Communications Specialist
EME	Monitoring and Evaluation Specialist
ENB	National Biodiversity Strategy
ENRH	National Water Resources Strategy
ERC	UNDP Evaluation Resource Centre
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEF-ID	GEF Project Identification Number
GIZ	German Society for International Cooperation
GN-SAP	Core Group for SAP development
GN-TDA	Core Group for TDA development
GSAAC	Social Management of Water and the Environment in Basins, Peruvian Programme *Gestión Social del Agua y el Ambiente en Cuencas, Programa en el Perú*
GWP	Global Water Partnership
HDI	Human Development Index
IBA	Important Bird and Biodiversity Area
IDB	Inter-American Development Bank *Banco Interamericano de Desarrollo*
IHH	Hydraulics and Hydrology Institute *Instituto de Hidráulica e Hidrología*
IMARPE	Peruvian Institute of the Sea *Instituto del Mar del Perú*
INRA	National Institute for Agrarian Reform *Instituto Nacional de Reforma Agraria*
IP	Implementing Partner (synonymous with executing agency)
IPD-PACU	Bolivian Decentralized Public Institution of Fisheries and Aquaculture *Institución Pública Desconcentrada de Pesca y Acuicultura de Bolivia*
IRD	French Research Institute for Development *Institut de recherche pour le développement*
IUCN	International Union for Conservation of Nature
IW	GEF International Waters Focal Area
IW:LEARN	GEF International Waters Learning Exchange and Resource Network
IWC	International Water Conference

IWRM	Integrated Water Resources Management
LOA	Letter of Agreement
M&E	Monitoring and Evaluation
masl	Metres above sea level
MINAGRI	Peruvian Ministry of Agriculture and Irrigation
MINAM	Peruvian Ministry of Environment
MMAyA	Bolivian Ministry of Environment and Water
MRE-B	Ministry of Foreign Affairs of Bolivia
MRE-P	Ministry of Foreign Affairs of Peru
MTR	Mid-Term Review
NA	Not available
NBI	Unsatisfied Basic Needs
NGO	Non-Governmental Organization
OAS	Organization of American States
PDGB	Binational Master Plan for the TDPS Water System *Plan Director Global Binacional del Sistema Hídrico TDPS*
PELT	Binational Lake Titicaca Special Project *Proyecto Especial Binacional Lago Titicaca*
PER	Republic of Peru. Abbreviation according to ISO 3166-1, Alpha-3 Code.
PIR	Annual Project Implementation Report
PIW	Project Inception Workshop
PNC	National Basin Plan *Plan Nacional de Cuencas*
PND	National Development Plan *Plan Nacional de Desarrollo*
PNUD-CO	UNDP Country Office
PPPNC	Promoting Project for the National Basin Plan Proyecto Promotor del Plan Nacional de Cuencas
PRODOC	Project Document
PRODUCE	Peruvian Ministry of Production
PSCK	Katari Basin Master Plan
PTAR	Wastewater treatment plant *Planta de tratamiento de aguas residuales*
ROAR	Results-Oriented Annual Report *Informe Anual Orientado a Resultados*
RSC-LAC	UNDP Regional Center in Panama for Latin America and the Caribbean
SAP	Strategic Action Programme
SBAA	Standard Basic Assistance Agreement
SCC	IUCN Species Survival Commission

SDC	Swiss Agency for Development and Cooperation
SENAMHI	Bolivian National Meteorology and Hydrology Service
SERNANP	National Service of Natural Areas Protected by the State [Perú]
SERNAP	National Protected Areas System [Bolivia]
SIG	Geographic Information Systems
SNHN	National Naval Hydrographic Service *Servicio Nacional de Hidrografía Naval*
SWOT	Strengths, Weaknesses, Opportunities and Threats Analysis
TDA	Transboundary Diagnostic Analysis *Análisis de Diagnóstico Transfronterizo*
TDPS	Titicaca - Desaguadero - Poopó - Salar de Coipasa Water System
TOR	Terms of Reference
UBCP	Binational Project Coordination Unit *Unidad Binacional de Coordinación del Proyecto*
UNCCD	United Nations Convention to Combat Desertification
UNDAF	United Nations Development Action Framework
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
USD	United States Dollar
VRHyR	MMAyA Vice Ministry of Water Resources and Irrigation *Viceministerio de Recursos Hídricos y Riego del MMAyA*

Main species cited in the document

Common name	**Scientific name**
Alpaca	*Vicugna pacos*[2]
Boga, boguilla	*Orestias pentlandii*
Yellow carachi, yellow carache	*Orestias luteus*
White carachi, yellow carache, white carache	*Orestias albus*
Carachi, gray carachi, black carachi, black carache	*Orestias agassii*
Ispi	*Orestias ispi*
Water lentils	*Lemna* sp.
Llama	*Lama glama*
Mauri	*Trichomycterus dispar*
Pejerrey, silverside	*Odontesthes bonariensis*
Titicaca giant frog	*Telmatobius culeus*
Suche	*Trichomycterus rivulatus*
Rainbow trout	*Oncorhynchus mykiss*
Umanto, boga	*Orestias cuvieri*
Vicuña	*Vicugna*
Zampullín del Titicaca, Titicaca grebe, keñola, keñuchi, kenocaya, Lake Titicaca macá	*Rollandia microptera*

[2] See Kadwell et al., (2001).

Definitions

Biodiversity	See biological diversity
Biological diversity	It is the variability of living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part of; this includes diversity within species, between species, and of ecosystems. Source: CBD.
Endorheic basin	It is an area where the water has no outlet to the sea. Any rain or precipitation that falls in a closed basin remains there and leaves the system only by infiltration or evaporation, which contributes to the concentration of salts. In endorheic basins where evaporation is greater than supply, salt lakes disappear and salt flats emerge. Endorheic basins are also called internal drainage systems.
Environmental education	It is the process of recognizing values and clarifying concepts to create skills and attitudes, aimed at understanding and appreciating the interrelation between man and his culture, and the surrounding biophysical environment. Environmental education also includes the practice of making decisions and formulating a code of behaviour about issues concerning environmental quality. Source: IUCN.
Human Capital	Human capital includes capacities, knowledge, work skills, and good health which together enable people to engage in different strategies and achieve their objectives in terms of their livelihoods. Source: DFID (1999).
Hydrographic Unit	Hydrographic units are drainage areas limited by watershed dividing lines, which are spatially related by their codes. Source: Pfafstetter (1989).
Integrated Water Resources Management (IWRM)	It is a process that promotes the coordinated management and development of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. Source: Technical Committee of the Global Water Partnership.
Key Stakeholder	Stakeholders who can significantly influence (positively or negatively) an intervention or those who are very important to achieve success in a project or cause that a circumstance may happen in a certain way. Source: DFID (1995), Tapella (2007).
Multidisciplinary team	It is the group of professional participants with different educational backgrounds and experiences, who work together and pursue a common objective.
Protected Area	A protected area is a geographic space clearly defined, recognized, dedicated, and managed through legal or other effective means to achieve long-term conservation of nature and its ecosystem services, as well as the associated cultural values. Source: IUCN.
Red list	The IUCN red list of threatened species is an inventory, updated annually, of plant and animal species running the risk of extinction as well as the related global conservation status.
Salt flats	Depression occupied by an endorheic basin in arid regions, covered by a salt crust.
Social capital	Social capital comprises those networks and social relations that facilitate collective action. It refers to the social resources that people depend on to pursue their objectives in regards to their livelihoods. Source: Fox (2003), DFID (1999).
Socio-environmental Conflict	Socio-environmental conflicts are interactive processes between social stakeholders mobilized by their shared interest in natural resources; as such, they are social constructs, cultural creations, which can be changed depending on how they are addressed and driven, on the basis of how they become transformed and solved, with or without the help of others, and depending on how they engage the attitudes and interests of the parties in dispute. Source: Torres (2005).
Species conservation strategy	It is a plan to save a species or group of species throughout all or part of its natural range. Source: IUCN/SCC (2008).
Stakeholders	Individuals, groups or organizations with an interest in a project. Source: DFID (1995), Tapella (2007).
Strategic Action Plan (SAP)	For projects developed within the GEF International Waters portfolio, the SAP is a negotiated policy document to be approved at the highest political levels from all relevant sectors. It sets clear priorities for action (e.g. policy, legal and institutional reforms, or investments) to solve the main problems identified in the TDA. Source: INBO & GWP (2012).

Sustainable use	See sustainable utilization.
Sustainable utilization	It is the utilization of components of biological diversity in a manner and at a rate that does not cause long-term decline of biological diversity, thereby maintaining its potential to meeting the needs and aspirations of present and future generations. Source: CBD
Traditional knowledge	This comprises the wisdom, experience, skills, and practices that are developed, maintained, and conveyed from generation to generation within a community and often are part of their cultural or spiritual identity. Source: World Intellectual Property Organization.
Transboundary Diagnostic Analysis (TDA)	For the projects developed within the GEF International Waters portfolio, TDA is a scientific and technical fact-finding analysis used to quantify the relative importance of sources, causes, and effects of transboundary water problems. The aim of TDA is to identify, quantify and prioritize issues related to water that are transboundary in nature. It should be an objective assessment and not a negotiated document. Source: INBO & GWP (2012).

SECTION I: NARRATIVE

PART I: Situation Analysis

Part 1A: Context

Environmental context

1. The Lake Titicaca - Desaguadero River - Lake Poopó - Salar de Coipasa (TDPS) water system is located in the Andean highlands. It is a transboundary, endorheic water system, consisting of four interconnected elements: Lake Titicaca basin, Desaguadero River basin, Lake Poopó basin, and Salar de Coipasa basin (Figure 1 and Figure 2). The TDPS covers an area of 143,900 km^2 (Table 1); it consists of 14 hydrographic units of levels 3 and 4 in the Pfafstetter coding system (Figure 3, Table 2); the system is distributed among Bolivia, Chile, and Peru (Table 3) [3]. The average altitude is 3,800 meters above sea level; the highest point is Mount Sajama[4] (6,452 masl) and the lowest is Salar de Coipasa (3,653 masl).
2. Lake Titicaca is the largest water body in TDPS; the lake receives discharges from nine hydrographic units (Table 2). Lake Titicaca in turn drains into the Desaguadero River, which bifurcates at its end. The eastern branch drains into Lake Uru Uru (near the city of Oruro in Bolivia) and from there into Lake Poopó; the Western branch drains directly into Lake Poopó. Finally, the Lacajahuira River originates in Lake Poopó and drains into the Salar de Coipasa.
3. Environmental conditions are extreme; climate conditions in the area are intense (e.g., there is low oxygen concentration, high solar radiation, extreme wilderness, very low temperatures) and there are water bodies and soils with high concentration of salts and minerals. Salinity in superficial waters increases from north to south of TDPS. Lake Titicaca and its tributaries have moderate salinity, while salinity increases in Desaguadero River up to its discharge into the Mauri River[5], where salinity decreases, thereafter salinity progressively increases again up to the south end of Desaguadero River and reaches the highest levels in Lake Poopó and Salar de Coipasa (Quintanilla, et al., 1995). Accordingly, the biota is not very diverse, but has particular adaptations to survive in extreme conditions. The TDPS has habitats with great value for conservation, including totora reed areas, wetlands, and tolares, as well as endemic species such as the Titicaca giant frog (*Telmatobius culeus*), the boga (*Orestias pentlandii*) and the Titicaca grebe (*Rollandia microptera*).
4. TDPS water resources have high value for Bolivia and Peru. Since the 1950s, both countries have advanced mechanisms for joint management. In 1992, both countries agreed to establish the Binational Autonomous Authority for the Water System of Lake Titicaca, Desaguadero River, Lake Poopó, and Salar de Coipasa (ALT). Later, both countries established several cooperation mechanisms such as the binational technical commissions for Maure-Mauri[6] and Suches[7] Rivers, and the High Level Binational Commission for Lake Titicaca[8]. ALT is in charge of implementing the Binational Master Plan for the TDPS Water System (PDGB[9]). There are several studies on TDPS, the main references are: Dejoux &

[3] According to ALT estimates, 4.87% of TDPS is in Chilean territory (Mamani, 2013).
[4] Snowcapped Sajama Mountain is the highest peak in Bolivia and is located in Sajama National Park, west of the country, in the department of Oruro.
[5] Mauri River is key to the regulation of water salinity in the southern sector of TDPS.
[6] In February 2003, both countries agreed to establish the Binational Technical Commission on the Maure- Mauri River (CTB Maure-Mauri).
[7] In 2010, both countries agreed to establish the Binational Technical Commission on Suches River (CTB Suches).
[8] The commission was created as part of Commitment 1 of the Working Group on Transboundary Water Resources agreed in the first binational cabinet of ministers carried out on Esteves Island (Peru) in June 2015 (Annex 5).
[9] The acronym PDGB and Master Plan are used interchangeably in this document to refer to the Binational Global Master Plan for the TDPS Water System.

Iltis (1991), INTECSA, AIC & CNR (1993), INTECSA, AIC & CNR (1993a), Quintanilla et al., (1995), UNEP & OEA (1996), UNESCO (2003), Martínez et al., (2006), UNESCO (2006), World Bank (2009), UNEP (2011), and Pouilly et al., (2014).

Table 1. Surface of hydrographic units in the TDPS System

Hydrographic Unit	Surface (km^2)	Percentage
Titicaca	56.270	39,1
Desaguadero	29.843	20,7
Poopó	24.829	17,3
Salar de Coipasa	32.958	22,9
Total	143.900	

Source: Official data by Autonomous Binational Authority of the Lake Titicaca, Desaguadero River, Lake Poopó, and Salar de Coipasa Water System (ALT).

Water System

Lake Titicaca

5. The hydrographic unit of Lake Titicaca comprises ca., 39% of the surface of TDPS (Table 1). The lake has an area of ca. 8,400 km^2 and has an average elevation of 3,810 masl. Lake Titicaca is the highest navigable lake in the world and the second largest lake in South America; its thermoregulatory effect contributes to create a mild climate in its area of influence.
6. Lake Titicaca is composed of the so-called Lago Mayor (i.e., large lake) and Lago Menor (i.e., small lake) that are linked by the strait of Tiquina, which is ca., 800 m wide. To the north is the Lago Mayor or Chucuito, with an area of ca. 6,400 km^2 and a maximum depth of about 285 m. The Puno Bay is located west of the large lake, in the Peruvian sector, it is bordered by Chucuito peninsula to the north and Capachica peninsula to the south; the city of Puno sits in the bay. The Lago Menor or Huinaymarca is in the south and has an area of ca., 2,100 km^2 and a maximum depth of about 40 m, although the depth generally does not exceed 6 m (Dejoux & Iltis, 1991). To the west, in the Bolivian sector, Cohana Bay is located at the mouth of Katari River.

Table 2. Surface of hydrographic units in TDPS.

Hydrographic Unit	Surface (km^2)	Level 3 & 4 Hydrographic Units	Surface (km^2)
Lake Titicaca	57,364.2	Ramis	14,857.9
		Coata	4,563.8
		Illpa	1,294.2
		Ilave	7,747.6
		Suches	3,020.5
		Katari	3,012.9

Hydrographic Unit	Surface (km^2)	Level 3 & 4 Hydrographic Units	Surface (km^2)
		Huancane	3,538.5
		Huaycho	1,273.6
		Circunlacustre *(Around the lake)*	18,055.1
Desaguadero River	28.184,0	Alto Desaguadero	8,824.1
		Medio Desaguadero	9,415.8
		Maure - Mauri	9,944.2
Lake Poopó	25,372.6	Poopó	25,372.6
Salar de Coipasa	33,616.4	Coipasa	33,616.4
Total	144,537.2		

Source: Map information provided by the Vice Ministry of Water Resources and Irrigation (VRHyR) of the Ministry of Environment and Water (MMAyA) of Bolivia, the National Water Authority (ANA) of Peru, and the Binational Autonomous Authority of Lake Titicaca, Desaguadero River, Lake Poopó Salar de Coipasa Water System (ALT).

Note: Surfaces do not match the official information provided by ALT. The Master Plan does not include surfaces of hydrographic units.

Table 3. Percentage of TDPS in Bolivia, Peru, and Chile.

Hydrographic Unit	Surface (km^2)	Percentage of TDPS	Percentage in each country		
			Peru	Bolivia	Chile
Lake Titicaca	56,494	39.1	74.1	25.9	0
Desaguadero River	31,218	21.6	17.2	78.3	4.5
Lake Poopó	23,743	16.4	0	100	0
Salar de Coipasa	33,135	22.9	0	83.0	17.0
Total	144,590				

Source: ALT. Modified from Mamami (2013).

7. Lake Titicaca is fed by the drainage from nine hydrographic units[10] and rainfall. The rivers provide ca., 210 m^3/s -- the largest tributary is the Ramis River with an average flow of 76 m^3/s (ALT, 2003) -- and rainfall contributes ca., 270 m^3/s (UNEP, 2011). The contribution of groundwater is insignificant (Dejoux & Iltis, 1991; UNEP, 2011). The losses are due to evaporation (ca., 436 m^3/s, which is equivalent to 93.93% of the losses) and drainage leaving by the southern area of the Huinaymarca towards

[10] i.e., Circunlacustre [Around the Lake], Coata, Huancané, Huaycho, Ilave, Illpa, Katari, Ramis, and Suches. The hydrophraphic units of Huaycho and Suches rivers are binational.

Desaguadero River (ca., 35 m^3/s, equivalent to 4.83% of the losses). The level of Lake Titicaca has annual and multi-annual fluctuations. Dejoux & Iltis (1991) reported that since 1914 the range of variation in the lake level has been 6.37 m.

8. Near Lake Titicaca are the Arapa Lagoon -- which is within the hydrographic unit of Ramis River and covers an area of 131.8 km^2, with totora fields and a great diversity of birds[11] -- and the Umayo Lagoon – located within the hydrographic unit of the Ilpa River and with an area of 28.8 km^2.

Desaguadero River

9. The Desaguadero River originates at Lake Titicaca and downstream creates a reservoir in the Aguallamaya sector -- which has an area of ca., 96 km^2. Thereon, it flows southeast and bifurcates near the city of Oruro, in La Joya sector, the eastern branch then drains into Lake Uru Uru and from there into Lake Poopó, whereas the western branch drains directly into Lake Poopó. The river receives waters from several tributaries and is composed of three hydrographic units (Table 2). The average flow is 89 m^3/s at the middle Desaguadero, 52 m^3/s at the high Desaguadero, and 25 m^3/s at Mauri River (ALT, 2003). The Mauri River is the main tributary to Desaguadero River, this is a transboundary river that originates with the name of Maure at Villacota lagoon in Peru; its basin extends to Peru, Chile and Bolivia (Figure 3).

The Mauri is an international successive course river as it originates in Peruvian territory, at the foothills of Cerro Llallagua and then enters Bolivian territory in the vicinity of the ruins of Tambo Mauri in the José Manuel Pando province of the Department of La Paz. The river flows along 124 km on Bolivian soil, before draining into the Desaguadero River, near the town of Calacoto. Its major tributaries on the right bank are the reivers Caquena, Villca Palca, Putiri, Sopocachi, and Achuta or Chico, and the rivers Cusi-Cusini, Berenguela, and Challuyo on the left bank.

Lake Poopó

10. Within this hydrographic unit are Lake Uru Uru and Lake Poopó. Lake Uru Uru was formed in 1963 by an overflow of the Desaguadero River and covers an area of approximately 214 km^2; it has high evaporation and low depth (on average less than 1.5 m) (UNEP, 2011).

11. Lake Poopó is a body of water located at an average altitude of 3,686 meters above sea level (ALT, 2003). The water balance depends mainly on the contribution of the Desaguadero River[12] and high evaporation (ca., 1,200 mm/year), because precipitation and infiltration are very low. Water seasonal variability is large, as the river can reduce up to 50% (Pillco & Bengtsson, 2006). Zamora (2008) reported that the surface was reduced from 2,797 km^2 in April 1990 to 2,378 km^2 in July 2001. Its depth is less than one metre and there is high probability that it dries up in a few more years (Pillco & Bengtsson, 2006; UNEP, 2011). The lake is distributed among 14 municipalities in the Department of Oruro (Bolivia).

12. Lakes Uru Uru and Poopó have a permanent deficiency of dissolved oxygen due to their shallow depth and progressive reduction of water surface (Quintanilla et al., 1995).

[11] In the Neotropical Waterfowl Census of July 2007, 3,169 individuals of 38 species of birds were registered, while in Umayo pond 4,083 individuals of 33 species were registered. In Lake Titicaca, 14,769 individuals of 30 species were also registered. (Acuy Yañac & Pulido Capurro, 2008).

[12] Although there are also other minor tributaries like the rivers Marquez, Santa Fe, Huanuni, Antequera, Poopo, Tacagua, and Juchusuma.

Salar de Coipasa

13. The Salar de Coipasa covers an area of 2,225 km^2 and has an average altitude of 3,657 masl (ALT, 2003). The salt marsh receives water from the rivers Lacajahuira and Lauca.
14. The Lacajahuira River is the only effluent of Lake Poopó, which flows towards the west southwest for approximately 135 km up to Salar de Coipasa. The contributions of Lake Poopó flow mainly in the years when the water level is high (Mariaca, 1985).
15. The Lauca River originates in Chile, at Cotacotani lagoons (within Lauca National Park); it receives waters from several tributaries as Sajama and Copasa rivers, and flows into Bolivia at Coipasa lagoon, which is within the salt marshe, it has an area of ca. 2,500 km^2 (UNEP, 2011) (Figure 1).

Weather

16. Because of the high altitude where the system sits, the weather is cold throughout the year and is dry because the lateral longitudinal ridges act as barriers against the humid winds from outer plains and slopes (ALT, 2005). However, in the northern sector of the TDPS, Lake Titicaca is a source of moisture and has a thermoregulatory effect. This sector has rainy and semi-rainy cold weather, while the southern sector of the TDPS has semi-rainy weather in the foothills and a semi-arid and cold weather in most of the hydrographic units of Lake Poopó and Salar de Coipasa (Map 1).
17. The rainfall cycle is seasonal and very uniform throughout the TDPS: humid summer – rain from December to March (peak in January) – and dry winter – May to August (minimum rainfall in June - July). The annual rainfall in the southern sector is low (Map 2). In a humid year, the area of Lake Poopó and Salar de Coipasa receives less than 500 mm/year (Map 3), and in a dry year throughout the southern sector and the western fringe of the northern sector the area receive less than 200 mm/year (Map 4).
18. Solar radiation is high, ranging from 462 cal/cm^2 per day in Puno, in the northern zone of the region, to 518 cal/cm^2 per day in Patacamaya, in the south. However, there are significant variations during the year. In Puno, this range fluctuates between 390 cal/cm^2 per day in July to 549 cal/cm^2 per day in November, and in Patacamaya between 457 cal/cm^2 per day in June to 596 cal/cm^2 day in November (UNEP & OAS, 1996).
19. A more detailed description of climatic conditions in TDPS can be found in UNEP & OAS (1996) and ALT (2005).

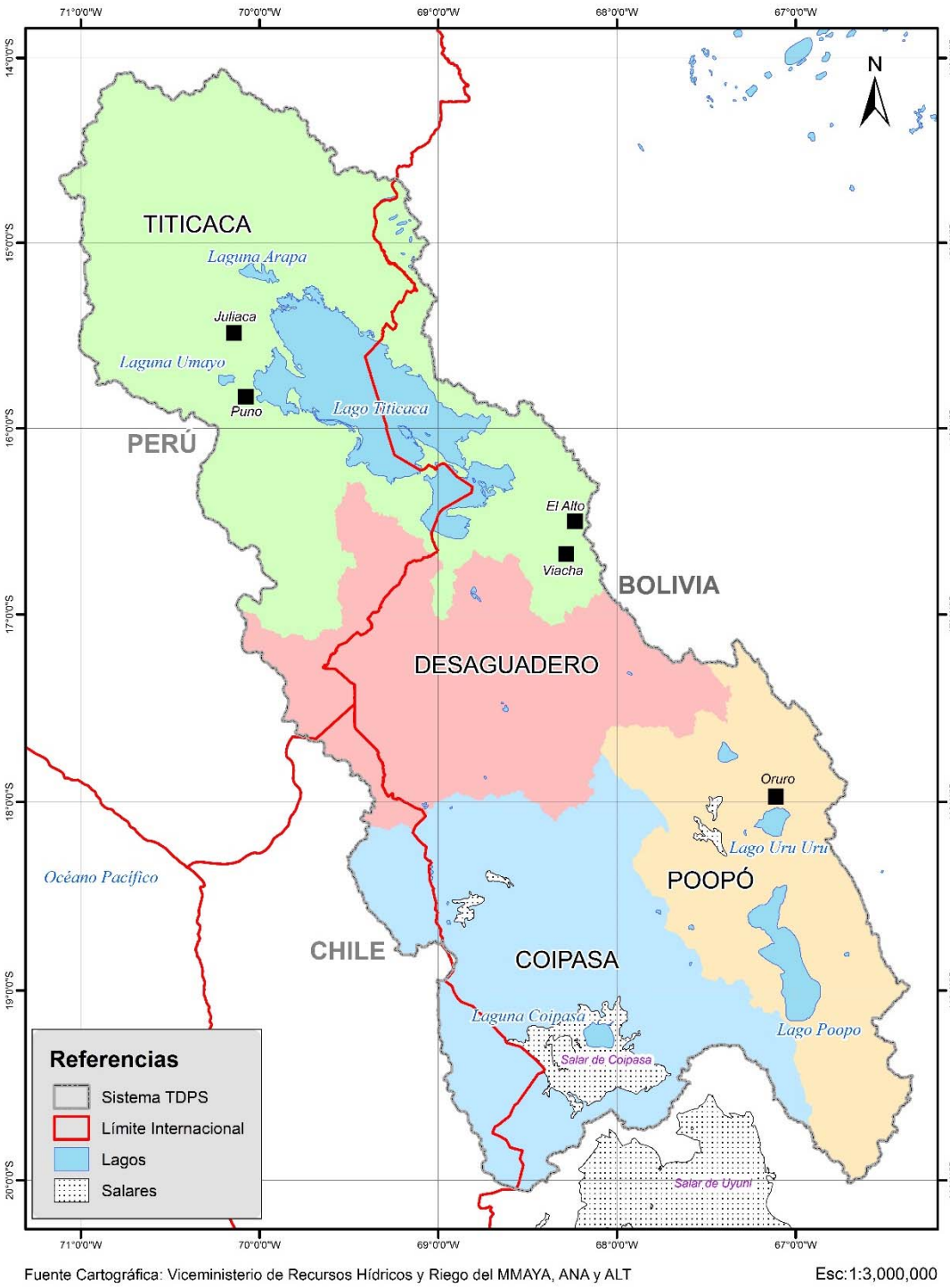

Figure 1. Location and components of the Titicaca - Desaguadero - Poopó - Salar de Coipasa Water System (TDPS).

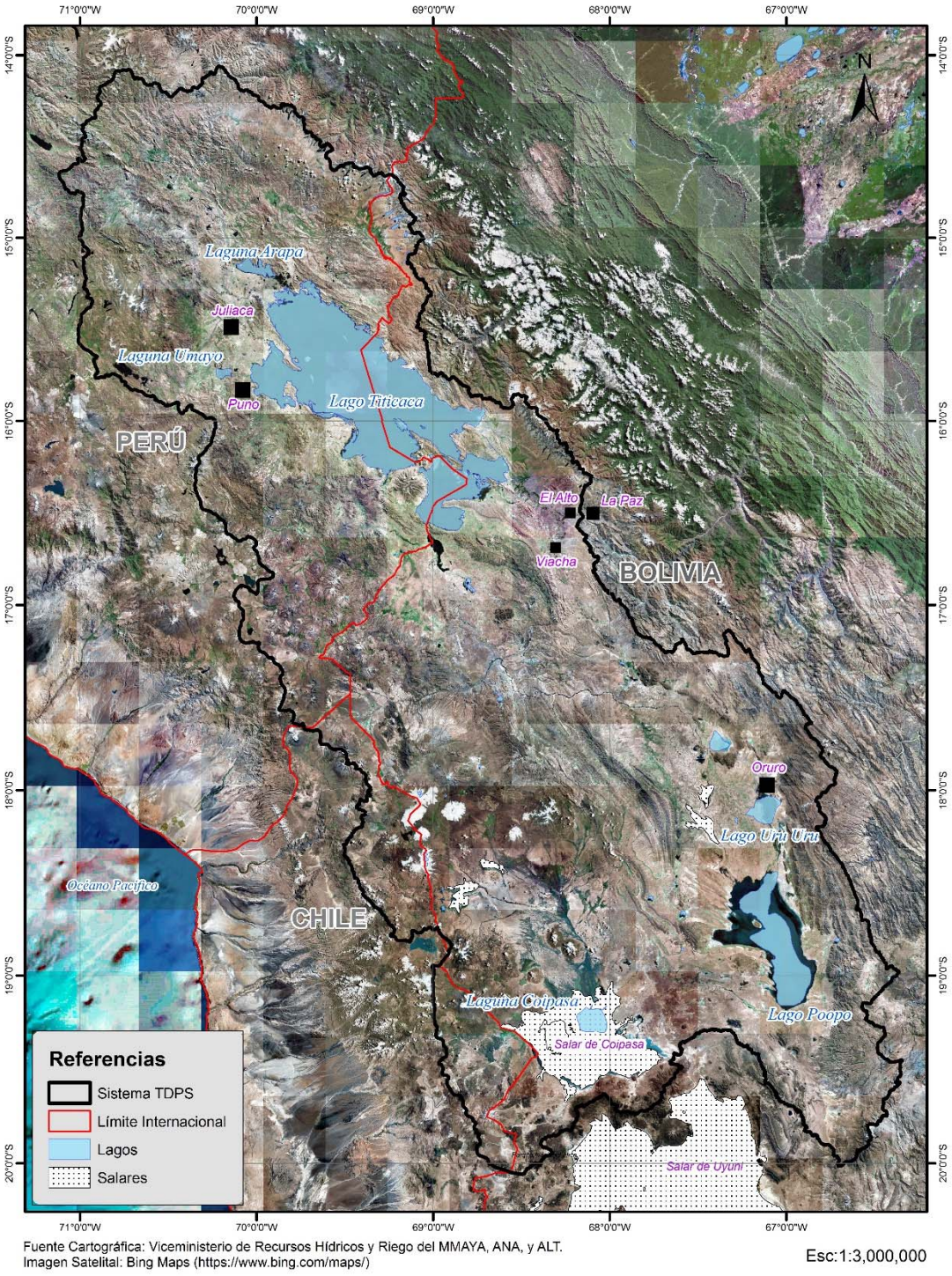

Figure 2. Satellite image of TDPS location and components.

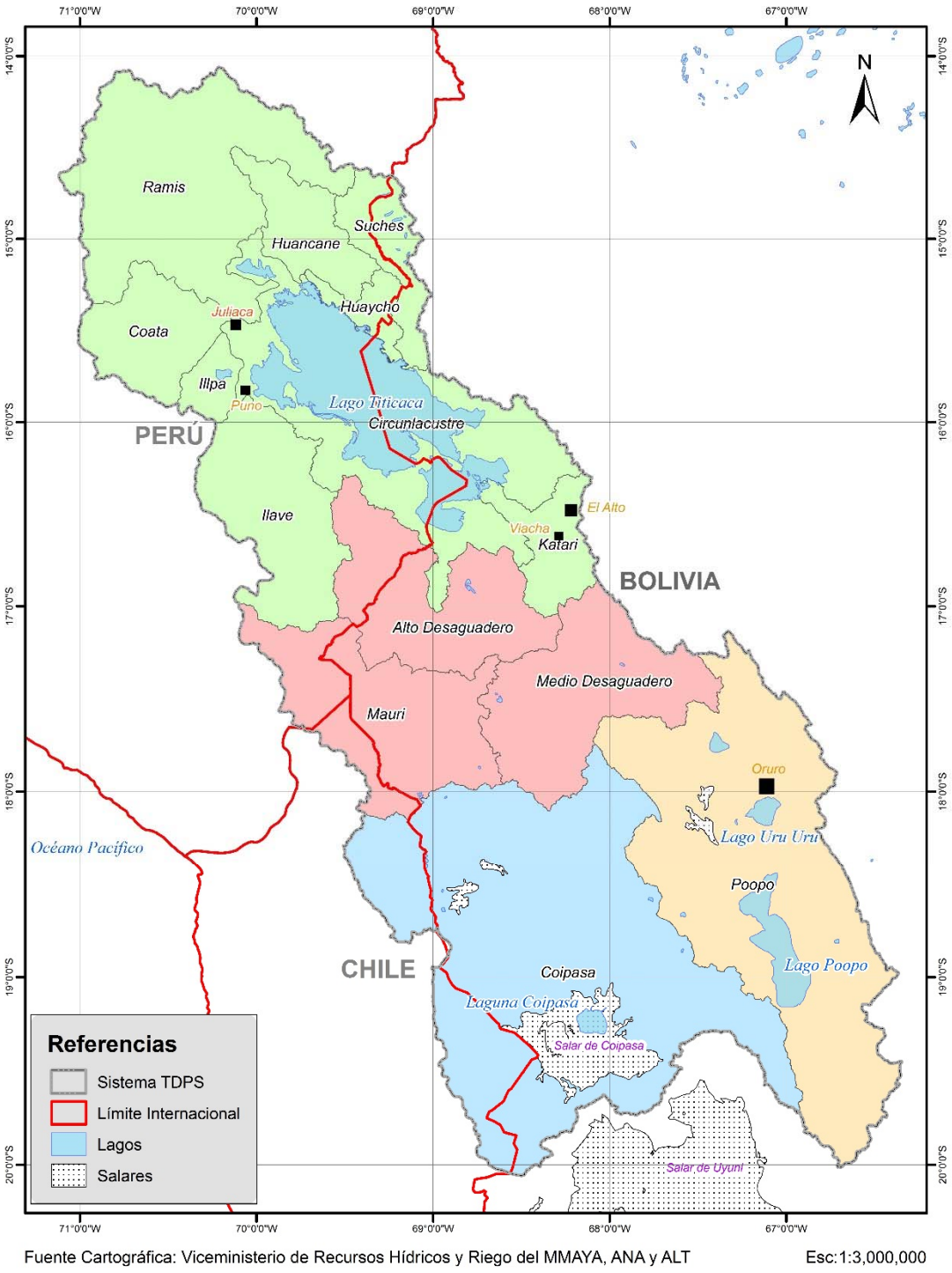

Figure 3. Hydrographic units in TDPS (Pfafstetter methodology, levels 3 and 4).

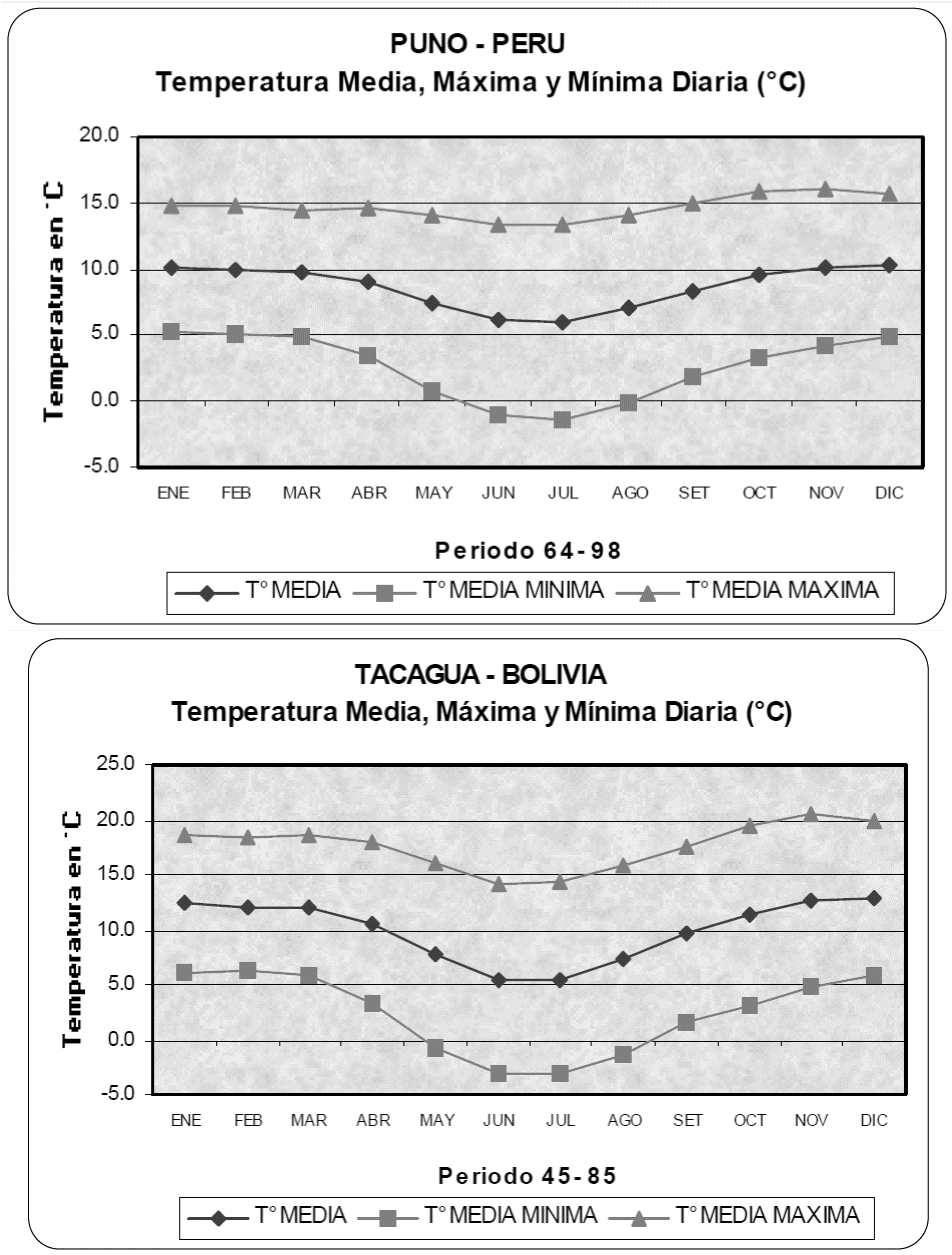

Figure 4. Average temperature pattern in two TDPS points. Puno (Peru) in the north near Lake Titicaca and Tacagua (Bolivia) in the south near Lake Poopó. Source: ALT (2005).

20. Temperature in the TDPS has seasonal fluctuations, with higher amplitude between maximum and minimum levels in the south (Figure 4, Map 5).

21. Average atmospheric pressure values are very similar throughout the TDPS and mainly vary with altitude. At the level of the high plateau, the pressure varies between 645 mb in the north (Juliaca, Peru) and 656 mb in the south (Uyuni, Bolivia) whereas in Chacaltaya, in the mountains north of La Paz (Bolivia), it is 536 mb (UNEP & OAS, 1996).

Biodiversity

Ecosystems

22. The ecosystems of the TDPS can be classified into three major groups: *puna*, high Andean, and aquatic.

Puna

23. The puna (also called high Andean tundra) is an elevational ecosystem that develops from the shores of the lakes (between 3,600 and 3,800 masl) to about 4,400 masl. In this ecosystem, a gradual decrease in humidity from north to south can be seen, and four types of puna can be distinguished based on volume of precipitation: humid, dry, arid, and very arid (Map 6).

24. The humid puna is a meadow with grasses and shrubs. The grasses are extensive grasslands, whose most characteristic species is the ichu (*Stipa ichu*) used for fodder. This ecosystem has been intervened for agriculture and livestock since pre-Columbian times. At present, crops are grown in the more humid valleys and plains. Within the humid puna the particular local conditions of humidity and soil have originated local ecosystems. UNEP & OAS (1996) list the following as the most important ecosystems:

- Bofedales, meadows, or high bogs. This is an evergreen plant formation dominated by grasses, which is typical of wetlands. They are small natural grasslands developed on hydromorphic, wet, or soggy soils, usually acid, near lakes and rivers. The bofedales are found from 3,850 masl, or more often from 4,000 masl (UNEP, 2011). Their biological characteristics vary according to moisture and permanence in time. Characteristic plants include *Distichia* and *Plantago* (the most distinctive plant is *Distichia muscoides*), they form a tapestry of some decimetres in high, interrupted by numerous pools, where plants of the genera *Carex, Calamagrostis, Gentiana, Erneria, Arenaria* and *Hypsela* associate. Plants of genera *Lachemilla* and *Ranunculus* grow in the puddles. The bofedales are used to feed camelids and are the main food source of alpacas (*Vicugna pacos*). The wetlands cover about 1.5% of the surface of TDPS[13] (Alzérreca et al., 2001; UNA Puno, 2001).
- Chillihuares or chiliguares. These are meadows of limited surface, dominated by chillihua grass (*Festuca dolichophylla*). They develop on deep, moist soils, with good agricultural qualities. Other species present in chillihuares are *chiji* (*Muhlenbergia fastigiata*) and, in the more humid areas, sillo sillo (*Alchemilla pinnata*) which is used as fodder and medicinal plant.
- Satureja shrublands. These are areas dominated by *Satureja* sp. associated with kiswara (*Chuquiraga* sp.) and grasses of the genera Festuca, Stipa, and Poa.

25. The dry puna is located south of Lake Titicaca. The arid puna is located in the central elevated lands and the very arid puna is located along the southern part of the TDPS. They primarily differ from the wet puna in their density of vegetation (the drier the weather the lesser dense is the Puna, with patches of bare soil) and in their species, which are more drought-tolerant. Also, in the south the soil salinity is different (UNEP & OAS, 1996). Additionally, depending on the conditions of each site, there are bofedales, chillihuares, iru ichu and gramadales. In iru ichu grasslands, *Festuca orthophylla* is predominant; this is a perennial species that grows on poor, loose soils, with high percentages of sand (UNEP & OAS, 1996). The gramadales are fields of grass where the most predominant species are white chiji (*Distichlis humilis*) and black chiji (*Muhlenbergia fastigiata*).

[13] In the early 2000s, it was estimated that in Peru and Bolivia there were, respectively, 1,114.73 km^2 and 1,023.41 km^2 of wetlands (Alzérreca et al., 2001; UNA Puno, 2001).

26. A distinctive and very important plant formation is the tola or thola, which is highland native shrubbery that grows in sandy, loam soils with stones. These areas are characterized by the dominance of perennial resin-producing shrubs commonly known as tola (*Parastrephia lepidophylla, Parastrephia quadrangularis, Baccharis incarum, Baccharis tricuneata* and *Fabiana densa*) (Alzérreca et al., 2002; Montero, 2006; Joffre & Acho, 2008). The tola is mainly used as fuel because it produces a resin that facilitates combustion both when dry and fresh; it is also used as emergency forage during droughts. Tolares cover, respectively, 53.2% and 3.6% of the Bolivian and Peruvian areas of the TDPS (Alzérreca et al., 2002, IIP Qollasuyo, 2003).

High-Andean Ecosystems

27. They are open grasslands, with limited areas of scrub bush, usually open. In fact, it is the continuation of the highlands above 4,400 masl. Two categories can be distinguished: (i) humid and sub-humid high-Andean floor; and (ii) dry and arid high-Andean floor (UNEP & OAS, 1996). In the southern sector of the TDPS, subalpine warm temperate desert scrub and subalpine warm temperate semi-arid desert life zones predominate (Map 6).

28. The humid and sub-humid high Andean floor is characterized by grasslands which become sparse as height increases. They are typical grasses of genera *Festuca*, *Poa*, *Calamagrostis* and *Paspalum*. Depending on the particular characteristics of the site, bofedales and gramadales develop. The wetlands are developed in two manners: (i) herbaceous pads with dominant *Distichia muscoides* and *Oxychloe andina*, and (ii) areas with dominant grasses of the genera *Calamagrostis*, *Poa* and *Paspalum*. The high-Andean gramadal is typical of non-saline wetlands with forbias[14] (genera *Selaginella, Gentiana, Lachemilla,* and *Merope*), and soft cushions of *Pycnophyllum* as well as cactaceae.

29. The dry and arid high-Andean floor has species that can withstand drought, salinity, and poor soil, mainly iru ichu (*Festuca orthophylla*). Also, depending on the particular characteristics of the site, there are bofedales, tolares, gramadales, and polylepis shrubs. The latter are forest fragments, located in specialized microhabitats of kewiña (*Polylepis tomentella*) and high altitude queñoa or keñua (*Polylepis tarapacana*[15]).

30. In the Peruvian sector of the TDPS, there are 48 glaciers spread over the mountain ranges of Apolobamba, Carabaya, Vilcanota, and La Raya, in the basins of the rivers Suches, Azángaro and Pucara, covering an area of 27.8 km^2 (ANA, 2014). In the Bolivian sector of the TDPS, most glaciers are located on the eastern mountain range, with the exception of few glaciers, such as Sajama, Parinacota, Pomerape and Acotango; the latter is almost extinct and is located on the western mountain range (Solon Foundation, 2010). Outstanding glaciers in the eastern range are those located in the areas of Calzada, Chearoco, Chachacomani, Nigruni, Condoriri, Saltuni, Huayna Potosí, Zongo, La Cumbre and Chacaltaya; all of them are part of the northern section of the eastern range. The first region is particularly important because its glaciers feed large areas of bofedales in the northern highlands. The glaciers of the second region feed the Tuni reservoir, which is a source of drinking water for the cities of La Paz and El Alto. The glaciers of the third region feed the Milluni reservoir, also a source of drinking water for the city of La Paz. It is important to highlight that the number of glaciers has increased, but their total area has decreased as they are in a recession phase, which has led to the division of large glaciers (MMAyA, 2013).

[14] Forbia is a type of grassland consisting of herbaceous plants (not grasses or graminoides) like clovers, sunflowers, and ferns.

[15] It is believed to be the tree growing at the highest altitudes. It has been found in the Sajama volcano (Bolivia) at 5,200 meters above the sea level (Schmidt-Lebuhn et al., 2006).

Aquatic ecosystems.

31. The aquatic ecosystems are lakes, ponds, and rivers. The largest lakes are the Titicaca and Poopó, both have been thoroughly studied (Dejoux & Iltis, 1991, Zabaleta, 1994; Jellison et al., 2004; World Bank, 2009; Pando, 2009). The TDPS aquatic ecosystems are home to several endemic species with high conservation value.

32. Around Lake Titicaca there is a live zone of subtropical montane rain forest that has been frequently intervened (Map 6). The lake has dense concentrations of macrophytes at the edges. Collot et al., (1983) identified six associations according to depth and distance from the shore:

a. Shoreline group (0 - 0.2m), where plants of genera *Lilaeopsis* and *Hydrocotyle* grow, especially in protected areas with soft slopes, on sediments of sandy or clayey type. This association is absent when the shore is rocky or stony.

b. *Myriophyllum* - Elodea group (0.2 m - 2.5 m), dominated by plants of the genera *Myriophyllum* and *Elodea* to the edge of the totora reeds. Other genera are present in this area: *Potamogeton*, *Zannichellia*, *Ruppia* and *Sciaromium*. These plants are called locally llachu, yana or chanceo llachu (*Elodea potamogeton*), fennel or waca llachu (*Myriophyllum quitense*) and huichi or chilka llachu (*Potamogeton strictus*). Llachu is used to feed cattle on the shores of the lake; cattle feeds directly from llachu when pasture is scarce (Dejoux & Iltis, 1991).

c. *Schoenoplectus tatora* group[16] (2.5 m - 4.5 m). Totora reed (totorales) is the most conspicuous element of the lake, the plants grow up to 5.5 m in depth. Dejoux & Iltis (1991) report that in areas of high density of totora (> 50 stems/m^2) plants of *Potamogeton* and some plants of *Elodea* and *Sciaromium* also grow. In areas with lower density of totora, chara[17] proliferates and even prevents regrowth of totora. The totora has been used since ancient times by locals (Vidaurre et al., 2006); the green reed is harvested to feed livestock (Gerlesquin, 1991). Totorales are declining, TYPSA & PROINTEC (2002) reported that between 1970 and 1992 totora reed areas decreased from 59,132 ha to 37,426 ha.

d. *Characeae* group (4.50 m - 7.50 m). The chara grows from the inner edge of the totorales or from the shore when the totora is sparse or absent. Chara can be found at up to 15 m of depth, but the more developed are is between 4.5 and 7.5 m depth. Chara is the largest plant surface in the lake (Gerlesquin, 1991).

e. Deeper *Potamogeton* group (7.5 m - 9.5 m). Iltis & Mourguiart (1991) reported that in the Bay of Puno and the Lago Menor there was a zone of *Potamogeton* plants, sometimes associated with plants of *Zannichellia*. No recent information on the status of this association of macrophytes is available.

f. Floating plants group. The plants of genera Lemna and Azolla are common in protected shores and among the totorales. The biomass of duckweed or water lentil (Lemna sp.) has grown explosively in eutrophic areas of Lake Titicaca, forming thick blankets on the water surface, mainly in Puno and Cohana bays. In the inner Puno Bay an average biomass of 6.9 kg/m^2 from duckweed was found, ranging from 2.8 kg/m^2 to 15 kg/m^2, equivalent to a total biomass between 6,000 t and 10,800 t in an area of 200 hectares (Canales-Gutiérrez, 2010). To compensate this, ALT has conducted campaigns of mechanized harvest of duckweed in Puno Bay.

33. The best characterization of fauna in the lake is that by Dejoux & Iltis (1991). Lauzanne (1991) reported that native fish fauna was composed of several species of the *Orestias* genus (*Cyprinodontidae* Family) - many of these endemic: the catfish *Astroblepus sp*.[18] (*Astroblepidae* Family) and two species of *Trichomycterus* (*Trichomycteridae* Family): suche (*Trichomycterus rivulatus*) and mauri (*T. dispar*).

[16] Now *Schoenoplectus californicus* ssp. *tatora*.

[17] *Chara* is the name given to plants of the Characeae family, specifically from the genera *Chara, Lamprothamnium* and *Nitella* (Gerlesquin, 1991).

[18] Most likely *Astroblepus stuebeli* (Schaefer, 2003).

Based on genetic analysis, Sostoa et al., (2010) validated 12 species: *Orestias agassii, O. albus, O. crawfordi, O. forgeti, O. gilsoni, O. gracilis, O. incae, O. ispi, O. luteus, O. pentlandii, O. tomcooni,* and *O. uruni.* In addition, six species previously reported were not found and 12 species require more precise examination to substantiate scientific validity. Furthermore, Sostoa et al., (2010) found only evidence of the existence of *T. rivulatus.* There is no recent information on the status of *Astroblepus* sp.

34. Of the species validated by Sostoa et al., (2010), *O. pentlandii* is critically endangered, O. *albus* is endangered, ten species[19] are vulnerable, and *O. ispi* is near threatened (MMAyA, 2009). The survival of *Orestias* fish has been affected by (i) the introduction of exotic species, (ii) fishing, (iii) degradation of macrophyte banks, and (iv) water pollution. Sostoa et al., (2010) found evidence that the evolutionary process of the species of the *Orestias* genus is under development and therefore these fish must be protected.

Several authors assume that the introduction of rainbow trout (*Oncorhynchus mykiss*) - introduced between 1941 and 1942 - and silverside (*Odontesthes bonariensis*) - introduced between 1955 and 1956 - negatively affected native fauna. This was confirmed by Monroy et al., (2014) who found that food sources eaten by ispi (*O. ispi*) overlap with those eaten by the silverside (39%) and the trout (19.7%), and that ispi is the main prey of the two introduced species. It is assumed that the introduction of trout was responsible for the extinction of the umanto (*Orestias cuvieri*), which was an endemic species whose latest report dates back to 1937. In December 1981, there was a mass mortality of *Orestias* fish caused by the parasite *Ichthyophthirius multifiliis*; it is assumed that the parasite was introduced along with the trout and the silverside (Wurtsbaugh & Alfaro, 1988). The most affected species was carachi (*Orestias agassii*), a species of commercial importance classified as vulnerable in the Bolivian red book (MMAyA, 2009). In April 2015, there was also mass a mortality of fish in the Lago Menor (Anon, 2015).

35. Another endemic species with high conservation value is the Titicaca giant frog (*Telmatobius culeus*). This species was common in the lake but its population has declined rapidly in recent decades and is classified as critically endangered on the IUCN red list (Icochea et al., 2004) and the Bolivian red book (MMAyA, 2009). The main threats to the species survival are: (i) contamination of the lake, (ii) alteration of macrophyte banks, (iii) catch for consumption as an aphrodisiac, and (iv) probable predation of larvae by trout. In April 2015, there was massive mortality of frogs, fish, and birds around Quehuaya island on the Lago Menor (Anon, 2015), which is believed to be caused by anoxia due to an occasional bloom of filamentous algae generated by an excessive nutrient load. The presence of the pathogenic fungus *Batrachochytrium* in Lake Titicaca (Cossel et al., 2014) was recently confirmed, which indicates a possible risk factor for extinction. The giant aquatic frog (*Telmatobius gigas*) is also categorized as critically endangered but there is very little information about this species (Cortez et al., 2004; MMAyA, 2009).

36. TDPS lakes and ponds are home to a large variety of birds, including endemic and endangered species. It should be noted that the zampullín or Titicaca grebe is an endemic species inhabiting many water bodies in the TDPS, since it is distributed from the Arapa and Umayo lagoons, in the north, to Lakes Uru Uru and Poopó in the south. Its population has declined sharply, the main threats it faces are: (i) habitat alteration and deterioration, (ii) bycatch in gillnets, (iii) impacts caused by tourism, and (iv) decline of *Orestias* fish which are its main food. The Titicaca grebe is classified as endangered on the IUCN red list (Bird Life International, 2012) and the Bolivian red book (MMAyA, 2009).

37. Lake Poopó is an important habitat for birds, about 30 species have been recorded. Among resident birds there are three species of flamingos, various species of ducks, the andean goose (*Chloephaga melanoptera*) and the andean gull (*Larus serranus*). The flamingos *Phoenicoparrus andinus* and

[19] i.e., *Orestias agassii, O. crawfordi, O. forgeti, O. gilsoni, O. gracilis, O. incae, O. luteus, O. tomcooni, O. uruni*, and *T. rivulatus*.

Phoenicoparrus jamesi are categorized as vulnerable[20] in the Bolivian red book (MMAyA, 2009). The survival of birds in Lakes Uru Uru and Poopó is threatened by water pollution, desiccation and reduction of water masses, and hunting of ducks and flamingos. In November 2014, massive deaths of fish, flamingos, and other birds occurred; this was attributed to excessive water heating or pollution caused by mining (Anon, 2014; Anon, 2014).

Protected areas

38. There are 19 protected areas, either entirely located within the TDPS or intersecting with the system (Map 7, Table 4). The protected areas cover an area of ca., 14,541 km^2, with the largest areas located in Bolivia and Chile, 51.7% and 35.8%, respectively. The largest protected zone (ca., 4,400 km^2) is at the top of the hydrographic unit of the Salar de Coipasa where Sajama National Park in Bolivia converges with Lauca National Park and Las Vicuña National Reserve in Chile, also close to the south is the chilean Volcan Isluga National Park.

Table 4. Protected areas in the TDPS.

Name	Country	Surface (km2)	Year of creation	Managing Entity
National Reserve of Titicaca	Peru	361,80	1978	Management Committee composed of: Illapa Andean Cultural and Development Project (PACDI). Office for Natural Resources and Environmental Management of the Regional Government of Puno. Titicaca National Reserve. XV Regional Council Puno of the Association of Biologists of Peru. Puno Hotel Chamber Pauracolla District Municipality Urus Chulluni District Municipality
Vilacota Maure Regional Conservation Area	Peru	1.243,13	2009	Tacna Regional Government
Cerro Khapia Landscape Reserve	Peru	183,14	2011	National Service of Natural Areas Protected by the State (SERNANP)
Taypipiña Private Conservation Area	Peru	6,51	2012	Private
Checa Private Conservation Area	Peru	5,60	2012	Private
Sajama National Park	Bolivia	1.002,30	1939	Management Committee composed of: National Protected Areas System (SERNAP) Municipal Autonomous Government of Curahuara de Carangas.
Tuni Condoriri National Park	Bolivia	380,00	1942	La Paz Departmental Autonomous Government
Mirikiri National Park	Bolivia	10,50	1945	La Paz Departmental Autonomous Government
Huancaroma Wildlife Refuge	Bolivia	110,00	1975	Oruro Departmental Autonomous Government
Flavio Machicado Viscarra Wildlife Sanctuary	Bolivia	65,88	1987	La Paz Departmental Autonomous Government
Apolobamba National Integrated Management Area1	Bolivia	4.837,48	1972	Management Committee composed of: National Protected Areas System (SERNAP) Charazani Municipal Autonomous Government

[20] *Phoenicoparrus andinus* (Andean flamingo) is listed as vulnerable on the IUCN Red List, while *Phoenicoparrusjamesi* and *Phoenicopterus chilensis* (Chilean Flamingos) are listed as near threatened.

Name	Country	Surface (km2)	Year of creation	Managing Entity
				Curva Municipal Autonomous Government Pelechuco Municipal Autonomous Government
Llica National Park	Bolivia	975,00	1990	Potosi Departmental Autonomous Government
Huancaroma Wildlife Refuge	Bolivia	110,00	1974	Oruro Departmental Autonomous Government
Natural and Sports Reserve Cerro Viscachani	Bolivia	No data available	2000	Oruro Departmental Autonomous Government
Lake Poopó National Heritage and Ecological Reserve of Bolivia and Oruro	Bolivia	30,84	2000	Oruro Departmental Autonomous Government
Arenales de Cochiraya and San Pedro Cultural Heritage and Landscape	Bolivia	1,50	2002	Oruro Departmental Autonomous Government
Lauca National Park2	Chile	1.378,83	1970	National Forestry Corporation (CONAF)
Las Vicuñas Natural Reserve2	Chile	2.091,31	1970	National Forestry Corporation
National Park Volcán Isluga2	Chile	1.747,44	1967	National Forestry Corporation

1 Shared with the Amazon basin.
2 Shared with the Pacific basin.
Source: National Protected Areas System (SERNAP), National Service of Natural Areas Protected by the State (SERNANP), National Forestry Corporation (CONAF).

Table 5. TDPS Ramsar sites.

Name	**Code**	**Country**	**Surface (km^2)**	**Year of creation**	**Managing Entity**
Lake Titicaca (Peruvian sector)	PE881	Peru	4,600.00	1997	SERNANP, through a management committee
Lake Titicaca (Bolivian sector)	BO959	Bolivia	8,000.00	1998	La Paz Departmental Autonomous Government
Lakes Poopó and Uru Uru	BO1181	Bolivia	9,676.07	2002	Management Committee that includes the communities of Vilañeque, Llapallapani, and Puñaca of the Urus indigenous nation in Lake Poopó and public entities.

Table 6. Important Bird and Biodiversity Area (IBAs) in the TDPS.

	Name	**Code**	**Country**	**Surface (km^2)**
1.	Ramis and Arapa	PE097	Peru	5.210,00
2.	Chacas Lagoon	PE098	Peru	5,84
3.	Umayo Lagoon	PE099	Peru	298,00
4.	Lake Titicaca	BO018	Bolivia	4.211,28
5.	Sajama National Park	BO019	Bolivia	1.078,52
6.	Lake Poopó and LakaJahuira River	BO017	Bolivia	2.645,22
7.	Lauca National Park	NA	Chile	1.378,83
8.	Salar de Surire Natural Monument	NA	Chile	112,98
9.	Volcán Isluga National Park	NA	Chile	1.747,44

39. The entire Lake Titicaca and Lakes Uru Uru and Poopó are Ramsar sites, covering ca., 15% of the surface of TDPS (Map 8, Table 5). Ramsar sites in Peru have a management body called Participatory Management Committee. In Bolivia, the Ramsar site for Lakes Poopó and Uru Uru has a management committee that includes participation of Vilañeque, Llapallapani and Puñaca communities of the native nation Urus in Lake Poopó and public entities (MMAyA, 2015). Both governments have indicated that

restoration and impact mitigation measures are required in the three Ramsar sites (MINAM, 2015). There are also nine IBAs, three in each country (Table 6, Map 9).

Socioeconomic context

40. Bolivia has an area of 1,098,581 km^2 and a total population of 10,027,254 inhabitants[21] (INE, 2013). It is a country of great eco-regional and ethnic-cultural diversity, expressed in the 36 languages recognized by the Constitution; those languages represent 36 nations and native indigenous peoples and farmers who account for 2,806,592 people[22] (40.5%) compared to 4,032,014 people (58.2%) who self-identified as non-indigenous in the 2012 census (INE, 2013). Urban population is estimated at 67.3%, while rural population is 32.7%. Most of the population is settled in the so-called horizontal center axis of the territory comprising the cities of La Paz (764,617 inhabitants), El Alto (848,840 inhabitants), Cochabamba (630,587 inhabitants), and Santa Cruz (1,453,549 inhabitants).

41. In 2005, the gross domestic product (GDP) of Bolivia was USD 3.7 billion (Bs. 26 billion) and increased to USD 5.4 billion (Bs 38.4 billion) in 2013[23]. The per capita GDP was USD 1,010 in 2005, reaching USD 2,794 in 2013[24] (INE, 2014). In the last decade, the country's GDP grew mainly due to the increase of the prices of raw materials. The country's economy is based on the production of natural gas for export (in the Platense basin) and minerals (tin, lead-silver, zinc, gold, especially in the TDPS area but also gold from the Amazon basin), which have spurred a record growth of Bolivia's exports, accounting for 83% of total sales of traditional and non-traditional products. Other sectors that make a lesser contribution to GDP are activities such as agribusiness and agriculture, but in turn these activities generate about 80% of employment in the country (INE, 2014).

42. In the Bolivian sector of the TDPS (104 municipalities) the percentage of poverty due to unsatisfied basic needs[25] (NBI) in 2012 was 77.65. It is worth noting, however, that this average value expresses very different realities, as poverty is lower in the municipalities of capital cities such as El Alto (NBI 36%) and Oruro (NBI 24.9%), municipalities of intermediate cities as Viacha (NBI 53.4%), tourist centres such as Huatajata (NBI 29.6%), and mining centres such as Huanuni (NBI 24%) and Llallagua (NBI 36.7%). Contrary to this, in 20 small and remote rural municipalities (of the 104 TDPS Bolivian municipalities) in the four main hydrographic units, the NBI poverty rates are above 90%. There are extreme cases in six municipalities that have poverty levels >95%: Humanata 95% (in Lake Titicaca hydrographic unit), Chacarilla 96.8%, Santiago de Callapa 97.3%, and El Choro 97.9% (all three in the Desaguadero River hydrographic unit); Carangas 97.6% (in Lake Poopó hydrographic unit), and Belén de Urmiri 95% (in Salar de Coipasa hydrographic unit).

43. In 1980, the Human Development Index (HDI) of Bolivia was 0.489[26]; it increased to 0.620 in 2000 and to 0.675 in 2012. This shows that the country has improved this indicator and as a result the 2012 UN report placed Bolivia in the group of countries with medium human development.

44. The territorial organization of the Bolivian state is based on departments, provinces, municipalities, and native indigenous and farmers' territories (TIOCs). As of July 2015, there were nine departments, 339 municipalities, and zero TIOCs.

[21] Population determined by the 2012 National Population and Housing Census (INE, 2013).
[22] Individuals aged 15 or older who are defined as members of an indigenous nation or people, as native farmers, or having African-Bolivian origin (INE, 2013).
[23] The World Bank reported in 2014 a GDP of USD 34,175,832,127.4 (current prices). Source: http://datos.bancomundial.org/.
[24] The World Bank reported in 2014 a per capita GDP of USD 3,150.5 (current prices). Source: http://datos.bancomundial.org/.
[25] The data on poverty due to NBI comes from the online database of INE called "Resultados censo nacional de población y vivienda – ficha resumen censo de población y vivienda 2012". The database is available at http://censosbolivia.ine.gob.bo/censofichacomunidad/.
[26] Source: http://idh.pnud.bo/d7/content/el-desarrollo-humano.

45. The Bolivian State Constitution provides in Article 271, paragraph I, that the Framework Autonomy Law (Law 031, dated July 2010) regulates the preparation of regional Statutes and Organic Letters, transfer and delegation of juristictions, economic and financial systems, and coordination between central and decentralized and autonomous territorial entities. Article 272 provides that autonomy involves the popular election of authorities by citizens, management of financial resources, and exercise of legislative, regulatory, supervisory and executive powers by self-governing entities in accordance with their appropriate areas of jurisdiction, attributions, and functions. Finally, Article 273 states that the law shall regulate the formation of associations between municipalities, regions, and TIOCs to achieve their objectives and also, in Article 276, that autonomous regional authorities are not subordinate to each other and have equal constitutional status.

46. The Bolivian TDPS sector is within four of the nine Bolivian departments. Most Bolivian TDPS areas fall within the departments of La Paz (26.46%) and Oruro (33.52%), there are smaller areas in the departments of Potosi and Cochabamba (Table 8). There are 104 Bolivian Autonomous Municipalities (of the existing 339) in the TDPS (i.e., 30.7%) and they have large indigenous populations of Aymara, Quechua, and mestizo ethnic groups, as well as a few other ethnic minorities, such as the Urus.

Table 7. TDPS population.

Hydrographic Unit	Total population	Population by country		
		Bolivia[a]	Peru[b]	Chile[c]
Titicaca	2.560.776	1.342.803	1.217.973	0
Desaguadero	488.368	283.576	202.2.2	2.550
Poopó	435,616	435.616	0	0
Salar de Coipasa	175.885	169.377	0	6.508
Total	3.660.645	2.231.372	1.420.215	9.058

[a] Source: INE, Censo Nacional 2012.

[b] Source: Fuente de Población del Perú Estimaciones y Proyecciones de población Departamental, 1995-2025. Boletín Especial 22 del INEI (estimated population for 2015).

[c] Source: PNUMA (2011).

Table 8. TDPS area distribution in the territories of the Departments and Regions of Bolivia and Peru.

Regions and Departments	Country	Percentage
Puno Region	Peru	34,61
Tacna Region	Peru	1,21
Department of La Paz	Bolivia	26,46
Department of Oruro	Bolivia	33,52
Department of Potosi	Bolivia	4,11
Department of Cochabamba	Bolivia	0,09
	Total	100,00

Source: ALT.

Table 9. Population in 38 strategic Bolivian municipalities within TDPS.

Hydrographic Unit	Number of strategic municipalities	Population
Titicaca	20	1.170.007
-North bank	10	129.404
-South bank	10	1.040.603
Desaguadero	10	103.530
Department of La Paz	7	79.389
Department of Oruro	3	24.141
Poopó	7	342.397
-Cities	3	300.904
-Mining centre	1	24.687
-Other rural municipalities	3	16.806
Coipasa	1	903
TOTAL	38	1.616.837

Source: INE – 2012 Census

47. Peru has an area of 1,285,215.60 km^2 (INEI, 2013), it is a country of great eco-regional and ethnic diversity. In Peru coexist 76 ethnic groups; the indigenous peoples organized by ethnolinguistic families are: Jibaro, Pano, Pebayagua, Quechua, Tucano, Tupi-Guarani, Uro Chiyapa, Arawak, Aru, Cauapana, Harakmbut, Muitoto, Tacana, and Zaparo. In the last census (2007) the population was 27,412,157 people (76% urban and 24% rural population) (INEI, 2007). According to estimates of the National Institute of Statistics and Information (INEI), as of June 2015, the estimated population was 31,151,643 (INEI, 2013).

48. Most of the people live in Lima (31% of the population), Piura (6%), La Libertad (6%), Cajamarca (5%), and Puno (5%)[27]. The World Bank reports that in 2014 Peru's GDP was USD 202,902,760,292.7 (at current prices) and the per capita GDP was USD 6,594.4 (at current prices)[28]. Between 1995 and 2013, the average annual growth rate was 9.5%, compared with other Latin American countries, this growth rate is high. According to INEI estimates for 2013, the country's economy is based mainly on manufacturing (15.1%), extraction of oil and minerals (12.1%), trade (11%), construction (6.9%) and agriculture (5.3%). NBI poverty in 2007 was 40.7% and the population facing a situation of extreme poverty was 13.7% (INEI 2007). In 1993, the poverty level due to NBI was 56.8%. That same year, 42.5% of urban residents had poverty based on NBI, while 90.1% of the rural population had NBI poverty. In 2013, the HDI was 0.737, which placed the country at a high level of human development (UNDP, 2014).

49. Peru is made up by 24 departments, one constitutional province, 195 provinces, and 1,845 districts. According to Article 194 of the Constitution of the Peruvian State "provincial and district municipalities are entities of local government. They have political, economic and administrative autonomy in matters within their competence."

50. It is estimated that 3,660,645 people live in the TDPS (Table 7). The Bolivian population within TDPS is divided into 104 municipalities, but they are concentrated on 38 municipalities called strategic for their high populations and their direct contact (shoreline/riverine) with the four hydrographic units in TDPS (Table 9).

[27] Source: http://www.inei.gob.pe/estadisticas/indice-tematico/poblacion-y-vivienda/
[28] Source: http://datos.bancomundial.org/.

51. As it can be seen, of the total of 2,231,372 Bolivian residents in the TDPS and 1,342,803 people living in the Lake Titicaca hydrographic unit, 1,170,007 live in only 20 of the 35 municipalities of Titicaca (83% of population). In turn, this population represents 52% of the Bolivian population in the TDPS.

52. In the Bolivian sector of Lake Titicaca hydrographic unit there are 1,342,803 residents (Table 10), of which 1,007,755 people (75%) are concentrated in six municipalities; the most outstanding are El Alto (848,452) and Viacha (80,724).[29] This concentration has, as it will be seen later, fundamental effects on the TDPS and its resources. In the case of Lake Poopó hydrographic unit, 75% of the residents live in the city of Oruro and surroundings areas as well as in the mining town of Huanuni, the main Bolivian mining center.

Table 10. Population concentration in the Bolivian sector of the TDPS.

Hydrographic Unit and 38 strategic municipalities	Main urban and mining concentrations in the Unit	Population of the main urban and mining concentrations in the unit	Provinces	Department
Titicaca	**(six municipalities)**	**1.007.755**		
20 strategic municipalities	1. El Alto	848.452	Murillo	
	2. Viacha	80.724	Ingavi	La Paz
	3. Laja	24.531	Los Andes	
	4. Pucarani.	28.465		
	5. Batallas	17.426		
	6. Puerto Pérez	8.157		
Desaguadero	**(ten municipalities)** No urban concentration	**103.530**	La Paz:	
10 small strategic municipalities		79.389 (La Paz)	Pacajes, Aroma, G Villarroel, Ingavi	La Paz and Oruro
		24.141 (Oruro)	Oruro:	
			Barron, Cercado, Saavedra	
Poopó	**(four municipalities)**	**325.581**	Cercado	
7 strategic municipalities	1. Oruro.	264.943	Cercado	
	2. Soracachi.	12.846	Cercado	Oruro
	3. Caracollo.	23.115	P. Dalence	
	4. Huanuni (mining centre)	24.677		
Coipasa	**Coipasa**	**903**	Sabaya	Oruro
1 strategic municipality				
TOTAL	18	1.437.769		La Paz y Oruro

Source: INE Bolivia, Census 2012.

[29] Source: http://censosbolivia.ine.gob.bo/censofichacomunidad/.

53. The population in the Peruvian TDPS sector is mainly concentrated in the department of Puno and in the province of Tarata, department of Tacna (Table 8). There are 13 provincial municipalities and 109 district municipalities in the department of Puno. In the provincial municipality of Tarata, three district municipalities are part of the TDPS. A peculiarity of the Puno region is that it is culturally populated by Aymara and Quechua residents. Geographically, the Aymara population predominates in the southern part of the region of Puno, while the Quechua thrive in the north. A relevant aspect related to this cultural peculiarity is that it is more difficult to design and implement development projects that bring together Aymara and Quechua communities. The main urban centers on the Peruvian side are Juliaca and Puno. According to INEI projections for 2015, Puno and Juliaca concentrate ca., 30% of the Peruvian population in the TDPS.

54. A small portion of TDPS is in Chilean territory. This area corresponds to the provinces of Parinacota and Tamuragal. The Chilean population in the TDPS is estimated at ca., 9,058 inhabitants, of which about 2,550 people live in the Desaguadero River hydrographic unit and the rest in the Salar de Coipasa hydrographic unit (UNEP, 2011).

55. The population of the Lake Titicaca hydrographic unit is 69% (i.e., 2,560,776 people) of the total population in TDPS. It is predominantly indigenous Aymara. In Bolivia, of the 104 municipalities in the TDPS, 35 municipalities are located within this hydrographic unit. More than 75% of the people identify themselves as Aymara, 10% as Quechua and the rest as non-indigenous or other members of a minority indigenous group. Among the indigenous minority groups are the Uru, who are considered the oldest residents in the TDPS. The Uru mixed with the Aymara and over time they acquired Aymara language as their mother tongue. In Bolivia, a few Uru families live in the vicinity of Lake Titicaca, in Uru-Irohito Ayllu, Jesus de Machaca municipality (which is not adjacent to the lake) and in the Limancachi community, Ancoraimes municipality (adjacent to the lake) and also in areas surrounding Lake Poopó and Lake Uru-Uru, in the department of Oruro.

56. In Peru, just as in Bolivia, the vast majority of the people in the areas that surround Lake Titicaca are Aymara. However, four Uru communities have been identified: (i) on the floating islands of Urus-Puno living in the Puno Bay, (ii) on the floating islands of Kapi in the district of Huatta-Puno, (iii) the Urus-Titino, and (iv) the Urus-Chullini who live by the shores of Lake Titicaca. Today, the Uru are dedicated to tourism and fishing (mainly carachi and silverside); tourism has become the most important activity for this indigenous group.

57. The anthropological, archaeological, and cultural value of Lake Titicaca is immense. It is considered that the area was home to outstanding pre-colonial Andean civilizations in the region (Uru, Colla, Aymara, Inka). The long survival of a society living on small-scale farming and low urbanization levels contributed for decades to the conservation of the lake resources. However, the urban explosion of the 1980s in Bolivia and Peru, and the gradual shift of economic activity towards intensive agriculture and cattle raising drastically changed the framework conditions related to the resources of Lake Titicaca. It is believed that the giant frogs may have been part of pre-Hispanic rituals, but now they are captured to be prepared in smoothies that allegedly have aphrodisiac properties.

58. In the Desaguadero River hydrographic unit, 13.4% (488,368) of the people living in TDPS are found. In Bolivia, 32 municipalities are located in this area, with a mainly Aymara population (> 90% identified themselves as Aymara). On the Peruvian side, there are 202,242 people (41% of the total population in this hydrographic unit), most of them are Aymara and Quechua people.

59. Lake Poopó hydrographic unit concentrates 11.9% (435,616 people[30]) of the population living in the TDPS. These people are entirely Bolivian and populate 14 municipalities in the basin. These residents are mostly Aymara, while Quechua people are fewer. There is a very small Uru minority, who represented

[30] Source: http://censosbolivia.ine.gob.bo/censofichacomunidad/.

1,316 people according to the 2012 census; most of those residents are settled around Lake Poopó and Lake Uru-Uru and they self-identified as Uru Muratos and Uru Chipaya (department of Oruro). The Uru are mainly fishermen and farmers, although fishing is in a critical condition as a result of mining pollution. The Uru nominated, based on a Constitutional recognition of their customs, a member of congress representing their Special Indigenous Constituency in the 2014 nationwide election.

60. Salar de Coipasa hydrographic unit has 4.8% (169,377 people) of the total population in TDPS; they live in 23 Bolivian municipalities. This is a predominantly rural population, scattered in the region and mostly Aymara and Quechua. Local residents have always made artisanal use of the salt in Salar de Coipasa.

Living conditions

61. The living conditions of the populations in TDPS are in general conditions of poverty with the exceptions of capital and intermediate cities (i.e., El Alto, Oruro, Viacha and Pucarani in Bolivia, and Puno and Juliaca in Peru) as well as mining centers, such as Huanuni in Bolivia, where poverty rates are below 50%. The distribution of poverty caused by NBI shows that the greater the distance from large urban or mining centers, the greater the poverty; in the case of Bolivia, the highest rates of poverty are concentrated in remote rural municipalities in the departments of Oruro and Potosi (Map 13).

62. In the Peruvian sector, access to basic services, according to the 2007 INEI census, is poor in rural areas. Access to electricity was 82.4% in urban areas, while in rural areas it was 36.4%. Regarding clean water, there is better access in urban areas, since more than 70% of houses have private or shared connections to clean water systems. However, in rural areas, about 45% of the population mainly use water from rivers, ditches and/or springs. Sewage or sanitation also has greater coverage in urban areas. According to INEI, drainage networks in urban areas were >70% in 2010. On the contrary, only 9% of the population had sewer services in ther homes in rural areas. Most rural dwellers use other types of sanitation systems as septic tanks and latrines. In terms of garbage collection, only the main towns have municipal dump sites and collection systems. Municipal dumps in Puno and Juliaca are already full and now they are being closed with technical assistance while alternative measures for treatment of waste are being sought and implemented. With regard to education, Puno province has the largest number of schools (886); it is therefore inferred that there are better educational conditions in schooling and professional training. Some provinces such as San Antonio de Putina, Moho and Yunguyo have fewer schools, especially at the secondary level (<200 schools). This is a key factor for young people in rural communities to decide to migrate toward urban centers since they want to pursue secondary education. As for illiteracy, it should be noted that the region of Puno has higher rates than the national average. In 2010, the percentage of people (15 years of age and above) who could not read or write was about 10%.

Table 11. Bolivian population and living conditions in the TDPS.

Hydrographic Unit	Number of Strategic cities	Population in the unit	2001-2012 intercensal growth rate	% of Sewer System Coverage	% of Garbage Collection System Coverage
Titicaca	**20**	**1.170.007**	**1,4**	**27,9**	**35,3**
- North bank	10	129.404	0,7	7,0	5,2
- South bank	10	1.040.603	2,2	48,8	65,5
Desaguadero	**10**	**103.530**	**1,4**	**2,1**	**0,0**

Hydrographic Unit	Number of Strategic cities	Population in the unit	2001-2012 intercensal growth rate	% of Sewer System Coverage	% of Garbage Collection System Coverage
La Paz Dept.	7	79.389	0,9	1,8	0,0
Oruro Dept.	3	24.141	1,9	2,4	0,0
Poopó	**7**	**342.397**	**1,3**	**35.2**	**33.4**
-Cities	3	300.904	0,9	51,8	70,3
-Mining centre	1	24.687	2,1	37,9	27,5
-Other rural municipalities	3	16.806	0,8	15.3	2.42
Coipasa	1	903	3,4	0,0	9.4
TOTAL	**38**	**1.616.837**	**1,8**	**16.3**	**19.5**

Source: INE, 2012 Population and Housing Census.

Table 12. Major urban concentrations and living conditions in strategic Bolivian municipalities – TDPS.

Unit and main urban concentration	Population	Growth rate	% of houses with sewage systems	% of houses with garbage collection systems	% of poverty due to NBI
Titicaca	**953.707**	**3.2**	**26.8**	**43.5**	**46.0**
1. El Alto	848.452	2,1	58,4	76,1	32.0
2. Viacha	80.724	4,9	22,2	55,0	53.4
3. Laja	24.531	2,8	0,0	0,0	52.8
Desaguadero	**103.530**	**2,3**	**2.1**	**0,0**	**88.5**
Poopó	**325.576**	**1.1**	**26.4**	**31.9**	**51.9**
1. Oruro	264.943	2,4	57,7	77,6	24,9
2. Soracachi	12.846	-0,8	0,0	0,0	84,5
3. Caracollo	23.115	1,0	10,3	22,5	74,5
4. Huanuni (mining centre)	24.672	2,1	37,9	27,5	24,0
Coipasa	**903**	**3,4**	**0,0**	**9.4**	**84,5**
TOTAL	1.383.716	2,5	14.35	21.2	67.7

Source: INE, 2012 Population and Housing Census.

63. In the Bolivian sector, living conditions of the population can be assessed through three indicators:
(i) Intercensal growth from 2001 to 2012 to assess the demographic pressure on TDPS,
(ii) Percentage of access to public sewer systems to assess state attention to issues of domestic waste waters, and
(iii) Percentage of access to public garbage collection systems (Table 11).

Only municipalities in the Titicaca hydrographic unit stand out both in intercensal growth, percentage of access to public sewer infrastructure, and percentage of access to public garbage collection systems. In the other hydrographic units, Poopó is significant due to the presence of the city of Oruro and the Huanuni mining center, which have high percentages of access to sewage and garbage collection.

64. Table 12 shows that only large cities like El Alto, Viacha and the string of towns formed by Oruro – Soracachi – Caracollo - Huanuni have access to public sewage and garbage collection. Population growth rates remain relatively high in Huanuni and Oruro, but the rate is negative in Soracachi and Caracollo. This confirms that living conditions in urban towns is better and the farther you are from the cities, conditions get worse. The same situation can be observed in the percentage of NBI poverty, which has low values in the capitals and intermediate cities while there are high or very high values in rural municipalities.

Productive activities

65. The main productive activities in the TDPS differ between urban and rural areas. In large cities, which concentrate much of the population in TDPS (e.g., El Alto, Viacha, Puno, Juliaca, Oruro, Huanuni), trade, industry, crafts and services are the most important economic activities. In the case of Bolivia, mining activities in Huanuni are outstanding and generate revenues for the state, as tin is the most significant mineral export. In rural areas, where most municipal districts (PER) and rural municipalities (BOL) are located, the main economic activities are (i) agriculture, (ii) livestock farming (cattle, sheep, camelids), (iii) fishing, (iv) aquaculture, and (v) tourism.

Agriculture

66. In the Bolivian TDPS sector, agriculture is of the high-Andean type, small scale, mostly family-run, conducted on small lots, with small capital, and facing many limitations regarding access to markets according to the hydrographic unit where activities are developed. In recent years, associations of producers or rural farmers' economic organizations (OECAs) have been organized in the Titicaca hydrographic unit, according to their ecoregion, these farmers produce dairy products, vegetables, and camelids (especially alpacas and vicuñas) and take advantage of higher humidity levels in the area. The Desaguadero hydrographic unit mainly produces potatoes and Andean tubers, vegetables, and sheep. In the hydrographic units of Poopó and Salar de Coipasa, agriculture, except quinoa crops, faces many limitations due to higher salinity in the soil; families make a living out of raising sheep and camelids (especially llamas). Salt extraction is important in the salt marshes region; as a result, the temporary labor migration of residents of these two hydrographic units to the Chilean or Peruvian coast is complemented with trading activities that involve transborder smuggling.

67. The Peruvian side of the TDPS system is a mountainous area. Specifically in the highlands, the main products include oatmeal, potatoes, quinoa, barley, alfalfa, lima beans, and others that are grown in smaller proportions. The most important crop in terms of cultivated area is fodder oat, whose production has increased gradually. Another significant crop in Puno is the potato, although cultivated areas in 2011-2012 were reduced by approximately 1,000 hectares. Significantly, forage crops are quite important in the area, especially alfalfa whose crop area increased by about 20,000 ha between 2006 and 2011.

Animal husbandry

68. In the Bolivian sector of TDPS, animal husbandry is established in the vicinity of large cities (i.e., La Paz, El Alto, and Oruro). In the hydrographic units of Lakes Titicaca and Poopó, there is mainly dairy and

beef cattle. Throughout the Bolivian highlands there are ca., 799,000 heads of cattle. In 2009, La Paz produced 12,443 t of beef and Oruro produced 1,553 t (CEDLA, 2011).

In the department of La Paz the so-called "milk belt" includes the municipalities of Achacachi, Batallas, Pucarani, Viacha, Machaca, and Patacamaya. From the "milk belt," milk, dairy products and beef are supplied to the cities of La Paz, El Alto, and Viacha. It is known that in 2009 ca., 6,000 farming families produced about 43 million litres of milk, of which 85% was intended for sale, 12% for industrial processing, and 3% for consumption. Milk production has quadrupled in the past 10 years (CIPCA, 2010). In Oruro, there is bovine livestock for meat and milk in the Cercado province, from the municipality of Machacamarca to the municipality of Challapata, and also in the rural municipality of Oruro. Cattle farming in the Bolivian highlands increased the meat produced from the existing numbers of cattle, mainly due to increased productivity achieved by breeding techniques developed during the past 20 years. In short, since the northern and southern shores of Lake Titicaca are within the "milk belt", cattle farming puts pressure on resources in terms of land needed for fodder production and on totora in the banks of Lake Titicaca.

Production of camelids (i.e., alpacas, llamas, and vicuñas) is distributed in the central highlands and southern TDPS; production of alpaca and vicuña fiber takes places in the high puna of Apolobamba, near Suches River, and animal husbandry to produce meat and llama fibers occurs in the high plains of Oruro. Alpaca fiber is smuggled in large proportions into Peru, although part of the fiber is industrially processed in El Alto (INE, 2015). As for sheep herds, female sheep, male sheep, and lamb (young sheep) supply meat to rural markets and poor neighborhoods of large cities in the TDPS. Sheep wool is used to make clothing and other utility items.

69. In the Peruvian sector, livestock production is mainly based on breeding sheep, alpacas, and cattle. There are also poultry for meat and egg production. Milk production is the most important activity on the Peruvian side of the TDPS, although the cattle population is smaller than sheep. Between 2005 and 2010 there was a production increase of more than 25,000 t of milk (INEI, 2011). Other important products in the Peruvian side of the TDPS are beef and mutton, a productive activity that also increased. It should be noted, though, that between 2010 and 2011 there was a decrease in several livestock products. In retrospect, in 2006 the livestock subsector grew 3.13%, based on increased production of milk (26%), beef (1%), pork (3%), poultry (1.6%), mutton (0.4%) and alpaca (1.1%). Productivity levels are estimated at 1.58 litres of milk/cow, 138.8 kg of meat/cow, 1.72 kg of wool/sheep, 12.80 kg of meat/sheep, 1.72 kg fiber-wool/alpaca, 26.17 kg of meat/alpaca, 1.32 kg of fober-wool/llama, and 35.73 kg of meat/llama (MINAGRI, 2008). Additional details on livestock production can be found in Table 13. Animal husbandry on the Peruvian side of TDPS system constitutes a major economic activity. The farmers' communities in the basins of rivers Ramis and Suches have blamed mining pollution for the deaths of their cattle.

Table 13. Livestock production in the Peruvian sector of the TDPS (t)

	Year						
Livestock products	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Milk	44.154	55.367	58.986	67.951	71.047	70.476	71.234
Beef	17.230	17.401	17.642	35.359	36.331	35.187	33.880
Mutton	10.246	10.288	10.431	26.112	26.336	25.271	24.054
Alpaca meat	4.625	4.676	4.828	10.986	11.509	11.824	11.350

Poultry	2.555	2.603	2.676	2.034	2.042	1.898	1.760
Pork	2.054	2.114	2.154	2.930	3.103	3.014	2.927
Llama meat	1.387	1.403	1.451	3.329	3.386	3.277	3.184
Wool	4.940	4.942	4.960	4.940	4.978	4.652	3.958
Eggs	1.371	1.402	1.459	1.616	1.620	1.512	1.404

Source: INEI (2013).

Fishing

70. Fishing is very important for both farmers and city consumers, especially fishing of silverside (an introduced species), carachi and ispi. In the last decade it has been noted by the media that there is a shortage of fish, which has resulted in lower volumes of traditional fishing and the declining number of fishermen throughout the TDPS, although this is markedly noticeable in the Desaguadero River and Lake Poopó hydrographic units.

71. In the Bolivian TDPS sector, important fishing activities are developed in Lake Titicaca and Lake Poopó; they are aimed especially at catching trout and silverside, as well as native species such as carachi and ispi. In Lake Poopó the main fished species is silverside, which has historically accounted for ca., 90% of the catch (Zabaleta, 1994). For the Bolivian side, there are no recent statistics of the capture in these lakes, but fishermen have reported a steady decline in both introduced and native fish.

Van Damme (2002) estimated that fishing in Lake Titicaca sustain between 1,500 and 3,200 Bolivian fishermen. In the Titicaca hydrographic unit there is a Departmental Federation of Fishermen, Traders, Fodder Producers, Craftsmen, and Tourism Operators of La Paz, with 80 affiliated associations in five provinces (Omasuyos, Camacho, Manco Kapac, Ingavi, and Los Andes).

Fishing in Lake Poopó reached a maximum peak of ca., 3,379 t/year in 1990, including silverside and carachi (Zabaleta, 1994). In 1992, the lake dried up and the availability of fish collapsed; since then, the catch has remained at very low levels and faces increasing difficulties arising from mining pollution and domestic waste waters that affect Lake Poopó. Drastic reduction in fishing in the lake has had strong socio-economic effects for people that directly dependent on this activity. Zabaleta (1994) reported a decrease of ca., 68% in the number of fishermen in 1992.

72. There is significant catch on the Peruvian side, but most production comes from raising trout in floating cages. Fishing is an important component of food security in communities established around lakes and ponds. Fish is usually the only source of protein in their diet. The main exploited species are silverside, yellow carachi, and ispi. About 80% of fish is sold fresh in the regional marke, the remaining 20% is sold as dry-salted (mainly yellow carachi and ispi) (Chura & Mollocondo, 2009). Fishing on the Peruvian sector of Titicaca basin is regulated[31], but there is no full compliance with the regulations. Fresh ispi is being used to feed the trout raised in floating cages.

73. The decline of native fish is attributed to predation by trout that escape from the cages. It was also reported that trout producers feed them with ispi (Chura & Mollocondo, 2009). Fisheries and aquaculture have been developed on the banks of Lake Titicaca, until 2009, designated areas for fish farming reached 13,434 ha and the areas in process of preparation covered 8,026 ha (Chura & Mollocondo, 2009).

[31] Supreme Decree 023-2008-PRODUCE establishes the Regulation for Fishery and Aquaculture in Lake Titicaca Basin, and Supreme Decree 033-2009-PRODUCE amends the regulation indicated above.

Aquaculture

74. The main form of fish farming are floating cages for raising trout in Lake Titicaca, but there is extensive farming in other water bodies (i.e., releasing fish fry and fingerling). In the late 1970s, the Ministry of Fisheries of Peru initiated trout farming in cages in Lake Titicaca (Brenner, 1994). In the early 1990s a production of ca., 150 t/year (Brenner, 1994) was estimated, but this level has increased significantly. In 2006, the Brisas del Titicaca Association in Puno department (PER) produced 180 t/month; 90% was sold in the markets of Puno, Juliaca, Cusco, and Arequipa, and the rest was exported to Bolivia (Anon, 2006).

There is no updated information on trout farming in Bolivia[32]. FAO estimates that production of this species increased from 144 t/year in 1990 to 310 t/year in 2004 (Piludo, 2005). It is estimated that the total area of extensive farming, particularly regarding introduction of trout and silverside, is ca., 5,000 km^2, mainly in Titicaca, Poopó, and Uru Uru Lakes, as well as in other smaller lakes outside the TDPS system. In Bolivia, aquaculture production has a dual market: (i) the large cities of La Paz and El Alto, and (ii) the tourists who come to Tiquina, Copacabana, Isla del Sol, Tiahuanacu, and other surrounding sites.

In Peru, rainbow trout is mainly farmed in floating cages installed in Lake Titicaca, and Lagunillas and Arapa lagoons (Chura & Mollocondo, 2009). The main production facilities are located in the districts of Chucuito (Puno) and Arapa (Azángaro). Puno is the largest producer of trout (ca., 29,000 t in 2013) and the regional government has several initiatives to boost production. Chura & Mollocondo (2009) estimated at 40,000 t/year the potential production of trout in floating cages in the Peruvian sector of Lake Titicaca. There is also extensive farming done by planting trout in smaller bodies of water, which negatively impacts native fish fauna. Aquaculture production is regulated and there is an office for aquaculture land registry. The main areas for trout farming in the Peruvian TDPS side are: (i) South Zone (Faro-Pomata, Chucasuyo, Kajje and Olla-Juli, Cachipucara-Pilcuyo, Charkas-Platería, Barco, Cusipata-Chucuito), and (ii) North Zone (Lagunillas-Santa Lucia lagoon, Arapa-Arapa lagoon, Miajachi-Vilquechico-Huancané and Jacantaya-Moho) (MINCETUR, 2006). Smaller-scale trout producers or those using artisanal production systems are affiliated with organizations of fishers. On the other hand, there are also large production companies that are awarded areas for trout production in Lake Titicaca by the Ministry of Production of Peru (PRODUCE). These concessions include large scale companies like Piscifactoría de los Andes SAC and River Fish SA, located on Lake Titicaca, and Arapa, San Pedro, San Pablo SAC, which operates in the Arapa lagoon (Chura & Mollocondo, 2009).

75. There are concerns about the environmental impact of cage-based fish farming and the planting of introduced species in smaller water bodies (extensive farming). Improper handling of floating net cages releases nutrients into the environment (mainly phosphorus) and this alters the biodiversity of the lake and river beds (Beveridge, 1986; Mariano et al., 2010). Also, there is the practice of using ispi to feed trout in cages for fattening.

76. There are at least three experiences regarding support to fish farming:

- The ALT program on Promotion of Fisheries Productive Chain (PROCAP, in Spanish) for processing and giving added value to aquatic resources, including equipment and the installation of a processing plant for canned trout with a capacity of 177 t/year in Unicachi (PER), the creation of a municipal management company (Unicachi), and a technology transfer and personnel training initiative (Unicachi and Jinchaca in Bolivia).
- The ALT Program for Recovery of Native Fish Species (REINA, in Spanish) that has intervened on the islands of Anapia and Suana (PER), where they built and installed laboratories for the production of

[32] The main references are FAO (1977), Pedini Fernando-Criado (1984), and Pulido (2005).

eggs and fingerlings of native species and executed comprehensive technology transfer to the municipality of Anapia. Installation of genebanks in protected areas in both countries is also expected.

- The departmental government of La Paz, along with the Fishing Federation of La Paz, conducted a project for the repopulation of native species; the project concluded in 2015.

Mining

77. The TDPS has many mineral deposits (Map 14). However, one of the main problems identified is water and soil pollution as a result of mining. There is formal, informal, and illegal mining operations in theTDPS. Formal mining is the largest and has all the permits required by the state. Informal mining is done by small cooperatives. Both countries are seeking the gradual formalization of informal mining activities. Finally, illegal mining is primarily focused on gold extraction.

78. Mining production is mainly focused on tin, zinc, and silver. Tin is produced mainly in the mining town of Huanuni (Bolivia), which pours liquid industrial waste into Lake Poopó. The Huanuni mine belongs to the Bolivian Mining Corporation (COMIBOL), a state-run company. Tin and silver production increased between 2006 and 2008, then dropped in 2011 and now production has increased again. In September 2011, Oruro contributed to Bolivian exports 950,746 t of tin, with a value of Bs. 4,724,437 (Figure 5). The following years, 2012 to 2015, production levels were maintained, although international prices fell. Mineral exports generate departmental royalties, and therefore mining is key to the development of Oruro.

79. There is significant gold production in the TDPS, but production data seem unreliable. In 2006 only 805 kcf were reported in the Peruvian sector after the production reached more than 100,000 kcf in 2005, afterwards production increased to more than kcf 2,000,000 in 2007, followed by low levels in the subsequent years (Table 14).

In the Bolivian sector of TDPS there are two main areas of gold production:

a. An area on the north bank of Lake Titicaca, in the Apolobamba range, where the headwaters of Suches River are located (municipalities of Pelechuco and Charazani in the department of La Paz). There are associations of unspecified numbers of informal miners (they are not registered with any governmental office and do not have operation permits).

b. An area in the department of Oruro: San Bernardino, La Joya, Kori Kollo, Iroco, Kori Chaka. The Inti Raymi Company operates in Caracollo.

Puno is an important area for artisanal gold production. The major production areas are Ananea and La Rinconada (Ramis river basin in San Antonio de Putina Province), with a potential of 50 t/year. This potential is not fully exploited because of governmental control in the area, since the Ramis River region is the zone most polluted with mercury. Nevertheless, it is a paradox that San Antonio de Putina is the province with the largest gold wealth and in turn is among the poorest provinces in the Puno region as it as the highest rates of NBI. In 2010, there were 16 legally constituted companies with recognized concessions or in the process of obtaining such concessions in Puno (Table 15).

80. Regarding informal mining in the Puno region, according to the Regional Directorate of Energy and Mines, about 5,000 informal miners were identified, who have developed this activity for about 15 years. In San Antonio de Putina, informal miners extract gold in the Ramis River basin and in the Pampa Blanca district. However, according to comments by an ANA officer[33], in 2015 there were intentions to formalize approximately 11,000 informal miners. Informal miners who make such requests for formalization work in small cooperatives. This is a good reference to understand the magnitude and importance of these organizations in the TDPS system.

[33] Comments by Ing. Wilber Laqui (ANA officer). PRODOC validation workshop, La Paz, July 30-31, 2015.

81. At the head of the Suches River basin there is significant mining activity, in both countries. In the province of Carabaya, illegal mining operations extract gold in the basins of El Carmen and La Oroya. In Sandía, illegal miners have been identified in Huajchani and Ancocala.

82. It is worth mentioning that informal gold mining operations in Peru extract gold from concessions owned by formal businesses. In some cases, formal companies have agreements with informal operators for the exploitation of minerals. However, there are informal miners who take mine concessions by force, thus creating conflicts.

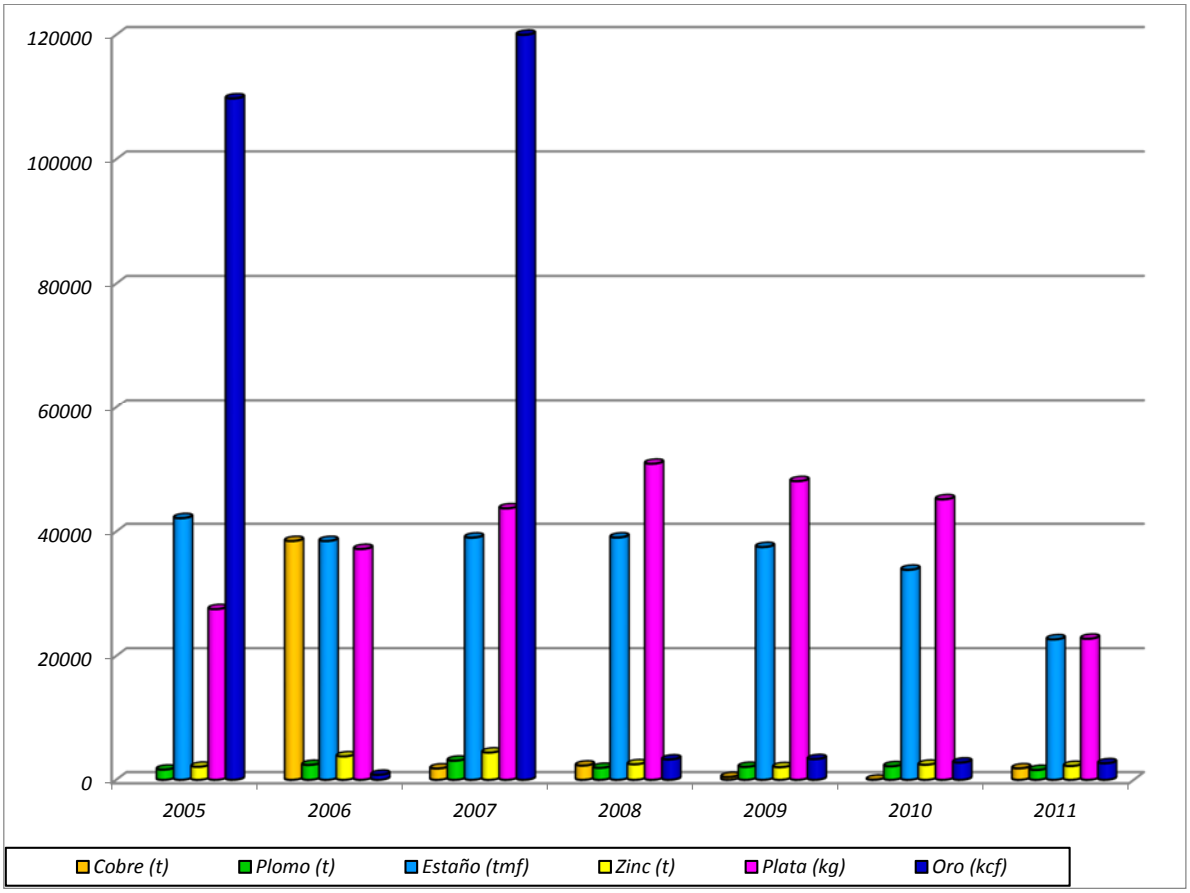

Figure 5. 2005-2011 mining production.

Table 14. Mining production on the Peruvian side of the TDPS (2005-2011).

	Year						
Products	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Copper (t)	__	38.470	1.830	2.299	4.45	21	1.852
Lead (t)	1.646	2.404	3.089	1.931	2.088	2.184	1.588
Tin (tmf)	42.145	38.470	39.019	39.037	37.503	33.848	22.663
Zinc (t)	2.106	3.788	4.406	2.507	2.041	2.432	2.231

Silver (kg)	27.527	37.191	43.721	50.893	48.096	45.180	22.764
Gold (kcf)	109.770	805	2.081.393	3.287	3.342	2.788	2.671

Source: INEI (2011).

Table 15. Legally established companies on the Peruvian side of Titicaca and Desaguadero Basins (2010).

Company		Unit	Type of Investment	Province	District
1	Corporación Minera Ananea S.A.	Ana María	Operation	S. A. de Putina	Ananea
2	Newcrest Resources Inc. Peruvian Branch	Antaña	Exploration	Azángaro	Santiago de Pupuja
3	Arasi Sac	Arasi	Expansion	Lampa	Ocuviri
4	Minera Frontera Pacifico Perú S.A.	Calvario ii	Exploration	Carabaya	Corani
5	Minera Frontera Pacifico Perú S.A.	Calvario iii	Exploration	Carabaya	Corani
6	Cori Puno S.A.C.	Cartagena	Operation	Sandia	Quiaca
7	Solex del Perú S.A.C	Chuyo chuya 4	Exploration	Carabaya	Macusani
8	Minera Frontera Pacifico Perú S.A.	Condorillo	Exploration	Carabaya	Corani
9	Bear Creek Mining Company - Peruvian Branch	Corani	Exploration	Carabaya	Corani
10	Strike resources Peru S.A.C	Lituania 3	Exploration	Carabaya	Crucero
11	Minergia S.A.C	Macusani	Exploration	Carabaya	Corani
12	Canper exploraciones S.A.C	Pinaya	Exploration	Lampa	Santa lucia
13	Solex del Perú S.A.C	Princesa 2	Exploration	Azángaro	Potoni
14	Minsur S.A.	San Rafael	Expansion	Melgar	Antauta
15	Bear Creek Mining Company - Peruvian Branch	Santa Ana	Exploration	Chucuito	Huacullani

Source: MINEM (2015).

Tourism

83. Tourism in the TDPS is concentrated in the Lake Titicaca and nearby areas, due to its scenic beauty and archaeological sites on the islands and their surroundings. The other hydrographic units have no tourism potential, although the Sajama National Park (Map 7) is receiving an increasing influx of tourists.

84. In the Bolivian sector, both the southern bank of Lake, with Tiahuanacu, as well as the peninsula of Copacabana and Isla del Sol, receive large numbers of foreign and domestic tourists, in two seasons: (1) Latin American tourists come in Winter (June to August) and (2) Europeans, North Americans, and tourists from the rest of the world come in Summer (December to February). The north bank of the lake, with Huarina, Chúa, Compi, Huatajata, and Tiquina, especially receives domestic tourism. Domestic tourism involves the displacement of thousands of people from the two cities close to Lake Titicaca (La Paz and El Alto) and this puts pressure on all the municipalities of the north bank of the Lake. The organization of tourism activities in Bolivia is an example of what has been called “plural economy”, this is an activity that articulates private companies —that offer tour packages especially hotels, buses,

catamarans, and yachts— and microenterprises that offer boats. Also, there are other links in the tourism value chain that include communities and associations that offer lodging, food, boats, and horseback riding. Although tourism is an industry appropriately labelled "smokeless" and generates income for thousands of Bolivians, it can also put pressure on the resources of Lake Titicaca, especially in relation with the small but existing pollution derived from hotel sewage and plastic waste on beaches and places used for sightseeing.

85. Tourism is an important activity in the Peruvian sector of Lake Titicaca, especially in tourist centres located on the shores of the lake. The flow of tourists is very variable (Table 16); there were years in which more tourists visited these areas, for example 2009 and 2011. A year when there was less influx of tourist was 2008. Tourists are mostly domestic, both those arriving from provinces of Puno for the day and those who stay overnight. In the case of foreigners, they mostly stay overnight in accommodation centres that exist in Puno. The main tourist resources are: (i) the city of Puno, (ii) Lake Titicaca, the "Aymaras" tourist corridor, (iii) the Quechua tourist corridor, and (iv) the north of Lake Titicaca tourist corridor. Since traditionally there has been Aymara and Quechua presence in the Peruvian side of the TDPS, there are about 300 ethnic and folk dances in the area. There are dances of colonial origin satirizing the Spaniard conquerors and mestizo dances. Given the growth of tourist arrivals, hotel infrastructure has increased considerably. In 2010 there were 262 lodging establishments, which represented a growth of 20% between 2005 and 2010 (Regional Government of Puno, 2011).

Table 16. Arrival of tourists by nationality in Puno (Peru).

	Year						
Variable	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Domestic	174.305	195.602	216.919	209.082	236.104	234.765	249.462
Foreign	157.957	177.249	203.739	184.256	186.680	179.035	196.955
Total arrivals	**332.262**	**372.851**	**420.658**	**393.338**	**422.784**	**413.800**	**446.417**
Domestic	200.688	257.000	276.165	344.296	296.877	298.442	321.219
Foreign	173.481	267.032	309.103	270.214	288.917	291.141	298.346
Total overnight stays	**374.169**	**524.032**	**585.268**	**614.510**	**585.794**	**589.583**	**619.565**

Source: INEI - Dirección Regional de Comercio Exterior y Turismo (DIRCETUR) - Dirección de Turismo de Puno.

Institutional context

Bolivia

86. The Ministry of Foreign Affairs of Bolivia (MRE-B) represents the State in the international arena. The Directorate General of Limits, Borders, and International Transboundary Waters is responsible for promoting the management of international waters and transboundary basins. For binational management of the TDPS, the MRE-B conducts and coordinates with its Peruvian counterpart activities of ALT, the Binational Technical Commission Maure-Mauri River (CTB Maure-Mauri), the Binational Technical Commission on Suches River (Suches CTB), and other instances of binational coordination. It also manages and develops binational presidential meetings and follows agreements established by the Binational Cabinet of Ministers of Peru and Bolivia.

87. The Ministry of Environment and Water (MMAyA) is the governing body in the areas of integrated water resources management, irrigation, sanitation and environment. In regards to water resources, it is

responsible for the formulation and implementation of a comprehensive water policy that ensures the priority use of water for life while managing, protecting, guaranteeing and prioritizing suitable and sustainable use of water and respecting traditions and customs of the native indigenous farmer organizations.

MMAyA has three Vice Ministries, who are related to the topic of this project:

i. The Vice Ministry of Water Resources and Irrigation which develops specific actions on water resources and irrigation even in transboundary basins. The Vice Ministry directs and coordinates the National Basin Plan[34] (PNC) (MdA, 2007), the Master Plan for the Katari Basin (PSCK), the Master Plan for the Poopó Basin, and the National Irrigation Development Plan.
ii. The Vice Ministry of Drinking Water and Basic Sanitation is responsible for aspects of drinking water, sewage, and solid waste management.
iii. The Vice Ministry of Environment, Biodiversity, Climate Change and Forest Management and Development (VMABCCGDF) is responsible for the management of biodiversity, climate change, and environmental management of productive activities.

MMAyA oversees several institutions, among them: (i) the National Protected Areas Service (SERNAP) which is a decentralized entity under the VMABCCGDF, (ii) the National Meteorology and Hydrology Service (SENAMHI) which is a decentralized technical agency, (iii) the Plurinational Authority on Mother Earth[35] (APMT), and the Bolivian Operational Unit[36] (UOB). The latter is an advisory body to MMAyA, Foreign Ministry, and other public institutions in all aspects related to water resources.

88. The Andrés Ibáñez Framework Law of Autonomy and Decentralization (Law 031, dated July 19, 2010) provides that the autonomous departmental governments, autonomous municipal governments, and indigenous, farmer autonomous governments are in charge of implementing the general policy on soil conservation, forest resources, and basin conservation and protection[37]. Likewise, Article 7 Paragraph II provides that autonomous governments are repositories of the public trust in their jurisdictions and in order to serve the citizens they pursue the following purposes: preserving, conserving, promoting, and providing, as appropriate, the environment and ecosystems, and contributing to a rational land use and sustainable use of natural resources in their jurisdictions.

Article 88 of Law 031 provides that these levels of government must protect and help protect the environment and wildlife in their jurisdictions. Most departmental development plans consider water as a

[34] The objective of the National Basin Plan is to promote and strengthen IWRM and integrated basin management with an approach based on participation and self-management as the foundation of sustainable human and environmental development, from the perspective of local cultures and life systems.

[35] APMT was created by the Framework Law on Mother Earth and Integral Development for Living Well (Law 300, dated October 15, 2012). It is a strategic and autonomous public law entity with autonomy of administrative, technical and economic management that reports to MMAyA. Supreme Decree 1696, dated August 14, 2013 regulates the operation of APMT and particularly its functions with regard to the fight against climate change.

[36] Pursuant to Article 14 of the ALT Statute and Supreme Decree 28939 (dated November 22, 2006) that created the Bolivian Operational Unit of the Binational Authority of Lake Titticaca.

[37] Article 87, paragraph IV: According to the concurrent jurisdiction of Numbers 4 and 11 of Paragraph II in Article 299 of the Bolivian Constitution, the competencies are distributed as follows:

1. Autonomous departmental governments:

a) Implement the general policy on conservation and protection of basins, soil, forests, and forest resources.

2. Autonomous municipal governments:

a) Implement the general policy on soil conservation, forest resources, and forests in coordination with the autonomous regional government.

b) Implement the necessary activities and mechanisms for the implementation of the general soil policy.

3. Indigenous, farmers' autonomous governments:

a) Management and sustainable use of forest resources in the context of the policy and regime established by the central State level, in accordance with competence in Numeral 3, Paragraph III of Article 304 of the Constitution.

b) Implement the necessary activities and mechanisms according to their own rules and procedures to implement the general soil and watershed policy.

primary resource, while a number of departments also have a basin management plan that defines priority actions for the conservation of water resources. Furthermore, Article 89 of the law determines that those entities have exclusive competence to establish their system of water resources management and services that include regulations regarding water use.

89. The Autonomous Departmental Government of La Paz (GADLP) is a public institution that comprises a Departmental Assembly with deliberative, supervisory, and legislative competence in the department according to its attributions, and an executive body, headed by the Governor in his/her capacity of as the highest executive authority.

The organizational structure of GADLP[38] has several levels. In regards to TDPS, at the level of support and control there is a Directorate of Early Warning and Risk Prevention. At the Executive and Operational Level there are: (i) a Departmental Secretariat for Development Planning, (ii) a Departmental Secretariat of Mining, Metallurgy and Hydrocarbons, (iii) a Departmental Secretariat on the Rights of Mother Earth, with a Department of Natural Resources, and (iv) a Departmental Secretariat of Tourism and Culture along with a Department of Tourism.

Supreme Decree 24176 (dated December 8, 1995) indicates: the Prefecture of La Paz, currently the Departmental Government of La Paz, is the competent environmental authority in the jurisdiction of the Department. Article 40 provides that prefects (currently departmental governors), through their environmental agencies, are responsible for implementing the Environmental Action Plan in their respective departments.

The legal GADLP bases and regulations regarding TDPS consist primarily of laws[39] and departmental decrees[40].

90. The Autonomous Departmental Government of Oruro (GADOR) is a public institution that comprises a Departmental Assembly, with deliberative, supervisory, and legislative attributions in the scope of its departmental powers, and an executive body, as indicated in Article 277 of the Constitution. The structure of its secretariats and directorates is similar to those of GADLP and is regulated by Law 031, cited above. GADOR implemented, with support from the European Union, the Program for Sustainable Management of Natural Resources in the Lake Poopó Basin.

91. Article 83 of Law 031 provides that the autonomous municipal governments are responsible for providing potable water and sewage services, and article 88 provides that departmental and municipal

[38] Departmental Law 042, dated April 5, 2013.

[39] The relevant departmental laws are:

1. Law 005 (dated October 20, 2010) on attention of emergencies and natural disasters.
2. Law 033 (dated December 3, 2012) declaring the Department of La Paz as a mining department.
3. Law 036 (dated October 7, 2012) declaring departmental mourning due to a tragedy in Lake Titiaca.
4. Law 049 (dated October 31, 2013) declaring the Challapata peninsula, in Escoma Municipality, Eliodoro Camacho Province of La Paz, an Archaeological, Historical, and Cultural Heritage of the Department.
5. Law 072 (dated October 17, 2014) declaring the integrated management of Suches River Basin a departmental need and priority.
6. Law 096 (dated May 28, 2015) declaring the tourist route Escoma – Península de Challpata (Eliodoro Camacho province) part of the departmental road network.

[40] The relevant departmental decrees are:

1. Departmental Decree 004/2010 (dated June 15, 2010) on the prohibition of deterioration of the environment.
2. Departmental Decree 009/2011 (dated January 3, 2011) on the permanent and strict ban on using wildlife species and specimens.
3. Departmental Decree 011/2011 (dated February 15, 2011) on the prohibition of irrational use and sale of water for recreational purposes.
4. Departmental Decree 018/2011 (dated June 27, 2011) which declares the Department of La Paz as the Capital of Mountaineering in order to promote mountain tourism in the mountain range region of the department, which includes the majestic snowcapped mountains of Illimani, Illampu, Huayna Potosi, Mururata, and others.
5. Departmental Decree 049/2014 (dated January 27, 2014) on management and control of fisheries and aquaculture activities in the Department of La Paz.
6. Departmental Decree 069/2014 (dated April 20, 2015) called "Departmental Basin Plan."
7. Departmental Decree 071/2015 (dated May 6, 2015) called "Departmental Mining Plan of La Paz."

governments are in charge of regulating and implementing, within their jurisdiction, their policies and systems to address solid, toxic, and industrial waste.

92. The Ministry of Mining and Metallurgy is responsible for implementing policies on mining and metallurgy as well as regulating and planning the national mining development. The legal basis for the mining industry is the Mining and Metallurgy Law (Law 535, passed in 2014). The Mining Corporation of Bolivia (COMIBOL) is responsible for managing the productve chain of state-run mining.

93. The Mining Administrative Jurisdictional Authority (AJAM) was created by Law 535 as an autonomous body under the supervision of the Ministry of Mining and Metallurgy and is in charge of overseen, supervising and monitoring of all mining activities in Bolivia. The institutional objectives of AJAM include:

a. Implementing legal actions against individuals and/or companies that perform illegal mining and controlling compliance with legal and contractual obligations,

b. Developing, updating, and implementing an efficient technical administration and management of mining cadaster and grid by means of a an integrated, computerized information system, and

c. Receiving and processing applications for adaptation, licenses, and mining contracts pursuant to Law 535 and implementing procedures for the legal protection of mineral rights.

94. The Ministry of Rural Development and Land (MDRyT)[41] is in charge of defining and implementing policies to promote, facilitate, regulate and coordinate the integrated rural development of agriculture, forestry, aquaculture, and coca in a sustainable manner and promoting a new ownership structure and access to land and forests in the country, as well as generating decent jobs for the benefit of producers, communities and rural economic organizations, indigenous people, and the business sector, following the principles of quality, equity, inclusion, transparency, reciprocity and cultural identity in search of food security and sovereignty to live well.

95. The Decentralized Public Institution on Fisheries and Aquaculture (IPD-PACU) is the national body in charge of managing, implementing, and executing programs and projects for integrated development of aquaculture and fisheries. It also supports research and promotion of alternatives to improve production systems for fisheries and aquaculture in coordination with other public and private entities. The IPD-PACU[42] was created by Supreme Decree 1922 (dated March 12, 2014) as an agency of the Vice Ministry of Rural and Agricultural Development of MDRyT. IPD-PACU operates through three units for the Altiplano, Plata, and Amazon Basins.

Peru

96. The Ministry of Foreign Affairs of Peru (MRE-P) is in charge of leading the foreign policy of the Republic of Peru. For the binational management of the TDPS, the MRE-P, in coordination with the National Commission for ALT, directs and approves the activities of ALT and, in coordination with its Bolivian counterpart, leads and coordinates the Binational Technical Commission of Maure-Mauri River, the Binational Technical Commission of Suches River, and other existing coordination bodies. It also coordinates and conducts presidential binational meetings, and follows up on the commitments of the Binational Cabinet of Ministers of Peru and Bolivia.

97. The Ministry of Environment of Peru (MINAM) is the environmental authority in charge of implementing the four strategic areas of environmental management in the country. MINAM functions are: (1) formulating, managing, and implementing the National Environmental Policy, applicable to all levels of government, (2) ensuring compliance with environmental standards and the implementation of

[41] Supreme Decree 29894 (dated February 7, 2009) which creates MDRyT.

[42] IPD-PACU replaced the Bolivian Center for Aquaculture Research and Development (CIDAB) (created in 2000). Supreme Decree 1922 extinguished CIDAB and transferred its rights and obligations to MDRyT.

the General Environmental Law (3) coordinating the implementation of the National Environmental Policy with the sectors, regional governments, and local governments, and (4) providing technical support to regional and local governments for the proper performance of functions transferred under the decentralization policy. In relation to this project, MINAM (1) formulates and manages the National Environmental Action Plan[43] and the National Environmental Action Agenda; (2) conducts the National System of Environmental Impact Assessment; (3) leads the National Service of Natural Areas Protected by the State (SERNANP); (4) promotes and coordinates the proper management of solid waste; and (5) develops and proposes policy and national strategies for management of natural resources and biodiversity.

The Vice Ministry of Environmental Management, through the Directorate General of Environmental Quality, (1) designs and supervise the implementation of instruments for environmental prevention, control and rehabilitation, and (2) proposes criteria for the development of prevention, de-contamination, and treatment of environmental liabilities, and plans for environmental emergencies, and oversee their implementation. In addition, in coordination with competent sectors, it promotes implementation of policies for integrated management of chemical substances and products.

The Vice Ministry of Strategic Development of Natural Resources through the Directorate General for Climate Change, Desertification, and Water Resources develops, update and coordinate the National Climate Change Strategy, and prepares the national water resources policy in coordination with the Vice Ministry of Environmental Management. It aslo provides technical assistance to regional and local governments for the development of their water and climate change policies.

Regarding this project, the National Meteorology and Hydrology Service of Peru (SENAMHI) and SERNANP are ascribed to MINAM.

98. The Ministry of Agriculture and Irrigation (MINAGRI) leads the agrarian policy. The Vice Ministry of Agrarian Policy generates and evaluates policies and coordinates with other sectors of government. The Vice Ministry of Agrarian Development and Infrastructure and Irrigation covers the development of agribusiness, land management, and environmental management and irrigation infrastructure. This Vice Ministry is the head of the Binational Lake Titicaca Special Project[44] (PELT) that develops management and conservation activities on behalf of the natural resources in the lake. In terms of this project, the National Water Authority (ANA) and the National Forest Service and Wildlife[45] (SERFOR) depend on MINAGRI.

99. The National Water Authority (ANA) is the governing body and the highest technical and regulatory authority of the National Water Resources Management System (SNGRH). ANA is an entity ascribed to MINAGRI with national jurisdiction to ensure integrated, participatory and multisectoral water management and is in charge of articulating the actions of public and private organizations involved in such management. It is the agency in charge of preparing the national policy and strategy on water

[43] The plan includes among its strategic goals by 2021:

- Goal 1. 100% of urban sewage water is treated and 50% is reused.
- Goal 2. 100% of solid wastes at the municipal level are handled, recycled, and disposed of properly.
- Goal 4. Reducing to zero the rate of deforestation in 54 million hectares of primary forests under various categories of land use; this contributes, along with other initiatives, to reduce 47.5% of GHG emissions generated by change of land use in the country; this also reduces vulnerability to climate change.
- Goal 6. Mining and Energy: 100% of artisanal and small scale mining implements and/or has environmental management tools; and 100% of large and medium mining and energy companies improve their environmental performance.

[44] The mission of PELT is to develop integrated binational actions for management and conservation of natural resources in Lake Titicaca (TDPS) by hydraulic infrastructure, water and aquatic studies, projects for agricultural and livestock development in areas with irrigation, incorporating techniques in Andean agro-ecological systems as well as environmental management actions and projects related to fisheries in order to promote sustainable regional development. PELT activities have included the repopulation of native species in Lake Titicaca.

[45] SERFOR is the national forest and wildlife authority, linked with various public and private agencies to ensure compliance with the National Policy and Law on Forestry and Wildlife.

resources, the national plan on water resources, and the guidelines for the preparation of water management plans in the waterbasins, their approval and supervise their implementation. ANA operates nationwide through decentralized agencies called Water Management Authorities[46] (AAA) that conduct water resources management and the operation of Local Water Agencies (ALA) in their respective territories. ANA coordinates with the Ministry of Foreign Affairs the signing of muti-national agreements related to integrated management of water resources in transboundary watersheds. The entity also supports the establishment and operation of the River Basin Water Resources Councils (CRHC)[47] and is in charge of approving the hydrographical demarcation of the river basins of the country.

100. The Ministry of Production (PRODUCE) is the governing body in charge of national and sectoral policies in industry and fisheries. The Vice Ministry of Fisheries formulates and guides the implementation of policies and regulation compliance by fisheries and aquaculture operations; this includes issuing fishing permits and aquaculture rights (licenses and concessions). An entity under PRODUCE is the Institute of the Sea of Perú (IMARPE), a research institution that generates knowledge and provides advice to the ministry on management and regulation of matters related to fisheries and aquaculture. IMARPE conducts research on the fisheries of Lake Titicaca and trout farming and has a decentralized laboratory in the city of Puno (IMARPE Sede Puno).

101. The Ministry of Energy and Mines (MINEM) is the governing body of the energy and mining sector in the country. The Vice Ministry of Mines oversees mining activities, including formalization, environmental management, and management of environmental liabilities.

102. In order to remedy the problem of informal and illegal mining, mainly in the basins of the rivers Ramis and Suches, through the Presidency of the Council of Ministers, a High Commissioner of Formalization, Illegal Mining and Environmental Remediation Affairs (ACAFMIRA), was created. Its main functions are: (i) formalization of small-scale mining and illegal mining, (ii) interdiction of illegal mining, and (iii) environmental remediation.

103. The Ministry of Housing, Construction, and Sanitation (MVCS) is in charge of managing the supply of potable water, sewerage, wastewater treatment, and excreta disposal. They implement national programs for urban and rural sanitation.

104. The Puno Regional Government (GOREPUNO) is a key stakeholder in the TDPS system through its operational units. In regards to its institutional structure, the Regional Government of Puno is headed by a regional president and a Vice President, who are elected by popular vote. Recently, the Peruvian government changed the titles of president and vice-president for those of Governor and Vice Governor. The Regional Council is in charge of issuing regulations. Under the regional governor, there is a regional general management office that oversees administrative and technical management offices. The technical management offices are: (i) Regional Planning Office, (ii) Regional Economic Development Office, (iii) Regional Management of Social Development Office, (iv) Regional Infrastructure Management Office, (v) Regional Office for Natural Resources and Environmental Management. These technical managements, as operational arms, have sub-manager offices, directorates, and special projects. Given the recent institutional reforms in State structure, many of the directorates and special programs created previously were reassigned to new regional offices. The management office with the highest influence on TDPS affairs is the Regional Office for Natural Resources and Environmental Management.

[46] There are 14 AAAs in the country, identified with Roman numerals and the name of the main river basins. For this project, the relevant ones are I AAA Caplina - Ocoña, which includes ALA Tacna where is part of the head of the Maure River, and XIV AAA Titicaca, which includes the ALAs Ramis, Huancané, Juliaca, and Ilave.

[47] Article 24 of the Water Resources Law (Law 29338) provides that the basin councils are permanent bodies and members of the National Water Authority. They arte created by Presidential Decree, upon initiative of the regional governments, to participate in the planning, coordination, and cooperation for sustainable use of water resources in their respective areas. The CRHC Titicaca (with participation in the AAA Titicaca) is in the process of being established.

105. The Multisectoral Commission for Environmental Prevention and Recovery of the Lake Titicaca Basin and Tributaries[48] is a permanent body, chaired by MINAM, which coordinates the implementation of actions for integrated environmental prevention and recovery of Lake Titicaca and its tributaries. The commission has seven working groups: (1) current status of investments, (2) council on basin water resources, (3) investment program, (4) international cooperation, (5) environmental research, (6) environmental enforcement, and (7) Coata group. The latter is a specific group for the lower basin of Coata river, established in January 2015 that focuses on discussing and analyzing an alternative definitive solution to provide potable water to the lower basin of the river and establish a technical committee to analyze environmental recovery measures in the river.

Binational

106. The governments of Bolivia and Peru have created a number of entities for bilateral cooperation in the TDPS. These include ALT, BTC Maure-Mauri, BTC Suches, and the Binational High Level Commission for Lake Titicaca.

107. The Binational Autonomous Authority for the Water System of Lake Titicaca, Desaguadero River, Lake Poopó and Salar de Coipasa is an international public law entity with full autonomy of decision and management on technical, administrative, economic, and financial matters that reports the Ministries of Foreign Affairs of Peru and Bolivia. The President of ALT reports directly to the foreign ministers of both countries, serves and complies with joint policy decisions made by both entities. ALT was created in 1996 by an exchange of notes between the governments of Bolivia and Peru that approved the statute and regulations for economic and financial management of the ALT; the reversal notes were ratified by legislative resolutions in both countries[49]. The aim of ALT[50] is to promote and conduct activities, programs and projects, and to adopt and enforce standards for planning, management, control, and protection of water management in the TDPS within the context of the Binational Master Plan for the TDPS Water System. ALT has a broad set of functions described in Article 6 of its statute, among which are: (i) ensuring proper enforcement of PDGB and improving and updating this plan, (ii) exercising authority over water and hydrobiological resources that are important for both countries in the TDPS, by establishing standards, operating rules, and recommending measures to be taken in extreme events (droughts, floods), (iii) ensuring maintenance and operation of the information systems, (iv) establishing guidelines for development and management of water and aquatic resources, and (v) encouraging close interagency coordination. ALT has two operating national authorities[51]: (1) the Binational Lake Titicaca Special Project, and (2) the Bolivian Operational Unit[52] (UOB). These operational agencies are in charge of implementing the annual plans that evaluate the PDGB. Annex 3 contains a detailed functional description of ALT.

108. The governments of Bolivia and Peru have agreed to update and modernize the institutional management instruments of ALT. The presidents instructed, through the 2010 Ilo Declaration[53], the creation of a binational *ad hoc* ALT Management Group to prepare and propose a new institutional structure for ALT, its organic statute, and program guidelines for a new Global Master Plan that is consistent with the economic, environmental, and social realities in the TDPS and with the needs and

[48] Created by Supreme Decree 075-2013-PCM (dated June 19, 2013).
[49] Legislative Resolution 26873 of the Congress of the Republic of Peru (dated November 10, 1997) and Law 1972 of Bolivia (dated April 30, 1999).
[50] Established in Article 4 of the ALT statute.
[51] Established in Article 14 of the ALT statute.
[52] UOB is a decentralized public institution that depends on MMAyA.
[53] The Ilo Declaration was signed by the Presidents of the Republic of Peru, Alan Garcia Perez, and of the Plurinational State of Bolivia, Evo Morales, in the city of Ilo, on 19 October 2010. See Annex 4.

requirements of the people residing in the TDPS. In June 2015[54], the presidents asked the Ministries of Foreign Affairs to propose measures to strengthen the functions of ALT. Also, an action plan was signed with specific commitments on ALT, CTB Suches and Maure-Mauri CTB.

109. The Binational Technical Commission on Maure-Mauri River was established in February 2003 to coordinate joint actions to manage the Maure-Mauri River Basin[55]. In 2010, the Ilo Declaration reaffirmed the political will to conclude a bilateral agreement on equitable and sustainable use of the river waters and the Declaration of Isla Esteves agreed to initiate the development of a binational management plan.

110. The Binational Technical Commission on Suches River (Bolivia - Peru) was created in 2010 to coordinate actions for mitigating mining pollution and developing a master plan for sustainable management of the Suches River Basin[56]. In the Ilo Declaration, the presidents agreed to declare the Suches River a "Critical Zone of Environmental Damage with Binational Priority" (Annex 4). The Isla Esteves Declaration agreed to adopt coordination measures to tackle illegal mining and related crimes in the border zone and to approve in the second semester of 2015, the Binational Master Plan for the Sustainable Management of Suches River Basin and the Binational Monitoring Plan for Water Quality and Sediment,

111. The Binational High Level Commission for Lake Titicaca was established as part of the commitments agreed at Esteves Island in 2015 (Annex 5). The presidents instructed the Ministries of Foreign Affairs of both countries to coordinate this committee and define within 90 days the guidelines and actions for environmental and biodiversity restoration in the lake, with an emphasis in the area of the Lago Menor.

Political and legal context

112. At the binational level, the project is part of agreements and commitments established by both countries:

- Use of water resources in terms of bilateral commitments and decisions. On 19 February 1957, Bolivia and Peru signed in La Paz, the Agreement for the Preliminary Economic Assessment of the Use of Lake Titicaca Waters that incorporated the concept of indivisible and exclusive condominium that both countries exercise over Lake Titicaca. In the 2010 Ilo Declaration, the presidents reaffirmed the legal status of the condominium of the waters of Lake Titicaca, as well as bilateral agreements in matter pertaining to ALT, and the obligation that commits both countries to harness the use of these unique resources based solely and exclusively on the basis of bilateral agreements and decisions within policies for environmental protection, in order to ensure the sustainable local development while excluding any unilateral use or diversion of waters (Annex 4). Additionally, in the same Ilo Declaration, the presidents reaffirmed that neither Bolivia nor Peru, in no case will unilaterally use the waters of the international rivers they share, with either continuous or successive course, in full and strict compliance with existing bilateral treaties and international law. In addition, in Paragraph 7 of the Esteves Island Declaration of 2015 (Annex 5), the presidents reaffirmed the obligations and rights that commit both countries to harness the water resources in TDPS for the benefit of their people according to agreements and bilateral decisions that contemplate equitable use while excluding any and all unilateral use and deviation.
- Upgrading the structure of ALT and the PDGB. In 2010 through the Declaration of Ilo, the presidents expressed their decision to upgrade and modernize the institutional management instruments

[54] The Esteves Island Declaration was signed during the presidential meeting and first meeting of the Peru-Bolivia Binational Cabinet of Ministers, by the Presidents of the Republic of Peru, Ollanta Humala Tasso, and of the Plurinational State of Bolivia, Evo Morales, in Esteves Island (Peru) on 23 June 2015. See Annex 5.

[55] Part of the Desaguadero River hydrographic unit (Figure 3).

[56] Part of the Lake Titicaca hydrographic unit (Figure 3).

and adapt the ALT and the PDGB to the new economic, environmental, and social realities in the TDPS (Appendix 4). Additionally, in 2015 through the Declaration of Esteves Island, the presidents agreed to instruct their ministries of foreighn affairs to propose measures to strengthen institutions and functions of ALT (number 10), and pledged to allocate, in the shortest term possible, resources needed to carry out a water study and to update the master plan (number 7). As part of the Working Group on Transboundary Water Resources contained in the Esteves Island Action Plan, the parties signed Commitment 3, that consisted in reaching consensus on a proposed new organic statute for ALT before the next Binational Cabinet, and Commitment 4, that consisted in updating the PDGB and ensuring financing to complete the upgrade as soon as possible (Annex 5).

- Recovery of Lake Titicaca. Through the Esteves Island Declaration, the presidents mandated the creation of a Binational High Level Commission (coordinated by the ministries of foreign affairs) to define the guidelines and actions for environmental restoration of Lake Titicaca and its biodiversity, with an initial emphasis on the Lago Menor (Commitment 1 of the Working Group on Transboundary Water Resources) (Annex 5).
- Integrated Management of Maure-Mauri River Basin. The Ilo Declaration includes a reaffirmation of the political will to conclude a bilateral agreement on equitable and sustainable use of waters of Maure-Mauri River (Appendix 4). In addition, in the Declaration of Esteves Island, the presidents agreed to consolidate and validate the binational hydrological model, begin preparing the Binational Management Plan based on the approved design, and establish a binational network of automated hydrometeorological stations (Commitment 4 of the Working Group on Transboundary Water Resources) (Annex 5).
- Addressing mining pollution in Suches River. In the Declaration of Ilo, the presidents declared that Suches River was a "Critical Zone of Environmental Damage with Binational Priority" (Annex 4). In the Declaration of Esteves Island, the Presidents instructed the competent offices to determine and implement joint actions for environmental restoration and monitoring, control, and eradication of illegal and/or polluting mining activities carried out in the area. They adopted a commitment to adopt coordination measures to tackle illegal mining and related crimes in the border zone and to approve, in the second semester of 2015, a Binational Master Plan for Sustainable Management of the Suches River Basin and a Binational Monitoring Plan on Water Quality and Sediments (Annex 5).

Bolivia

113. The project is part of the political and regulatory framework of the Plurinational State of Bolivia, which includes:

1. The New Political Constitution of 2009, which provides, inter alia, that (a) the state will promote the use of and access to water based on the principles of solidarity, complementarity, reciprocity, equity, diversity and sustainability; (b) it is the duty of the state to develop plans for the use, conservation, management, and sustainable exploitation of river basins; (c) any international treaty entered into by the State on water resources will ensure the country's sovereignty and will prioritize the interest of the state; and (d) the state will secure permanent boundary and transboundary waters for conservation of water wealth that contributes to the integration of peoples.
2. The Law on Mother Earth Rights (Law 071, dated 21 December 2010) and the Framework Law on Mother Earth and Integral Development for Living Well (Law 300, dated 15 October 2012). Law 300 establishes the regulatory framework for environmental (Mother Earth) protection, seeking to ensure continuity of the regenerative capacity of its components and habitats. Inter alia, this law: (a) provides rights of nature; (b) guarantees a right to access water on behalf of life[57]; (c) provides that any activity that

[57] There is a specific article promoting the guarantee of the right to water for life and protecting this resource from commodification and

uses water must implement plants/processes for water treatment to minimize pollution; and (d) establishes that mining activities must conduct restoration processes in living areas as well as mitigate damage. The law also creates three mechanisms to address climate adaptation and mitigation.

3. The Andrés Ibáñez Framework Law on Autonomy and Decentralization (Law 031, dated 19 July 2010) sets out the powers of the autonomous regional governments, autonomous municipal governments, indigenous and farmer autonomous governments.

4. Regulations on water resources, including:

a. Article 97 of Supreme Decree 29894, dated 7 February 2009, which establishes as one of the duties of the Vice Ministry of Water Resources and Irrigation that of contributing to the development and implementation of plans, policies, and standards for integrated watershed management and irrigation, as well as developing and implementing policies, plans, programs, and projects related to integrated basin management and irrigation, in coordination with the competent authorities.

b. National Basin Management Plan (PNC), approved by Ministerial Resolution 110, dated 29 December 2006, which has seven strategic components that emphasize the management of transboundary basins according to the Constitution, determine the formulation of management strategies for transboundary basins, monitor the ALT, the Binational Commission for the Development of the Upper Bermejo and Grande rivers in Tarija, and the tri-national Commission for the Development of the Pilcomayo River Basin.
   The PNC defines watershed as a hydrological- ecological unit where the hydrological cycle occurs, that can be described and used as a physical-biological unit, and as a social-political-economic unit for the purpose of planning and management of natural resources for human use; this is the realm in which social management of water and its multiple purposes becomes a territory-based activity.

c. Law 404, passed in 2013, declares that recovery, conservation, use and sustainable exploitation of wetlands are a national priority.

d. Ministerial Resolution 269, dated 8 September 2011, approves using the Pfafsteter methodology for delimitation and coding of watersheds in Bolivia. This use is mandatory in policies and instruments for planning and management of watersheds and water resources.

5. The regulations on environmental management, including:
   a. Environmental Law (Law 1333, dated 27 March 1992) and its regulations (Supreme Decree 24176, dated 8 December 1995).
   b. Bolivian Standard NB/ISO 14004, on Environmental Management Systems, General Guidelines on Principles, and Support Systems and Techniques.

6. Regulations on natural protected areas and wildlife, including:
   a. The new Constitution, promulgated on 25 January 2009, which provides in Article 385 that protected areas are a common good and part of the natural and cultural heritage of the country and that they have environmental, cultural, social, and economic functions necessary for a sustainable development.
   b. The Environmental Law, whose chapters VI and VIII refer, respectively, to flora and fauna, and protected areas.
   c. Supreme Decrees in favor of protected areas:
      i. Supreme Decree 0073 authorizing SERNAP to implement a trust fund for the National System of Protected Areas.
      ii. Supreme Decree 24781 on general regulations for protected areas.

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unsustainable use.

iii. Supreme Decree 24782, which approved the environmental regulations for mining activities. Article 2 was amended by Supreme Decree 28587 to include trade of minerals among the requirements to establishe a fully-fledged mining operation.
iv. Supreme Decree 25158 that provides rules of organization and operation for SERNAP.
v. Supreme Decree 28591 on the general regulation of tourism operations in protected areas.
vi. Supreme Decree 29117, which declares the entire national territory a mining fiscal reserve, comprising metallic and non metallic mineral resources, evaporite resources, precious and semiprecious stones, and brines. The Bolivian State exercises its right of ownership on the fiscal reserve and grants COMIBOL the power and authority to conduct mining exploitation and management.

7. The National Development Plan (approved by Supreme Decree 29271, dated 12 September 2007) is based on the "Living Well" paradigm for development and as a guiding principle in the Constitution; it is linked specifically to nature and social memory and is framed in the concepts of cultural diversity, encounter, and complementarity. On transboundary issues, there is acknowledgment of indigenous peoples, the international protection of biodiversity and water, and this recognition aims to adopt the model of shared responsibility to significantly reduce global warming. The plan also indicates that the basic unit for planning and management of water resources is the watershed, considered primarily as a living space and interculturalism that links public spaces and social management.
8. The Law of Mining and Metallurgy (Law 535, dated 28 May 2014) sets out principles, guidelines, and procedures for: granting, maintaining, and terminating mining rights; developing and continuing mining and metallurgical activities in a responsible, planned, and sustainable manner. It also determines the new institutional structure, roles, and responsibilities of government agencies and mining stakeholders. It also provides the powers and procedures of administrative mining jurisdiction, pursuant to constitutional provisions. In regards to water resources, there are two articles:
    a. Article 111 (Right of Water Use). IV. All integrated or isolated mining activity must implement in operations, the proper management or administration of surface and groundwater resources, thus complying with environmental and sectorial standards in force.
    b. Article 112 (Use of Water). When a holder of a mining operation rights does not have water resources in the area of such mining operation or those are insufficient, the holder may submit a request for water use to the competent authority; the request and the corresponding authorization must not prejudice the rights of use of third parties and life systems of Mother Earth, in accordance to the regulations in force.
9. Declaration of emergency in TDPS hydrographic basins:
    a. Declaration of environmental disaster zone and water emergency of the basin of Quelcata, Tujsahuira, Pallina, and Katari rivers, which flow into Lake Titicaca (Law 2798, dated 5 August 2004).
    b. Declaration of emergency at the departmental level, due to the imminent negative impact on human health and food security caused by the prolonged presence of pollution and salinization of soils in the area of influence of the Huanuni Sub-Basin, Department of Oruro (Supreme Decree 0335, dated 21 October 2009).
10. The plans developed by the autonomous departmental governments of La Paz and Oruro as well as by the municipalities that are part of TDPS.

Peru

114. The project is part of the political and regulatory framework of the Republic of Peru, including:

1. The Constitution of Peru, dated 30 December 1993, which declares that the state determines the national environmental policy, promotes sustainable use of natural resources and the conservation of biodiversity and protected areas.

2. The regulations on water resources include:

a. The Water Resources Law (Law 29338, dated 31 March 2009) establishes management principles, including, among others: (i) the participation of people in decision-making, (ii) respect for the uses and customs of farmer and native communities, (iii) sustainability in the use and conservation of water resources, (iv) decentralization in water management, and (v) participatory integrated management of watersheds. The law created the ANA and basin councils, and provides that the national authority coordinates with the MRE-P the signing of multinational agreements whose purpose is to set up integrated water management in transboundary basins.

b. Legislative Decree 997, called Organic Law of the Ministry of Agriculture that established the creation of the National Water Authority.

c. Supreme Decree 006-2015-MINAGRI, adopted on 12 May 2015, which approved the national policy and strategy on water resources (ANA, 2012).

d. Supreme Decree 005-2015-MINAGRI, dated 3 April 2015, which approved the regulations to Law 30157 (Law of water users' organizations).

3. The rules on fishing and aquaculture include:

a. General Fisheries Law, Decree 25977 (1992).

b. General Aquaculture Law, Decree 1195 (dated 29 August 2015).

c. Regulation of Fishery and Aquaculture in Lake Titicaca Basin (Supreme Decree 023-2008-PRODUCE, as amended by Supreme Decree 033-2009-PRODUCE).

d. Environmental impact studies in larger scale aquaculture (Resolution 871-2008-PRODUCE).

e. National Aquaculture Development Plan (PNDA) (Supreme Decree 001-2010-PRODUCE, 2010).

4. Regulations for environmental management, including the General Environmental Law (Law 28611, dated 15 October 2005), the Framework Law of the National Environmental Management System (Law 28245, dated 4 June 2004) that establishes sectoral, regional, and local competences for environmental management, and the Law of the National System of Environmental Evaluation and Control (Law 29325, dated 4 March 2009).

5. Natural Protected Areas Law (Law 26834, dated 4 July 1997), which creates the national system for natural areas protected by the Peruvian state and provides that protected areas can have national, regional or private management.

6. Law 29906, dated 19 July 2012, declaring that the integrated environmental prevention and recovery of Lake Titicaca and its tributaries is a matter of public need and utility.

7. Development Plan (CEPLAN, 2011), which includes a commitment by MINAM to rehabilitate the Titicaca Basin, including intervention strategies to control pollution from sewage, solid waste, and environmental damages.

8. The national wetlands strategy, approved by Supreme Decree 004-2015-MINAM, dated 23 January 2015.

9. Supreme Decree 075-2013-PCM that created the Multisectoral Commission for Environmental Prevention and Recovery of Lake Titicaca and its Tributaries.

10. Ministerial Resolution 033-2008-AG, dated 5 January 2008, which approved the Pfafsteter Geographical Units Coding Methodology, a descriptive record, and the Delimitation and Coding Plan for Hydrographic Units of Peru, developed by the National Institute of Natural Resources (INRENA); this is

a compulsory reference in all processes related to watershed management as well as administrative procedures relating to waters as contained in the Water Resources Law.

Part 1B. Baseline analysis

115. The TDPS is a large and complex system facing multiple threats to its biodiversity, water resources, and local people. Despite decades of joint efforts by both countries, the condition of TDPS has deteriorated and there are evident symptoms of severe problems in several areas of the system. At the moment, there are three major problems: (1) loss of biodiversity, (2) deterioration of environmental functions, and (3) decrease in the quality of life of the population. Among such symptoms of loss of biodiversity are the extinction umanto and the dire situation of the Titicaca giant frog and the zampullin. The deterioration of environmental functions manifests in the alteration of the water cycle caused by the destruction of bofedales, overgrazing, and water pollution from mining discharges. Finally, the quality of life of many people has been affected by factors such as soil salinization, declining native fish stocks, unusual wildlife mortality events, and the contamination of the food chain with heavy metals.

116. The three above-mentioned major problems have both natural and anthropogenic causes (Figure 6). Among the natural factors are: (i) extreme weather conditions such as droughts, frosts and strong solar irradiance, (ii) the natural process of erosion and sedimentation, especially in recent unconsolidated deposits, (iii) the natural process of salinization of endorheic basins, and (iv) a natural runoff of minerals and heavy metals in several sectors of TDPS due to the presence of polymetallic deposits.

117. The anthropogenic factors are various. Diverse stakeholders play a role in these factors at the local, regional, and national levels. The degree of influence of anthropogenic factors varies among TDPS sectors. In general, the anthropogenic causes are:

a. Inadequate sanitary management that causes discharges of solid domestic and industrial waste and untreated wastewater in waterways.
b. Poor mining practices that cause the discharge of acid mine drainage into the watershed of Lake Poopó and pollution with heavy metals and suspended solids in the basins of the Ramis and Suches rivers, as well as accumulation of environmental liabilities in several parts of the TDPS with no appropriate environmental measures to prevent and mitigate the environmental impact.
c. Introduction of exotic species, such as the trout and the silverside that, from what has been seen, compete for food with ispi and also predate on it (Monroy et al., 2014), as well as the snail *Physella acuta*[58] (Albrecht et al. , 2009).
d. Overfishing that has contributed to endangering the population of carachi and mauri in Lake Titicaca. Disobedience of fishing regulations is common.
e. Poor trout farming practices in Lake Titicaca that cause degradation of the benthos and contribute to the eutrophication of the water body.
f. Overuse of water resources for agricultural and mining activities. According to studies in the Master Plan, irrigation water becomes a loss for the water system, since for the most part it gets into the atmosphere through evaporation and transpiration. There are no water consumption statistics for mining.
g. Poor agricultural practices such as overgrazing, over-harvesting of totora, and the conversion of land for the expansion of crops such as quinoa.

[58] This is an invasive species native to North America, which has spread to all continents (Dillon et al., 2002). It was found in Lake Titicaca in April 2007 near Chucuito (Bay of Puno, Peru) (Albrecht et al., 2009). It is feared that the growth of its population would adversely affect the fauna of gastropods and other elements of native biodiversity.

h. Climate change generated by local, regional, and global factors. The area is very sensitive to climate variability which affects agricultural production and may have impacts on the health of the residents[59] (Gonzales et al., 2006; Sanabria et al., 2009).

118. Two root causes for the situation of TDPS have been identified: (i) limited application of IWRM, and (ii) insufficient capacity for monitoring and control. As it will be explained later, the barriers this project faces are found at this level. It should be noted that a contributing factor is poverty as it has a high incidence in the TDPS (Map 13). This is a factor that has been analyzed by several authors including UNESCO (2003), UNESCO (2006), Swinton & Quiroz (2007), Wolf & Newton (2009) and UNEP (2011).

119. The anthropogenic factors have degraded the four main hydrographic units in the TDPS and their critical habitats such as totorales, bofedales and tolares (Figure 7). The various existing problems have generated tensions and conflicts among different stakeholders in the area.

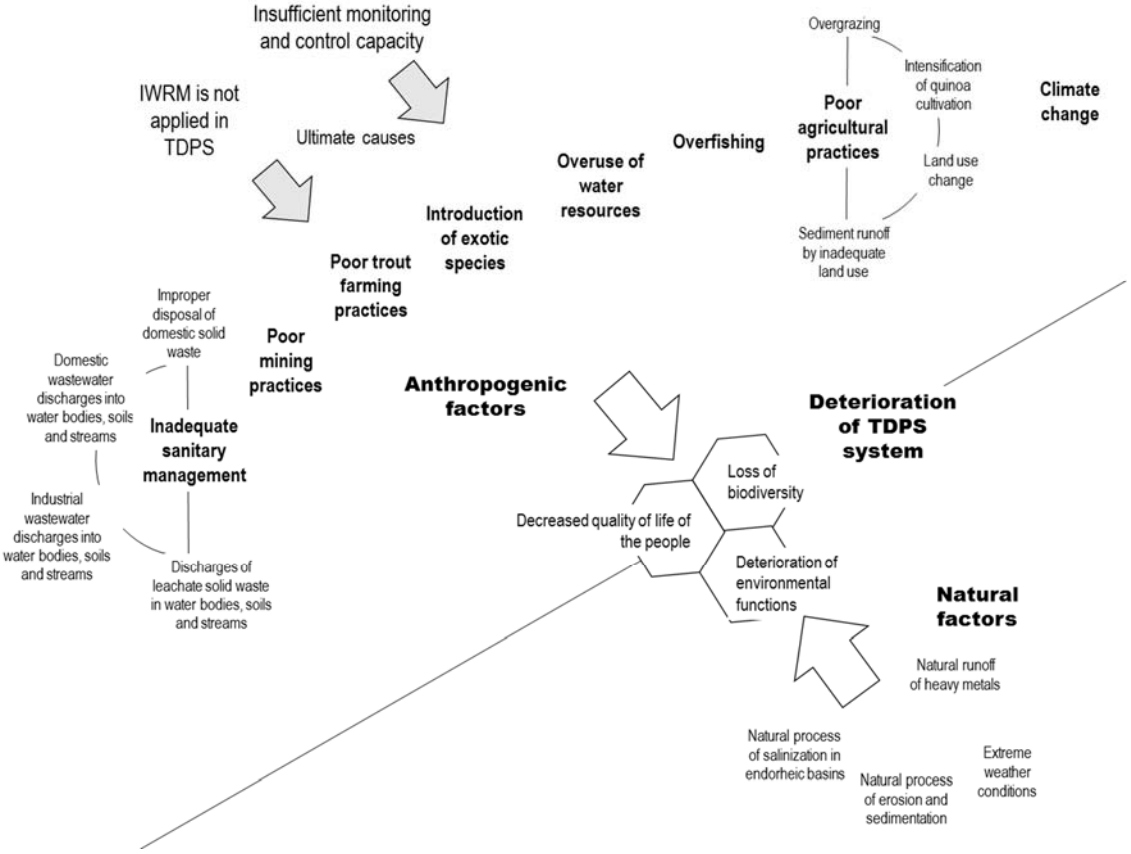

Figure 6. Main problems in TDPS and their natural and anthropogenic causes.

120. In the hydrographic unit of the Lake Titicaca the main pressures are: (i) eutrophication of the water body, (ii) pollution with industrial waste water and mine tailings, (iii) overfishing, (iv) high demand for water for domestic consumption and agricultural activities, and (v) the introduction of exotic species

[59] An outbreak of malaria occurred in 2008, with other subsequent cases, in the sector of Tuntunani, Mollebamba, and Sehuenquera communities, located about 50 km from Lake Titicaca (Gonzales et al., 2006).

(Figure 8). Eutrophication of Lake Titicaca is severe in the bays of Puno (PER) and Cohana (BOL) and is caused by raw discharges of domestic and industrial wastewater, solid waste dumped into waterways, runoff from agricultural activities, and residues from trout farming in floating cages (Dejoux & Iltis, 1991; UNEP & OAS, 1996; Fonturbel, 2005; Fonturbel et al., 2006; Shore, 2008; World Bank, 2009; Shore, 2010; CGE, 2012; LIDEMA, 2012; Mantilla, 2012; Shore, 2013; Peace & Diaz, 2013; coryza, 2014). Treatment plants in the cities of Puno (PER) and El Alto (BOL) have collapsed and, despite the existence of the relevant legal framework, there is not enough pressure for industries to treat their wastewater. The situation in Cohana Bay, where the waters of Katari River come is so severe[60] that the MMAyA has prepared a master plan for this river basin (MMAyA, 2010). As a result of excessive nutrient loading duckweed has proliferated thus covering large areas of the surface of the lake; this, in turn limits gas exchange and further aggravates the problem of eutrophication. Under current conditions, there is risk of cyanobacterial blooms in Lake Titicaca (Komárková et al., 2015). Pollution of the lake has caused massive mortality events of fish and recently of frogs (Anon, 2015). This adds to the deterioration of macrophyte banks, which are essential to the life cycles of local fauna.

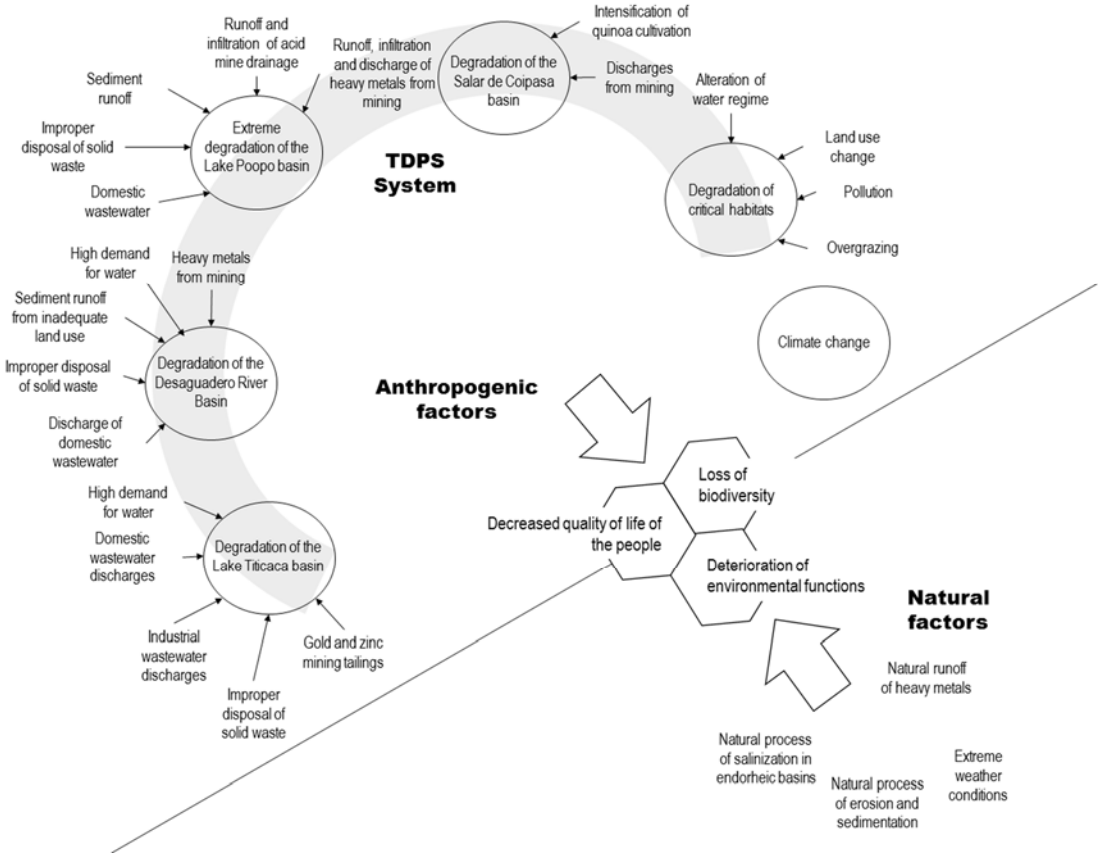

Figure 7. Anthropogenic factors that contribute to the degradation of water and critical habitat units in TDPS.

[60] In 2004, the basin of Quelcata, Tujsahuira, Pallina and Katari rivers was declared an environmental disaster and water emergency zone (Law 2798, dated 5 August 2004).

121. There is pollution caused by mining in a number of areas of the watershed, but the most severe situation is found in the watersheds of the Ramis and Suches rivers where there are environmental liabilities caused by both abandoned and active mines, as well as illegal and informal gold mining. In the Ramis river, many farmers oppose gold mining because they assume their livestock is dying as a result of pollution. The Peruvian government has taken steps to curb illegal and informal mining activities, including the creation of ACAFMIRA and has conducted actions to eradicate illegal mining enclaves[61]. In Bolivia, AJAM and the Governors' Office of La Paz are taking similar measures. At the binational level, mining issues are a key component of the agenda of CTB-Suches and agreements were recently made in the Esteves Island Declaration (Appendix 5).

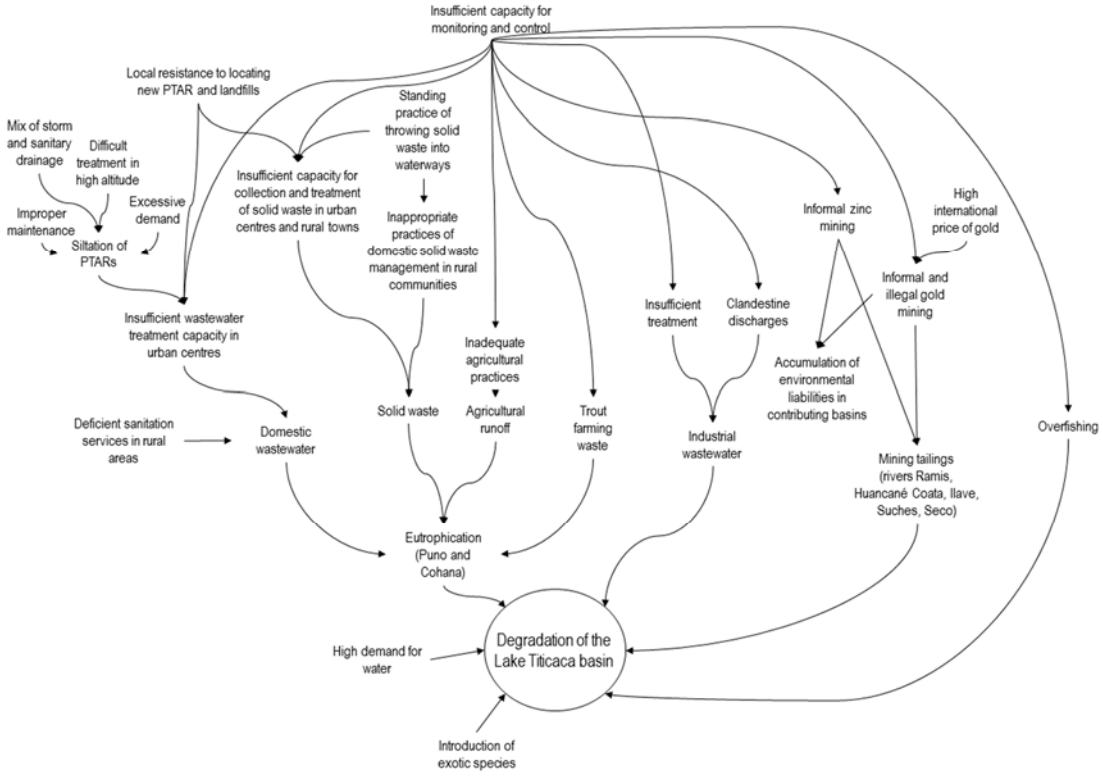

Figure 8. Causes for degradation of the Lake Titicaca hydrographic unit.

122. The Desaguadero River hydrographic unit is also affected by the discharge of untreated sewage and pollutants from mining and by inadequate solid waste disposal (Figure 9). Additionally, there are other factors such as high water demand for mining and agricultural activities, natural runoff of arsenic and boron, and salinization of water throughout the basin. The contribution of the Maure-Mauri river is very important to regulate water availability and salinity; therefore, both countries have emphasized the importance of a binational management of this water unit by means of the CTB Maure-Mauri. It should be noted that the construction works for water infrastructure defined in the Master Plan were not built, which were supposed to have contributed to maintaining the conditions of the Desaguadero River.

[61] Peru adopted a national strategy against illegal mining by Supreme Decree 003-2014-PCM, dated 10 January 2014.

123. The Lake Poopó hydrographic unit suffers severe deterioration. The main factors are mining pollution from the runoff of acid mine drainage and heavy metals[62], sediment erosion, and reduced streams. Also, there are natural factors such as high evaporation and natural runoff of arsenic and boron (Figure 10). Lakes Uru Uru and Poopó are unstable saline systems, whose biota has been further affected by the introduction of exotic species and the entry of heavy metals into the food chain (Jellison et al., 2004; Garcia et al, 2008; Zamora, 2008; Pando, 2009; Astorga, 2011; Molina et al, 2012; Pouilly et al, 2014). Native fish have almost disappeared and there have been several cases of massive mortality of fish and bird (Zabaleta, 1994; Anon, 2014; Anon, 2014th). The Program for Sustainable Management of Natural Resources in the Lake Poopó Basin, sponsored by the European Union, has conducted several studies to manage mining effluents and environamental liabilities, and has even discussed the option of establishing a basin authority for this hydrographic unit.

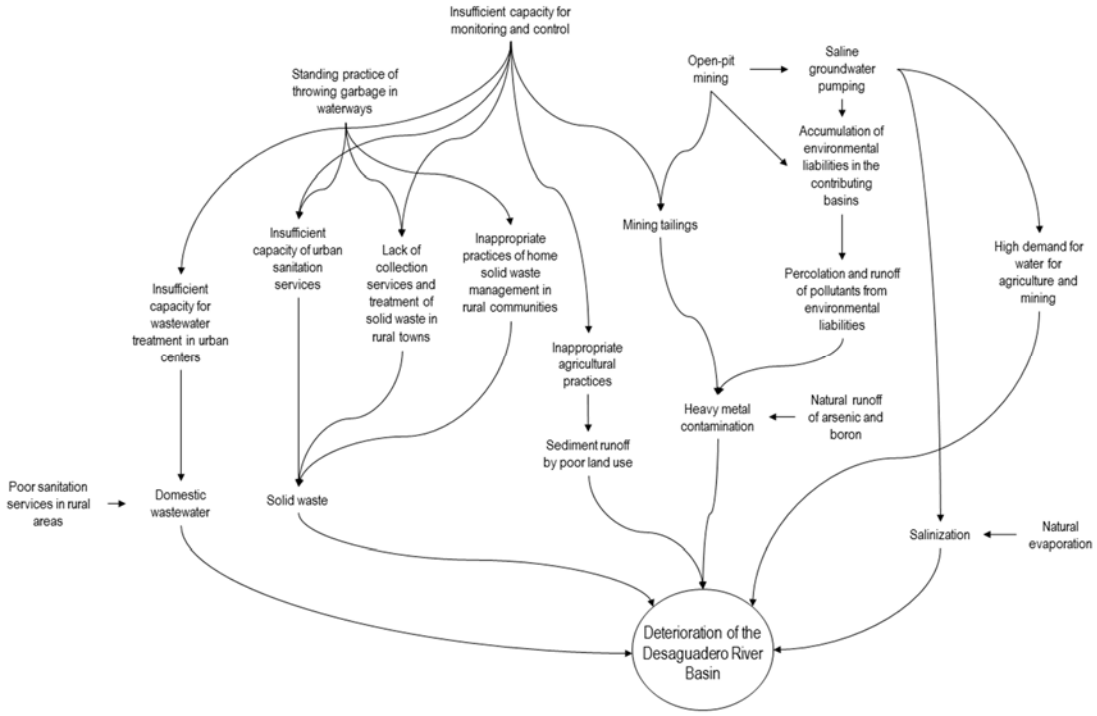

Figure 9. Causes for degradation of the Desaguadero River hydrographic unit.

124. A key element for the current situation in the Salar de Coipasa hydrographic is land conversion (mainly tholares) now used for expanding quinoa crops (Joffre & Acho, 2008) (Figure 11). There is a growing international demand for quinoa that has driven the expansion of acreage in Bolivia, but has not produced an increase in yield[63] (ALADI & FAO, 2014).

125. The solution to this complex situation requires a comprehensive approach and a coordinated and synergistic action including multiple actors with specific mandates and responsibilities. For example, the provision of services of domestic wastewater treatment is the responsibility of local governments while oversight and control of municipal, industrial, and mining effluents is the responsibility of the

[62] The Huanuni River basin was declared departmental emergency in 2009 (Supreme Decree 0335, dated 21 October 2009).

[63] Acreage increased from 36,847 ha in 2000 to 64,789 in 2011. However, the yield fell from 6.45 short hundredweights/ha to 5.9 short hundredweights/ha in the same period (ALADI & FAO, 2014).

environmental authorities, and the management of water resources is the responsibility of water authorities. In this context, the structure and operation of ALT have been insufficient to catalyze a comprehensive approach to address problems in the TDPS (Figure 12). Management efforts of ALT have primarily focused on Lake Titicaca, which probably contributed to the decision by both countries to establish specific binational commissions to address priority issues in the Maure-Mauri and Suches watersheds (i.e., CTB Maure-Mauri and Suches CTB). The Master Plan (INTECSA, AIC & CNR, 1993; INTECSA, AIC & CNR 1993a) was prepared on the basis of the concepts and paradigms about water management valid in those times. Therefore, the plan has a sector-based approach and does not incorporate IWRM perspectives or social participation. Despite efforts to complement it (ALT 2003; ALT, 2005), the Master Plan is insufficient to guide the comprehensive intervention the TDPS currently requires.

126. The governments of Bolivia and Peru recognize the limitations of ALT and the Master Plan and have made the decision to update them (Annexes 4 and 5).

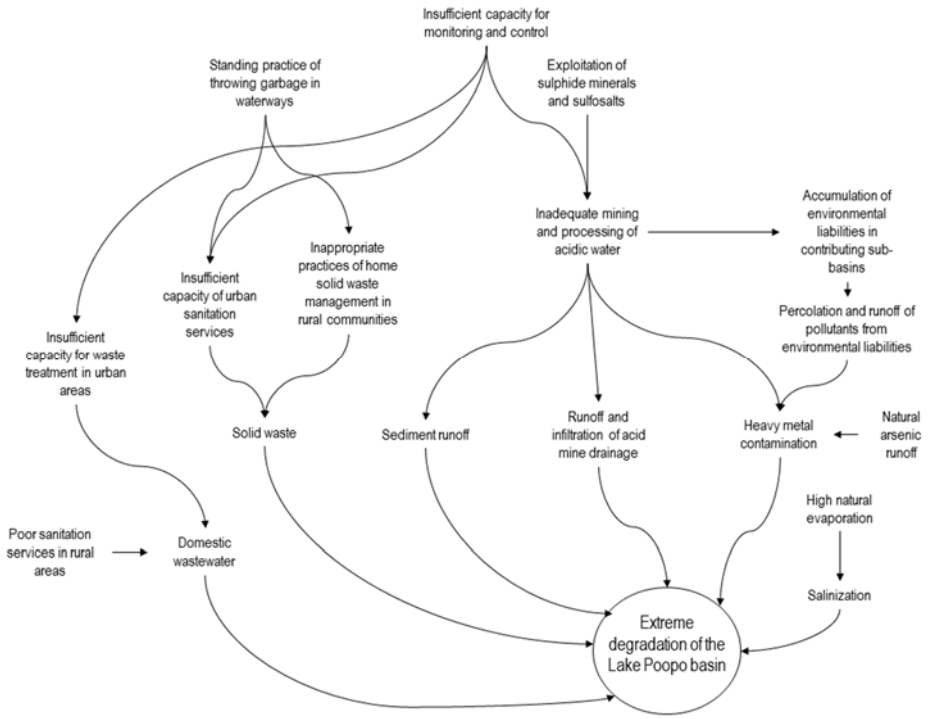

Figure 10. Causes for degradation of the Lake Poopó hydrographic unit.

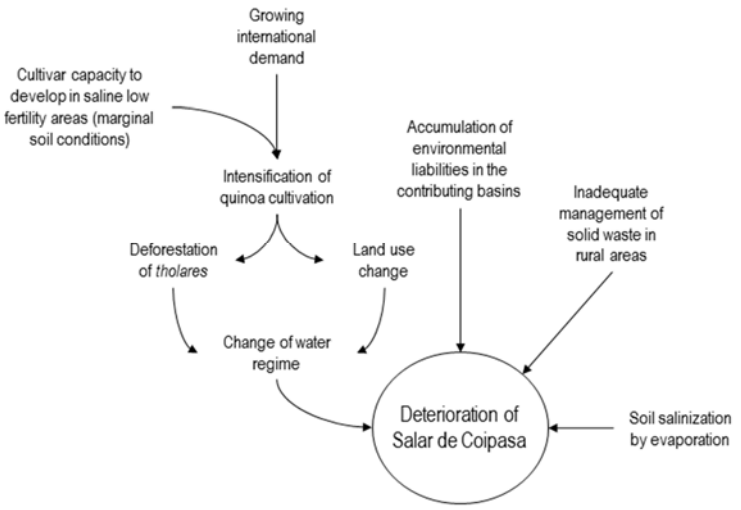

Figure 11. Causes for degradation of the Salar de Coipasa hydrographic unit.

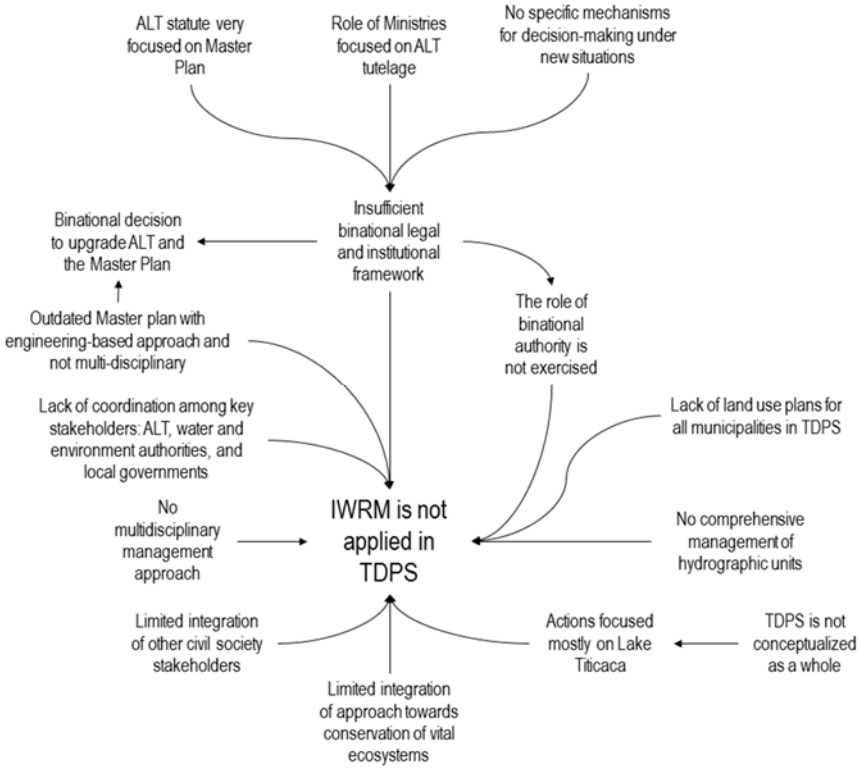

Figure 12. Causes of not applying IWRM in TDPS

Long-term solution

127. Addressing the issues in the TDPS requires action at several public and private levels that are beyond the scope of this project. Both countries are adopting measures (e.g., banning mining) and programming investments (e.g., new sewage water treatment plants[64]) that will contribute to solving the problems, but it is not expected a short term impact. In this context, this project will contribute to promote the conservation and sustainable use of water resources in the TDPS by incorporating IWRM[65] into the management system and updating the master plan while taking advantage of the fact that both countries have adopted an integrated management approach for water resources in their policy frameworks. Lack of quick incorporation of a holistic approach to catalyze synergistic actions throughout the TDPS system will result in further degradation of the water system and loss of biodiversity and ecosystem functions.

Analysis of Barriers

128. Even though both countries have solid bilateral cooperation and are moving forward in addressing the problems that affect the TDPS, the following barriers exist, which limit the application of IWRM in the water system:

[64] The Peruvian government announced it would invest ca., USD 470 million for new treatment plants (Anon, 2015a; Anon, 2015b).
[65] IWRM is understood by the definition established by the Technical Committee of the Global Water Partnership.

Barrier 1. The structure of ALT is insufficient to manage the TDPS system

129. As previously indicated, the structure and operation of ALT are insufficient to catalyze an integrated management of the TDPS. The project will not directly address updating the framework of bilateral cooperation for the management of theTDPS, since both countries have made significant advance on this matter. Following the 2010 Ilo Declaration, a binational *ad hoc* ALT Management Group was formed to prepare a new institutional structure. The group met five times and generated a proposed new statute for ALT. Afterwards, in June 2015, the binational cabinet assembled on Esteves Island agreed to reach consensus on the proposed new statute for the ALT before the next binational cabinet. Therefore, it is expected that by the beginning of this project, both countries will have already updated the ALT framework of cooperation. Consequently, the project will facilitate technical assistance to support an institutional strengthening of the binational TDPS management based on the results of the defining process for the new ALT management model and will provide support to the exchange of experiences on multilevel governance with administrative agencies and key stakeholders in other transboundary water bodies (see output 2.2).

Barrier 2. Outdated master plan

130. The master plan has a sector-based approach and does not incorporate the IWRM perspective for the TDPS nor climate change considerations. Since its approval in 1996, information (e.g., UMSA, 2013) and complementary elements (e.g. ALT, 2003; ALT, 2005) have been produced, as well as some analyses with an integrated perspective (e.g., UNESCO, 2003; UNESCO, 2006; UNEP, 2011). However, much information is scattered and there are significant gaps. For example, the information and knowledge generated by the Program for Sustainable Management of Natural Resources in the Poopó Lake Basin have not been incorporated into the integrated management of the TDPS. It has not been possible to standardize methodologies to produce a complete water balance of the TDPS; there is very little information on the availability and use of groundwater, there is no inventory of environmental liabilities caused by miners and information on the status of endangered species is scant.

131. The governments of Bolivia and Peru have given high priority to updating the PDGB, which is the central element of this project. The *ad hoc* Binational Group for ALT Management generated a proposal of guidelines to adapt the PDGB, and in the Esteves Island meeting both governments commited to: (i) updating the plan, (ii) actively participating in the preparation and execution of this project, and (iii) securing finances to complete the upgrade process as soon as possible (Annex 5). Consequently, the present project will help to fill the priority information gaps and generate a participatory process for a comprehensive analysis of the situation in the TDPS and will update the master plan with an IWRM approach (Component 1 of the project). The process is based on the GEF methodology for the preparation of the Transboundary Diagnostic Analysis (TDA) and the Strategic Action Programme (SAP) (GEF, 2013a; GEF, 2013b; GEF, 2013c). Consequently, in this project the PDGB / master plan and SAP documents are considered as equivalent.

Barrier 3. Limited integration of key stakeholders in managing water resources

132. Both countries have a fluid and solid binational collaboration and coordination between them; at the nationwide levels they have multiple offices for coordination with key stakeholders. However, historically TDPS management has been the focus of central government entities, with little involvement from local governments or other key stakeholders of the TDPS. Lack of coordination among stakeholders involved in the management of the system has contributed to predominant sectoral and local perspectives

that do not envision the TDPS as a whole. Rieckermann et al., (2006) and Wolf & Newton (2009), from an external perspective, identified a severe limitation in the fact that ALT did not have programs to include stakeholders in a participatory process for water resources management. In addition, it is still incipient the implementation of participatory management of water resources in the watersheds of the TDPS. At the moment, only the management organization for Katari River Basin (Bolivia) is operational, while the process for establishing water resources councils in the Titicaca hydrographic region of Peru is underway.

Consequently, the project will promote the integration of key stakeholders in the management process of the TDPS through participatory processes for the construction of the SAP and the TDA, and actions to strengthen collaboration and trust among the key stakeholders (i.e., social capital), as well as at a multilevel dialogue, so they can act synergistically within a framework of belonging to the water system.

Barrier 4. Incipient experience on IWRM in the TDPS system

133. Both countries have made important advances and have increased experience in water resources management at the national and transboundary levels; they have also included integrated basin management criteria in their national regulations and strategies. However, the application of IWRM in the transboundary context is still a new concept. For example, in Peru, the creation and operation of basin councils is still an incipient experience and the establishment of the regional council for the Titicaca watershed is under construction. In both countries, it is necessary to train technical staff from the national water authorities and local governments in integrated watershed management and multilevel dialogue in order to build social sustainability for water management. It is also necessary that local actors know the legal-institutional framework for integrated water resources, especially in the context of transboundary management and best practices that can be applied to conserve water and biodiversity. Consequently, the project will contribute (i) to the development of human capacities in national institutions, local governments, and local stakeholders in the TDPS, (ii) to develop experience and learning on key issues regarding TDPS management, and (iii) to promote coordination and collaboration between public and private stakeholders.

Analysis of Stakeholders

134. The project engages a variety of public and private stakeholders who are involved in the management of the TDPS hydrographic system. Mapping of key stakeholders from both countries are included in Annexes 6 and 7. Here is a summary of the stakeholders that have direct involvement in the implementation of the project.

Bolivia

135. MMAyA will be the implementing partner in Bolivia and will guide project activities. The ministry will participate in the governing and technical bodies for project management (i.e., Binational Steering Committee and Binational Technical Committee). Also, it will be in charge of coordinating the implementation of pilot projects in the country (component 2 of the project) and promoting coordination and involvement of public (e.g., COMIBOL) and private key stakeholders in TDPS. Finally, it will facilitate the articulation and contribution to the project by SENAMHI, APMT, and SERNAP.

136. The Ministry of Foreign Affairs of Bolivia coordinates with his Peruvian counterpart binational decision-making, specifically in ALT, BTC Maure-Mauri, BTC Suches, and other cooperation entities. It also organizes and coordinates the binational presidential meetings and conducts follow up on agreements

reached at the Binational Cabinet meetings. In the project the MRE-B will participate in the Binational Steering Committee to oversee and provide strategic guidance. It will also support multi-level dialogue of key stakeholders to achieve binational agreements.

137. The departmental governments of La Paz and Oruro and the provinces and municipalities of the TDPS are key stakeholders for the integrated management of water system. They will be involved in the participatory process of constructing the TDA and SAP, in training of human resources, and multilevel dialogue to address key issues in theTDPS (e.g., pollution in Lake Poopó, conservation of bofedales and tholares). It is expected that they will be actively involved in participatory planning processes to be developed for each watershed and that they will make decisions within the framework of their powers and authority, to address problems in the TDPS.

138. Producers, private sector and civil society (e.g., farmers, fishermen, miners) will be involved in the participatory process of drafting the TDA and SAP, in the training of human resources, and in multilevel dialogue to address key issues in TDPS. Their participation in activities such as community monitoring, exchange of learning and experience, and building relationships of trust between key stakeholders will be actively promoted. It is expected that they will engage constructively in the participatory planning processes to be developed for each watershed and that they will carry out actions to address issues in the TDPS.

139. The academic sector and NGOs will participate in generating information and drafting the TDA and SAP as well as in training programs for social and productive stakeholders, in developing comprehensive monitoring programs for TDPS, and in discussing and disseminating lessons learned and best practices.

Peru

140. MINAM will be the implementing partner in Peru and will guide project activities. The ministry will participate in the governing and technical bodies for project management (i.e., Binational Steering Committee and Binational Technical Committee). Also, it will be in charge of coordinating the implementation of pilot projects in the country (component 2 of the project) and promoting coordination and involvement of public (e.g., PRODUCE, MVCS) and private key stakeholders in the TDPS. Finally, it will facilitate the articulation with national office such as the Multisectoral Commission for Environmental Prevention and Recuperation of the Lake Titicaca Basin and Its Tributaries and the contribution to the project by SENAMHI and SERNANP.

141. ANA will participate in the Binational Steering Committee and the Binational Technical Committee; it will also implement several pilot projects, participate in the training of human resources, and be a part of the participatory process to build the TDA and SAP as well as a comprehensive monitoring program for TDPS. It is expected that ANA will foster the development and implementation process of the regional council of the Titicaca basin and promote coordination and involvement among public and private key stakeholders.

142. The Ministry of Foreign Affairs of Peru coordinates with its Bolivian counterpart binational decision-making, specifically in ALT, BTC Maure-Mauri, BTC Suches, and other cooperation entities. It also organizes and coordinates the binational presidential meetings and conducts follow up on agreements reached at the Binational Cabinet meetings. The MRE-P will participate in the BPSC to oversee and provide strategic guidance. It will also support multi-level dialogue of key stakeholders to achieve binational agreements.

143. The departmental governments of Puno and Tacna and the provinces and municipalities of the TDPS are essential for the integrated management of the TDPS. They will be involved in the participatory process of constructing the TDA and the SAP, in the training of human resources, and multilevel dialogue

to address key issues in TDPS (e.g., pollution in Puno Bay). It is expected that they will be actively involved in the participatory planning processes to be developed for each watershed and that they will make decisions, within the framework of their powers and authority, to address problems in the TDPS system.

144. Producers, private sector and civil society (e.g., farmers, fishermen, aquaculturists, miners) will be involved in the participatory process of drafting the TDA and SAP, in the training of human resources, and in multilevel dialogue to address key issues in TDPS. Their participation in activities such as community monitoring, exchange of learning and experience, and building relationships of trust among the key stakeholders will be actively promoted. It is expected that they will engage constructively in the participatory planning processes to be developed on each watershed and that they will carry out actions to address issues in TDPS.

145. The academic sector and NGOs will participate in generating information and drafting the TDA and SAP as well as in training programs for social and productive stakeholders, in developing comprehensive monitoring programs for TDPS, and in discussing and disseminating lessons learned and best practices. The NGO Suma Marka will implement a pilot project in the microbasin of Chacas lagoon (San Roman province, District of Juliaca).

Binational

146. The ALT will participate in the Binational Technical Committee and will be part of the participatory process to draft the TDA and SAP, as well as the comprehensive monitoring program for the TDPS. It is expected that ALT will promote coordination with PELT and UOB. It is also assumed that ALT, under its new structure, will host the TDPS information portal and execute long-term strategies for environmental education and communication for IWRM in the TDPS and citizen participation and coordination between key stakeholders.

PART II: Strategy

Project justification

147. Water is a limited resource in the TDPS, partly because of natural conditions in the area and its distinctive features as a closed basin, but also by anthropogenic pressures that have deteriorated ecological functions. The current situation of the TDPS is bad, the system has deteriorated despite the binational management mechanism established almost 20 years ago by means of ALT and regardless of multiple efforts by the governments of Bolivia and Peru. Neglecting quick action could lead to a further deterioration of the system with implications about the probable collapse of environmental functions in several parts of TDPS, severe negative impacts on the health and welfare of a number of residents, and the extinction of endemic species. Recovery of the system is beyond the scope of this foundational GEF project as it may ultimately involve large investments in multiple areas such as treating wastewater from populated centers, strengthening supervision and control of productive activities, and addressing illegal mining activities, but the GEF project, by assisting the countries in developing the TDA and SAP, will set the foundation for a long-term series of 'soft' and 'hard' interventions towards sustainable use of the TDPS and its ecosystem services. Currently, (i) the various efforts under implementation seem dispersed, (ii) the integrity of the TDPS and the interrelationships between human and natural environments are not made visible, and (iii) sectoral and local perspectives predominate. In this context, it is necessary to foster a shared and integrated vision on priority actions to be implemented and engage key stakeholders for TDPS management. Therefore, this project will be a catalyst that will contribute to: (i) build a common vision based on IWRM, (ii) establish common planning (i.e., SAP) to guide actions at the binational, national, and local levels, and (iii) mobilize and involve key stakeholders for the integrated management of the system.

148. The project is divided into four components. Component 1 will develop a participatory process to generate an integrated diagnosis (TDA) on the current situation of the TDPS and an updated master plan (SAP) agreed by both countries to guide conservation actions and sustainable use of water resources and biodiversity of the Titicaca - Desaguadero - Poopó - Salar de Coipasa water system. Furthermore, the project will support (i) the development and consolidation of the new structure of ALT agreed by both countries, and (ii) capacity building on IWRM for officials at the national, regional, and local governments as well as for social and productive stakeholders. Component 2 will focus on developing 11 pilot projects that will generate learning on managing natural resources in TDPS. During the execution of the pilot projects, the development of a learning community will be fostered and lessons learned will be documented and disseminated to be used in other parts of the TDPS, Bolivia, Peru, and the world. Component 3 will help to consolidate a comprehensive monitoring program in the TDPS that will be accessible to local technical staff and local stakeholders. Finally, component 4 will help to build human and social capital through communication actions for environmental education and citizen participation and coordination in support of IWRM.

Policy conformity

149. The two countries have signed and ratified the Convention on Biological Diversity (Table 17). Additionally, regarding the project, both countries are members of the Ramsar Convention, have ratified the UN Framework Convention on Climate Change (UNFCCC), and the United Nations Convention to

Combat Desertification (UNCCD), and they have signed the Minamata Convention on pollution by mercury[66].

Table 17. Dates of signing and ratification of the Convention on Biological Diversity.

Country	Signing	Ratification
Bolivia	June 13, 1992	October 3, 1994
Peru	June 12, 1992	June 7, 1993

Country eligibility and drivenness

150. Both countries are eligible for GEF assistance under the GEF instrument. The conditions in Bolivia and Peru are highly favorable for the implementation of the proposed intervention: (i) it is a high priority in the political agenda the sustainable management of the TDPS and to address the main causes of degradation of biodiversity and water resources in the system, (ii) there are government commitments to modernize the structure of ALT and to update the master plan as soon as possible (i.e., The Esteves Island Declaration of June 2015), and (iii) the project will build upon results achieved by previous[67] projects and will complement other initiatives by the GEF[68] and other donors.

151. In Bolivia, the project will help advance the implementation of the National Basin Plan and the Master Plan for the Katari watershed.

152. In Peru, the project will directly contribute to the implementation of the national policy and strategy on water resources and to the creation of the Council on Water Resources in the Titicaca Basin hydrographic region.

Project structure

153. The project objective is to promote the conservation and sustainable use of water resources in the Titicaca-Desaguadero-Poopó- Salar de Coipasa (TDPS) transboundary system, through the updating the Global Binational Master Plan[69]. The project focuses on catalyzing the integration of IWRM into the management system and on fostering integrated actions to address the pressures on biodiversity.

154. The project will be executed in 48 months and will have six outcomes:

[66] Bolivia and Peru signed the agreement on 10 October 2013. The ratification process is underway in both countries.

[67] The project will use the lessons and experiences of GEF-ID 202 Conservation of Biodiversity in the Lake Titicaca Basin. In addition, the project will use information, lessons learned, and experience from the following projects:

a. Support to integrated and participatory water management in the Titicaca-Desaguadero-Poopó-Salar Coipasa (TDPS) water system (small scale financing agreement ROLAC-SSFA-006/2009), sponsored by UNEP, which generated, inter alia, the GEO Titicaca report.
b. Program for Sustainable Management of Natural Resources in the Lake Poopo Basin, sponsored by the European Union. This program will finish in 2015 but it may have a second phase.
c. Building River Dialogue and Governance project (BRIDGE), implemented by IUCN and sponsored by SDC. The second phase ends in 2015 but it may have a third phase since 2016.

[68] The project will complement the following initiatives:

a. GEF-ID 4799, Implementation of comprehensive measures to minimize mercury discharges from artisanal gold mining in Peru, implemented by UNIDO.
b. GEF-ID 5494, Development of risk management approaches for mercury in Latin America, implemented in Peru by UNEP.
c. GEF-ID 5284, integrated transboundary water resources management in the aquifer and basin of Puyango-Tumbes and Catamayo-Chira and Zarumilla, implemented in Peru by UNDP.

[69] The PDGB is equivalent to the Strategic Action Plan as defined by GEF within the focal area of International Waters.

Outcome 1. The Transboundary Diagnostic Analysis (TDA) and the Strategic Action Programme (SAP) for the TDPS have been formulated and adopted.
Outcome 2. Improved institutional capacity to implement IWRM in the TDPS system in both countries.
Outcome 3. Practical learning generated in pilot experiences contribute to the development of the SAP and to decision making.
Outcome 4. Updated, accurate, and relevant information on TDPS management is available and accessible to allow implementation of the SAP with an adaptively approach, including attention to social and gender variables.
Outcome 5. Key stakeholders know the core issues of the TDPS, become empowered and act in the context of IWRM to advance workable solutions.
Outcome 6. Key stakeholders actively participate in a coordinated manner to address the core problems in the TDPS system.

155. The activities are organized into four interdependent and closely related components to generate eleven products (see Section II).

156. This is a binational project, the components, outcomes and outputs described below are generated in collaboration with the implementing agencies in the two countries: (1) the Ministry of Foreign Affairs of the Plurinational State of Bolivia (MRE-B), (2) the Ministry of Foreign Affairs of Peru (MRE-P), (3) the Ministry of Environment and Water of Bolivia, and (4) the Ministry of Environment of Peru. The National Water Authority of Peru will play a key role in ensuring coordintaion with water users. There will be a Binational Project Coordination Unit (BPCU) to organize and coordinate the implementation of activities. BPCU members will be hired with GEF funds.

Component 1. Strengthening the tools for binational and national management in the TDPS system: preparation of a Transboundary Diagnostic Analysis and updating the Binational Global Master Plan (SAP) for the TDPS system.

157. This is a binational component focused on completing a comprehensive analysis of the situation in the system and updating the master plan. Also, it will support (i) the development and consolidation of the structure of ALT, and (ii) capacity building for staff of national, regional, and local governments, and for social and productive stakeholders.

158. This component will be driven by the BPCU. The binational project coordinator (CBP) will provide technical guidance for the participatory process of building the TDA and SAP. In addition, (1) The communication specialist of the project (ECOM) will guide the development of these participatory processes, particularly will promote dialogue, communication and coordination among key actors of the TDPS, and (2) the specialist in monitoring and evaluation (EME) will document the process and lessons learned. These specialists will be hired with funds from the GEF.

Outcome 1. The Transboundary Diagnostic Analysis (TDA) and the Strategic Action Programme (SAP) for the TDPS have been formulated and adopted.

159. To achieve this outcome, the following outputs will be generated through activities as summarized below:

Output 1.1. Additional studies to support the preparation of a TDA for the TDPS

160. A core group for TDA development (GN-TDA) will be created. It will receive training to prepare the TDA and SAP on the basis of the GEF methodology (GEF, 2013a; GEF, 2013b; GEF, 2013c). The available information will be systematized and analyzed to identify whether additional studies are required. The preparation of studies will be contracted in order to generate information which in turn will feed the TDA. Seventeen (17) studies have been identified (see product 1.1 in Section II) and a sum of USD 195,000 of GEF resources have been set aside to finance studies not yet identified but necessary. To prepare the SAP, a team of consultants will be hired to provide short-term support and they will be led by the CBP. These consultants will support the GN-TDA in the area of analysis of information, preparation of TDA, and SAP conceptualization.

Output 1.2. TDA validated by the countries

161. The draft TDA will be disseminated through the electronic platforms administered by ANA, MINAM, MMAyA, ALT, and the project. Then, workshops will be organized with stakeholders in each of the four major hydrographic units (i.e., Titicaca, Desaguadero, Poopó, and Salar de Coipasa). The final version will be presented to the project Binational Steering Committee for official validation by both countries. It must be emphazised that the TDA is a technical and objective analysis of the situation in the system and not a document negotiated by both countries. Finally, the TDA, once approved by the BPSC, will be published and disseminated through the electronic platforms listed above and through IW:LEARN. A summarized version will be prepared using a format for dissemination to make it accessible to local stakeholders.

Output 1.3. Strategic Action Programme formulated by a participatory process, integrating an IWRM approach, adopted by both countries.

162. A core group for SAP development (GN-SAP) will be created. It will integrate members of the GN-TDA, and technical staff and stakeholders of both countries. Technical promoters will be hired to drive the participatory process in each of the 14 hydrographic units that make up the TDPS system. Members of GN-TDA and technical promoters will be trained in the methodology for SAP preparation. The SAP strategic framework will be outlined by means of binational workshops and participatory processes at the level of each of the 14 hydrographic units to build proposals that articulate IWRM at the local levels with an integrated perspective of the TDPS. A participatory exercise to integrate the actions of the watersheds in Lake Titicaca basin (nine level-4 hydrographic units) and watersheds in Desaguadero River (three level-4 hydrographic units) will be conducted. All elements will be integrated into the draft SAP to be reviewed by government officials from both countries and latter published on the project website to make it accessible to key stakeholders. The SAP, consisting primarily of an agreed suite of policy, legal and institutional reforms, and investments, will be submitted to the consideration of both governments for their formal approval and finally will be published and disseminated through the electronic platforms listed above and through IW:LEARN. A summarized version will be prepared using a format for dissemination to make it accessible to local stakeholders.

Outcome 2. Improved institutional capacity to implement IWRM in the TDPS system in both countries.

Output 2.1. Training of key stakeholders in IWRM.

163. A training course in transboundary IWRM will be designed for officers of national, regional, and local governments, including a set of short videos summarizing the main concepts and tools in the course. These videos will be released through the project YouTube channel, IW:LEARN, and water authorities in both countries (Figure 13). In addition, a course on IWRM for social and productive organizations in TDPS will be designed, which will also include short videos summarizing basic concepts.
164. Agreements with universities and other institutions in the TDPS will be established so that they can host training events and incorporate the courses in their training activities and community outreach. Subsequently, staff from these schools will be trained to enable them to teach the courses (training of trainers). The courses for government officials will be held between years 2 and 3 of the project, while courses for social and productive stakeholders will be held in years 2 to 4 of the project. The ECOM will promote the development of a communication network among the people who attend the courses.

Output 2.2. Actions to strengthen the institutional arrangement for binational management of the TDPS

165. There will be a fund for technical assistance (USD 50,000 of GEF resources) to support and strengthen the new institutional structure of the ALT, as agreed by the countries. Use of these funds will be approved by the BPSC.
166. Events will be organized to foster the exchange of experiences (i.e., guided tours and teleconferences) on multilevel governance with administrative entities and key stakeholders retaled to transboundary water bodies. Synergy will be sought through similar activities to be develop by the BRIDGE project.

Component 2: Evaluation of interventions at the pilot scale

167. This is a national component to be managed by each country. Eleven (11) pilot projects that build learning to manage TDPS resources will be implemented.

Outcome 3. Practical learning generated in pilot experiences contribute to the development of the SAP and to decision making.

Output 3.1. Eleven pilot projects on relevant issues of the TDPS

168. Eleven (11) pilot projects, five in Bolivia and six in Peru, will be implemented:
01-B-01. Application of ancestral technologies for sedimentation control at the source. San Andrés de Machaca.
02-B-02. Revitalization of bofedales to contribute to water availability. Charaña municipality.
03-B-03. Bioremediation of Huatajata and Cohana Bay areas in Lake Titicaca and economic and cultural revaluation of totora reeds.
04-B-04. Water quality monitoring system in the Suches River basin. Bolivian section.
05-B-05. Permanent observatory of Lake Titicaca.
06-P-01. Techniques for the reduction of sediment and mercury discharges from mining activities at the head of the Ramis River basin.
07-P-02. Phytoremediation techniques in water bodies affected by domestic sewage. Inner Puno Bay.
08-P-03. Creation of the water resources management system for the Ilave River-Titicaca region in Puno.

09-P-04. Monitoring of the impact on water quality in areas of high pressure from fish farming by means of automated stations. Larger Puno Bay.
10-P-05. Strengthening of citizen capacities for integrated management of water resources through community-based environmental monitoring in the micro-basin of the Chacas lagoon - Juliaca.
11-P-06. Measures to address unsustainable practices and promotion of sustainability of the Titicaca-Desaguadero-Poopó-Salar de Coipasa water system (TDPS), through the implementation of activities and management technologies and reduction of mercury use in areas dedicated to artisanal and small-scale gold mining aiming to a more integrated watershed management.

These projects were identified and selected by the *ad hoc* group, which was formed for the preparation phase of this project, and then prepared by the proponents who will implement them once the project begins. Table 18 summarizes the projects and

Table 19 details the investment on each of them, Map 15 shows their location, Annex 8 summarizes the social and environmental situation in the areas of intervention, and Annex 9 contains the projects. In all cases, key stakeholders (e.g., producers, private sector and civil society) will be involved during implementation. The organizations in charge of executing the pilot projects will receive funds for the goods and activities that were approved as part of the PRODOC (e.g., workshops, consultants, services) (

Table 19). The NGO Suma Marka will receive funds from the budget line 72600 grants. For this purpose, a donation agreement will be signed with this organization, the agreement will indicate the disbursement calendar and the conditions for each disbursement.

Output 3.2. The systematization of the results of pilot projects and the analysis of their applicability to the TDPS system are accessible and available to all stakeholders in the area.

169. The EME will monitor and document the pilot projects (a blog will be kept for each pilot project and virtual forums will be held each semester). The ECOM will ensure divulgation of the progress and results and will encourage the formation of a communication network among pilot project participants and key stakeholders of the TDPS. The memoirs of the pilot projects will be made available to the public through the project websites and IW:LEARN (Figure 13). Finally, a binational symposium will be organized to share the results and lessons learned with key stakeholders.

Table 18. Location, implementing agency and expected outcomes of the pilot project.

Code and Name	Location	Implementing agencies	Objectives and Outcomes
01-B-01. Application of ancestral technologies for sedimentation control at the source. San Andrés de Machaca.	Hydrographic Unit 0152-51-5*- Upper Desaguadero. Level 5: Desaguadero. Microbasin Jacha Jawira River Province: Ingavi Municipalities: San Andres de Machaca Communities in upper basin: Tijrata, Mallacapi, winto, Collpa and Totorani. Communities in mid-basin: Jhankho Kota, Caracollo, Mullisaca and Pampa Uta Communities in lower basin: Apacheta, Chuñavi, Chuchucamaya.	VRHyR of MMAyA	Objective: To identify, implement and evaluate the intervention measures and integrated management of basins and water conservation based on ancient technologies that help control sediment source. Outcome 1: Application of ancestral practices to reduce the rate of erosion in the microbasin and decrease sediment yield. Outcome 2: Installed capacities have been developed by the 12 participating communities.
02-B-02. Revitalization of bofedales to contribute to water availability. Charaña municipality.	Hydrographic Unit: 014-Mauri. Level 5: Desaguadero. Province: Pacajes Municipalities: Charaña Communities: Kuraj Pucho, Jalaru and Putani.	VRHyR of MMAyA	Objective: To revitalize the wetlands, in order to protect biodiversity and ensure sustainable use and management. Result 1: Wetlands revitalized and improved living conditions and ecosystems. Outcome 2: Wetlands with a plan for water use (water demand for optimum use) Outcome 3: Local capacities achieved.
03-B-03. Bioremediation of Huatajata and Cohana Bay areas in Lake Titicaca and economic and cultural revaluation of totora reeds.	Hydrographic Unit: 0153-59-57-Circulacustre and 0158-Katari. Level 5: Titicaca. Provinces: Omasuyos and Los Andes. Municipalities: Huatajata	MMAyA – UMSA – IRD	Objective: To propose two innovative techniques to reduce pollution in Katari River and Huatajata shores on Lake Titicaca by means of bioremediation of water, with socio-economic and cultural benefit for local communities. Outcome 1: Reduced levels of

Code and Name	Location	Implementing agencies	Objectives and Outcomes
	and Pucarani. Communities: Floating Island near Huatajata and at some other point near Katari River		contamination in the water passing through the decontamination system in Katari River. Outcome 2: Reduction of the average concentrations of pollutants on the shores of Huatajata. Outcome 3: Revaluation and conservation of totora reeds by local communities, as part of a socio-economic study of the feasibility and sustainability of replication of these initiatives.
04-B-04. Water quality monitoring system in the Suches River basin. Bolivian section.	Hydrographic Unit: 0172-Suches. Level 5: Titicaca. Provinces: Bautista Saavedra Franz Tamayo Camacho Municipalities: Pelechuco, Charazani Moco Moco, Humanata, Puerto Acosta, Escoma Comunidades: 6 Communities	VRHyR of MMAyA	Objective: To contribute to improving the quality of life of riverine populations through obtaining sufficient timely and relevant information, on a permanent basis, on water quality and quantity along Suches River. Outcome 1: Monitoring system created with the participation of national, departmental and local stakeholders. Outcome 2: Improved quality of water in Suches River by implementation of mitigation measures for prevention and remediation of negative environmental impacts in the short, medium, and long term. Outcome 3: Capacity building at different levels of the State.
05-B-05. Permanent observatory of Lake Titicaca.	Hydrographic Unit: 0153-59-57-Circulacustre and 0158-Katari. Level 5: Titicaca. Provinces: Omasuyos and Los Andes. Municipalities: Huatajata and Pucarani. Communities: Floating Island near Huatajata and at some other point near Katari River	MMAyA – UMSA – IRD	Objective: To understand the hydro-chemical and biological dynamics in Lake Titicaca from the implementation of a sustainable system for automated monitoring coupled to a routine sampling program. Outcome 1: Improved understanding of biogeochemical dynamics in Lake Titicaca on the basis of high frequency data from Huatajata. Outcome 2: Relations between several factors and particular phenomena on Lake Titicaca are identified to prevent or at least anticipate the emergence of “blooms” of algae and other phenomena that has great importance for the life and services provided by Lake Titicaca. Outcome 3: MMAyA and technical staff of the Government of La Paz trained to collect and interpret monitoring data and to share that information with local communities.
06-P-01. Techniques for the reduction of sediment and mercury discharges from mining activities at the head of the Ramis River basin.	Hydrographic Unit: n/n-Ramis. Leve5: Titicaca. Region: Puno Provinces: San Antonio de Putina, Ananea District	ANA - AAAT	Objective: To propose and validate a bio-remediation techniques for sediments polluted by mining waste in the headwaters of tributaries of Lake Titicaca. Outcome 1: Reduced sediment loads and levels of impact as well as environmental

Code and Name	Location	Implementing agencies	Objectives and Outcomes
			recovery from sediments at the head of the Ramis River Basin. Outcome 2: Validated techniques for bio-remediation of sediments in water bodies negatively affected by discharges of industrial wastewater.
07-P-02. Phytoremediation techniques in water bodies affected by domestic sewage. Inner Puno Bay.	Hydrographic Unit: 0153-59-57-Circunlacustre. Level 5: Titicaca. Inner Puno Bay	ANA - AAAT	Objective: To propose and validate a phytoemediation technique for water polluted by discharges of domestic sewage water. Outcome 1: Reduction of eutrophication and recovery of water quality in the inner Puno Bay on Lake Titicaca. Outcome 2: Phytoremediation techniques validated in water bodies negatively affected by domestic sewage.
08-P-03. Creation of the water resources management system for the Ilave River-Titicaca region in Puno.	Hydrographic Unit: n/n-Ilave. Level 5: Titicaca. Region: Puno Provinces: Chucuito, El Collao, Puno Districts: Huacullani, Juli, Capazo, Mazocruz, Conduriri, Ilave, Acora, Chucuito, Laraqueri, Platería, Puno, San Antonio	ANA - AAAT	Objective 1: To teduce environmental risks for the development of residents in the Ilave-Titicaca basin. Objective 2: To Improve services on hydro-meteorological information in the Ilave-Titicaca. Outcome 1: Adequate infrastructure for the Information Center. Outcome 2: Suitable equipment for information, conservation, and management services on water resources. Outcome 3: Technical and administrative training for professionals at the Information Center. Outcome 4: Strategies and communication materials to develop an environmental culture in the basin.
09-P-04. Monitoring of the impact on water quality in areas of high pressure from fish farming by means of automated stations. Larger Puno Bay.	Hydrographic Unit: 0153-59-57-Circunlacustre. Level 5: Titicaca. Region: Puno, Larger Puno Bay District: Chucuito	ANA	Objective: To prevent the deterioration of water quality in the Puno Bay resulting from intensive trout farming. Outcome 1: There is timely, adequate, and relevant information on water quality in an area dedicated to trout farming. Outcome 2: Sustainable practices of aquaculture in Lake Titicaca.
10-P-05. Strengthening of citizen capacities for integrated management of water resources through community-based environmental monitoring in the micro-basin of the Chacas lagoon - Juliaca.	Hydrographic Unit: n/n-Ilave. Level 5: Titicaca. Región: Puno. Province: San Román. District: Juliaca. Area: Microbasin of Chacas pond.	Suma Marka DNGO	Objective: To prevent, mitigate or remedy negative environmental impacts caused by anthropogenic activities in the Chacas pond and its territory, starting from environmental monitoring as a mechanism for citizen participation with emphasis on water resources. Outcome 1: Organizational structure strengthened through the creation of a water management committee for the Chacas microbasin and renewal of the community-based environmental monitoring

Code and Name	Location	Implementing agencies	Objectives and Outcomes
			and supervision committee and CVMACs of educational institutions. Outcome 2: Local stakeholders strengthened with individual and collective capacities generate information and local knowledge for water and land management in the microbasin of Chacas pond. Outcome 3: Improved land management by means of water governance between local and institutional stakeholders that respond to local needs and a larger collective vision of the Chacas pond basin. Outcome 4: Capacities of DNGO Suma Marka strengthened to implement management, systematization of processes and lessons learned from the pilot project that will facilitate engaging diverse social stakeholders in the TDPS system to replicate the experience in the short and medium terms.
11-P-06. Measures to address unsustainable practices and promotion of sustainability of the Titicaca-Desaguadero-Poopó-Salar de Coipasa water system (TDPS), through the implementation of activities and management technologies and reduction of mercury use in areas dedicated to artisanal and small-scale gold mining aiming to a more integrated watershed management.	Department of Puno. Province San Antonio de Putina. District: Ananea. Town: El Trapiche.	MINAM	Objective: To implement a pilot project by implementing new technologies that ensure Hg reduction from gold mining activities. Outcome 1: Improved knowledge and ability of miners and mining organizations to achieve better mining practices, and improve the environment, health, and social practices. Outcome 2: Training program for miners in the region implemented. Outcome 3: Increased capacity of regional and local governments to integrate international agreements and the mandates related to ASGM into plans or programs for sustainable development. Improved access to support services for all stakeholders involved in the ASGM sector. Outcome 4: Increased responsible trade of gold obtained through ASGM at the national and international gold markets.

Table 19. Investment in the pilot projects.

Code	Executing Agency	Duration (months)	GEF funding (USD)	Co-financing (USD)
01-B-01	MMAyA	24	300,000.00	1,800,000.00
02-B-02	MMAyA	36	300,000.00	1,800,000.00
03-B-03	MMAyA	36	370,000.00	2,415,461.00
04-B-04	MMAyA	24	180,000.00	1,080,000.00
05-B-05	MMAyA	36	250,000.00	789,608.00
06-P-01	ANA	24	280,000.00	1,680,000.00
07-P-02	ANA	24	270,000.00	1,220,000.00
08-P-03	ANA	24	280,000.00	1,075,000.00
09-P-04	ANA	24	220,000.00	1,150,000.00
10-P-05	Suma Marka DNGO	24	70,000.00	328,777.07
11-P-06	MINAM	24	280,000.00	2,725,000.00

Component 3. Support system to follow up on the TDPS status and implementation of the Binational Global Master Plan

170. This is a binational component focused on supporting the consolidation of a comprehensive monitoring program for the TDPS. This component will be driven by the BPCU. The EME will guide the development of the monitoring program.

Outcome 4. Updated, accurate, and relevant information on TDPS management is available and accessible to allow implementation of the SAP with an adaptively approach, including attention to social and gender variables.

Output 4.1. TDPS monitoring program.

171. A binational inter-institutional and multidisciplinary working group will be established with technical and academic stakeholders (monitoring working group for TDPS). This working group will review and refine the proposed design for the monitoring program, to be prepared as part of the output 1.1. This will be complemented with the design of the financial mechanism to support the monitoring program and the procedures for data and information storage, custody and access in ALT. The final version of the monitoring program will be presented to the BPSC to ~~encourage the negotiation of~~ negotiate a bilateral agreement that will: (i) adopt the program, (ii) ensure the participation and contribution of national entities (e.g., SENAMHI, IMARPE), (iii) guarantee data and information exchange and sharing among technical and academic institutions of both countries, (iv) establish the mechanisms for data and information storage, custody and access through ALT, and (v) establish the mechanism for program financing and management. Using GEF and counterpart resources, primary

information on key indicators will be collected. Finally, the interface for the TDPS information website, administered by ALT, will be refined to facilitate stakeholders' access and use of information.

Component 4. Improved communication, education, and participation of key stakeholders.

172. This is a binational component to be driven by the BPCU. The ECOM will guide the development of strategies for environmental education, communication, participation, and articulation between stakeholders on behalf of IWRM in the TDPS system. This component seeks to disseminate the outcomes and lessons learned from the project and to foster the development of human capital among the key stakeholders of the TDPS.

Outcome 5. Key stakeholders know the core issues of the TDPS, become empowered and act in the context of IWRM to advance workable solutions.

Output 5.1. Website for the dissemination of project results, including the exchange of experiences through IW:LEARN and participation in IWC

173. The ECOM will develop a system to inform the stakeholders and to disseminate the outcomes and lessons learned in the project (Figure 13). This system will include a project website, a YouTube channel, an electronic newsletter, and a Facebook project account, in addition to other electronic communication platforms. Additionally, with GEF resources, participation of seven people in the International Waters Conference (IWC) will be funded to present project outcomes and exchange experiences with other stakeholders of other transboundary watersheds. As per long-term GEF IW policy, at least 1% of the GEF project grant will be dedicated to portfolio learning through the various IW:LEARN programs and mechanisms.

Output 5.2. Strategies for environmental education and communication for IWRM in the TDPS system

174. Using GEF and counterpart resources, an inventory and documentation of practices and traditional knowledge relevant to the conservation and sustainable use of water resources and native biodiversity will be prepared. The results will be shared with key stakeholders through workshops and disseminated through the websites of the national entities. The information will be incorporated into the instruments for environmental education and communication.

175. The ECOM will guide the design of a communication strategy for environmental education that includes elements in formal, non-formal, and informal education. The strategy will be implemented with GEF and counterpart contributions. In the third year, the effectiveness of the strategy will be evaluated and its components will be refined to articulate effectively with SAP. It is expected that from the fourth year on, ALT will fully assume the implementation of this strategy.

Outcome 6. Key stakeholders actively participate in a coordinated manner to address the core problems in the TDPS system.

Output 6.1. Strategy for citizen participation and articulation among stakeholders in support of IWRM in the TDPS system

176. The ECOM will guide the preparation of a strategy for citizen participation that will encourage building of trust and articulation among key stakeholders of the TDPS. The strategy will be implemented

with GEF and counterpart contributions. The ECOM will promote communication among stakeholders through available electronic communication networks. Using GEF resources, binational multi-level stakeholder meetings on specific issues in the context of integrated TDPS management will be organized (e.g., water management in Maure-Mauri river, conservation and sustainable use of totorales). These meetings will be documented and the memoirs will be distributed through the communication channels of the project (Figure 13).

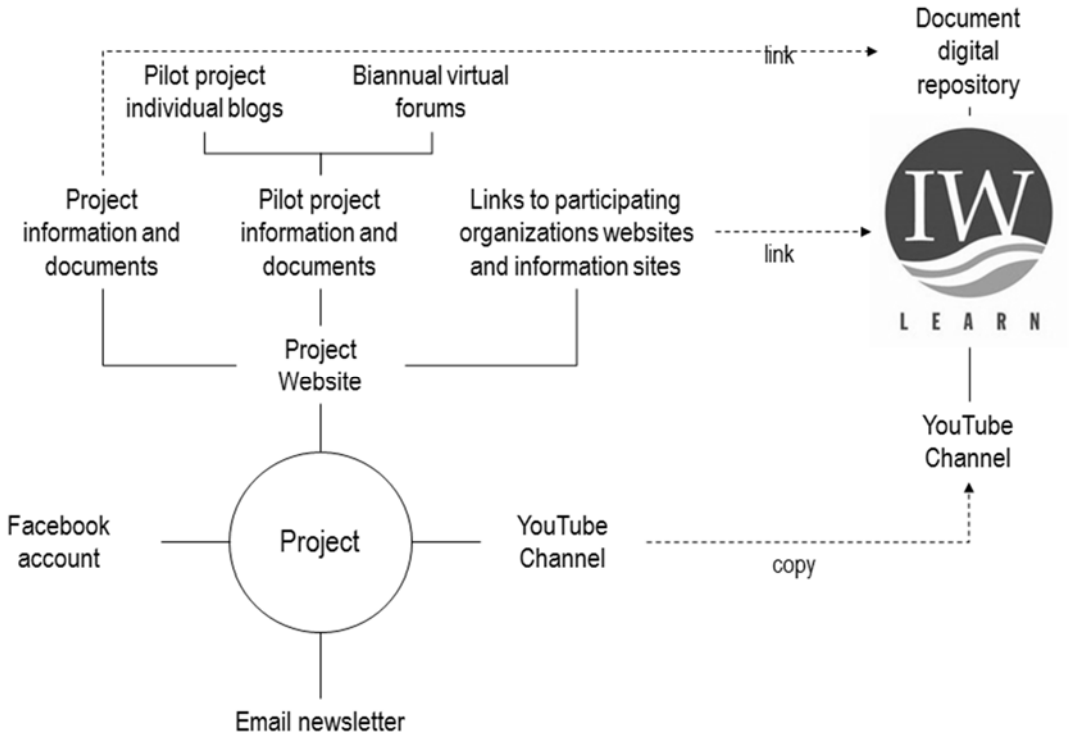

Figure 13. System elements to communicate the outcomes and lessons learned of the project.

Indicators and risks

177. A series of indicators, detailed in Section II of this document, have been established. The expected long-term impact is to improve environmental conditions and biodiversity in the TDPS as a result of integrated management of the water system and investments to address the main causes of deterioration (e.g., discharge of untreated waste water and mine tailings, conversion of tholares and bofedales, and capture of Titicaca giant frogs). In the medium term, this change will manifest through: (1) improved water quality in critical sites such as Puno and Cohana bays and lakes Uru Uru and Poopó, (2) reduced polluting discharges from mining activities, (3) active involvement of key stakeholders in watershed management, (4) disappearance of unusual mass mortality episodes of fish and amphibians in the waterbodies, and (5) increased populations of fish of the genus *Orestias* and suche, the Titicaca giant frog and the zampullin del Titicaca. The risk matrix was revised and updated. It is shown in Table 20 below.

Table 20. Risks and mitigation measures.

Risk	Level	Mitigation Measures
Natural. ENSO. It is documented that rainfall decreases in the TDPS during El Niño. During 2015 El Niño conditions developed between weak and moderate. By 10 september 2015 there was a probability of 95% that El Niño will continue through Northern Hemisphere winter 2015-16, gradually weakening through spring 2016[70].	High	The relationship between ENSO events and climate in the TDPS will be included in the preparatory analyses for the new master plan and will be shared with key stakeholders.
Natural. Occurrence of extreme weather events (hail, frost, drought, floods) that adversely affect the pilot projects. These events are common in the TDPS.	High	It has been ensured that the pilots consider this risk and include measures to prevent negative impact during implementation.
Social. Increased conflicts around the Ramis and Suches rivers due to illegal mining. In case of escalation of conflicts, this could affect the pilot projects implemented in these areas and social participation could be reduced.	High	The project team will establish and maintain direct communication and information channels with local stakeholders and will seek to establish relations of trust with them.
Social. Increased conflicts in the Coata River basin (PER) due to sewage contamination from EPS SEDAJULIACA S.A. This could reduce social participation in the project.	High	The project team will establish and maintain direct communication and information channels with local stakeholders and will seek to build trust with them.
Social. Mobilization due to decreasing captures and decreased number of members in the Fishermen Federation of La Paz with the risk of distrust and inaction on the part of this key stakeholders regarding the project actions.	High	The project team will establish and maintain direct communication and information channels with these key stakeholders and will try to establish relations of trust to encourage their participation in the project.
Social. Protests of irrigation users in the Desaguadero River basin due to decreased flow of river water. This could lead to distrust among the key stakeholders in the area.	High	The project team will establish and maintain direct communication and information channels with local stakeholders and will seek to establish relations of trust to encourage their participation in the project.
Political. Persistent distrust among national and subnational stakeholders. This can motivate a disconnection among key stakeholders of the project.	High	The project will promote the development of trust and will facilitate coordination and political dialogue between stakeholders at different levels.
Political. Disinterest among local stakeholders and beneficiaries to become involved and participate in the pilot projects.	Medium	It has been ensured that the proponents of pilot projects have informed the local stakeholders and have obtained their conformity.

Incremental reasoning and expected benefits

178. The project will generate global benefits by catalyzing the sustainable management of the transboundary Titicaca - Desaguadero - Poopó - Salar de Coipasa water system and the conservation of

[70] Climate Prediction Center, National Oceanic and Atmospheric Administration (NOAA).

highly value biodiversity. Without this intervention, it is very likely that deterioration will continue in the TDPS, as a result of uncoordinated actions based on sectoral and local visions and perspectives.

179. The lessons learned from the project will be useful for other endorheic watersehed and other transboundary water systems.

180. At the nationwide level, the project will contribute to mainstream integrated water resources management, which is central to the strategies for water resources in both countries. It will also encourage dialogue among multilevel key stakeholders to achieve their support to conservation of water resources and biodiversity. Multi-level dialogue will also contribute to engage indigenous groups and women into governance processes.

181. In the short-term, the TDPS resource users would benefit from strengthening their participation in the decision-making processes and from building partnerships and trust with other stakeholders. Women will be empowered by having direct involvement into governance processes for water management. In the medium term, it is expected that local groups, including women and indigenous people, will benefit from access to sustainable and safe water resources, goods, and of biodiversity functions in TDPS.

Coordination with other initiatives

182. The project will use the lessons learned from the following GEF projects:

1. The projects for the preparation and implementation of the strategic action programme for the Bermejo River Basin (GEF-ID 176 and 886), implemented by UNEP in Bolivia and Argentina.
2. The project on sustainable management of water resources in the La Plata River Basin with respect to the effects of climate variability and change (GEF-ID 2095), implemented by UNEP and executed by the Organization of American States.
3. The project on integrated and sustainable management of transboundary water resources in the Amazon River basin, implemented by UNEP and executed in the framework of the Amazon Cooperation Treaty Organization (OTCA), in which Bolivia and Peru participate.
4. Of particular interest will be the coordination and exchange of information with the following GEF projects:
5. Implementation of comprehensive measures to minimize mercury discharges from artisanal gold mining (GEF-ID 4799), which is being implemented by UNIDO in Peru.
6. Adaptation to climate change impact on water resources in the Andes (GEF-ID 5384), which is currently in preparation. It is being implemented by the World Bank in Bolivia, Colombia, Ecuador, and Peru.
7. Developing of risk management approaches for mercury in Latin America (GEF-ID 5494). It is a regional project implemented by UNEP in Peru.
8. Development of the initial evaluation of the Minamata Convention in Latin America and the Caribbean (GEF-ID 5879), a UNEP regional project which includes Bolivia.
9. National Biodiversity Strategy and Action Plan (GEF-ID 5888), currently implemented by the IDB in Bolivia.
10. Support to 16 eligible parties to align the National Action Programmes and reporting process under UNCCD (GEF-ID 5898), which is an international project of UNEP that includes Bolivia.
11. Support for NAP alignment and reporting of UNCCD (GEF-ID 5899), implemented by UNDP in Peru.

183. It will be essential to maintain close coordination with the project on integrated water resources management in the Puyango-Tumbes, Catamayo-Chira and Zarumilla transboundary aquifers and river basins (GEF-ID 5284), to be implemented almost simultaneously in Ecuador and Peru by UNDP. The implementing partner of the project in Peru is ANA, it will be important to exchange experiences in the

preparation of the TDA and SAP, implementation of pilot projects, monitoring the impacts caused by gold mining, creation of watershed councils, and integrated management of water resources. In addition, courses and education and communication materials could possibly complement each other.

184. The project will complement efforts with four other donor projects:

1. Building river dialogue and governance (BRIDGE[71]), implemented by IUCN with funding from the Swiss Agency for Development and Cooperation (SDC). Since 2011, this global project has provided direct support to the ALT for the development of tools and capabilities. Phase 2 will close in 2015, but a third phase, which would include the TDPS, is being negotiated. It is necessary to take advantage of the outcomes of this initiative in the TDPS and the other transboundary watersheds. If a third phase is approved, it will be crucial to ensure strong complementarity in the actions of both projects. Therefore, it is advisable to sign an agreement of commitment and organize annual meetings for joint planning.
2. Program for sustainable management of natural resources in the Lake Poopó Basin, sponsored by the European Union and implemented in collaboration with the Departmental Autonomous Government of Oruro (BOL). This initiative has generated important information and lessons for the management of mine tailings and environmental liabilities. They also prepared a plan for environmental education in Lake Poopó and outlined the concept of a watershed body for the Lake Poopó hydrographic unit. This project will close in 2015, but there is high probability that a second phase be developed. Information and outcomes generated by 2015 should be taken into account and, if a second phase is approved, it will be essential to ensure strong complementarity in the actions of both projects. Therefore, it is advisable to sign an agreement of commitment and organize annual meetings for joint planning.
3. Management of environmental damages in protected areas and their influence on water resources, sponsored by the European Union and implemented in collaboration with the MMAyA. The project will be implemented between 2015 and 2017 and will focus on producing a diagnosis of environmental liabilities generated by mining activities that affect protected areas. This is directly complementary to the proposed inventory of mining environmental liabilities and assessment of their impact on the TDPS, which will be a part of the TDA preparation (Output 1.1). Therefore, once this project begins, it will be essential to coordinate actions and subsequently integrate the results.
4. Support Program for Sustainable Biodiversity Conservation (PACSBIO), sponsored by the European Union through budget support and complementary support to MMAyA. The PACSBIO

[71] This is a global initiative that seeks to promote IWRM in transboundary basins in four regions: Mesoamerica, Mekong River, Africa, and the Andes. Since 2012, BRIDGE has participated in three shared basins of South America: (i) Zarumilla, (ii) Catamayo-Chira, and (iii) Lake Titicaca. In the region, it has helped increase institutional effectiveness and transboundary cooperation through strengthening regional capacities, promoting the involvement of stakeholders at different levels through the use of tools, experiences, and successful approaches to water management. IUCN works with the foreign ministries and water agencies of the countries involved. In the Titicaca basin, BRIDGE works directly with ALT. Among its main activities are: (i) collecting basic information for decision-making; (ii) supporting institutional strengthening and capacity building with key stakeholders in the Titicaca Basin (including capacity building workshops with ALT). In 2014, BRIDGE supported developing a baseline of knowledge on hydrological and aquatic resources in the TDPS system working jointly with the French Research Institute for Development (IRD). Other studies include: (i) "Information System Oriented to IWRM in the TDPS Water System; (ii) "Diagnosis of the hydro-meteorological stations network in the TDPS Water System and Recommendations for Best Performance;" (iii) "Setting the Reference Zero in Altimeter Level in Lake Titicaca TDPS Water System". They also developed the "Information System on Transboundary Basins". The second phase closed in 2015 and supported: (i) capacity building for the management of hydro-meteorological agencies with local data in Bolivia and Peru; (ii) promoting twinning experiences between Lake Geneva and Lake Titicaca; (iii) development of tools for a diploma on transboundary water management in the context of climate change, together with the NGO Agua Sostenible and Universidad de la Cordillera; (iv) support to ALT in the organization of workshops for capacity building in wastewater management among the new authorities in local municipalities; and (v) possible support to MMAyA and MINAM to develop opportunities for dialogue with experts to strengthen the intervention strategy on Lake Titicaca in order to tackle environmental degradation problems.

focuses on strengthening the national system for protected areas by promoting shared management as well as the socio-economic role of communities living in protected areas.

Cost – effectiveness

185. The project will ensure the cost-effectiveness of GEF resources through:

1. Allocate GEF funds to activities and products with high catalytic potential, such as:
    a. Participatory processes for the construction of TDA and SAP.
    b. Design of a transboundary IWRM course for officials from national, regional, and local governments and an IWRM course for social and productive organizations in TDPS, including training of trainers.
    c. Systematization and dissemination of experiences from pilot projects.
    d. Design and implementation of strategies for environmental education, communication, and participation.
    e. Use of electronic platforms to: (i) facilitate access to information for decision making (TDPS information website), (ii) disseminate lessons learned and outcomes of the project, and (iii) facilitate communication and articulation among key stakeholders.
2. Build on the lessons and experiences on management of transboundary water systems and the outcomes of other projects and initiatives.
3. Anchor the continuation of activities in the new structure of ALT and in entities at the national, regional, and local levels with competence and responsibility to address the critical issues in the TDPS (e.g., polluted water discharges).

186. As explained above, the solution of the problems of the TDPS requires high levels of investment by multiple public and private stakeholders. The project aims at contributing to catalyze these actions in order to build human and social capital and provide basic management tools focused on IWRM. Therefore, the cost-effectiveness of the project is reflected in the fact that major changes in the current condition of TDPS will be promoted from current investment in strategic actions, with high potential for synergy and replicability.

Sustainability

Environmental sustainability

187. The project aims to promote the conservation of biodiversity and water resources in the TDPS, framed in policies and action plans of Bolivia and Peru. The restoration of degraded water bodies, mitigation and prevention of negative anthropogenic impacts, and sustainable use of water resources are priorities on the political agenda in both countries.

Social sustainability

188. The project includes a participatory approach and emphasizes the involvement of key stakeholders in the management of TDPS resources. Measures will be taken to ensure that local stakeholders (farmers, fishers, indigenous groups) are represented and participate in the processes of construction of the TDA and the SAP, in IWRM training directed to social and productive stakeholders, and in watershed management processes. Also, the project will seek the involvement of local groups in community monitoring processes; therefore, the experience on the pilot project conducted by the NGO Suma Marka in the Chacas lagoon (PER) will be very useful. The activities in the strategies for environmental education and communication (output 5.2) and citizen participation (output 6.1) include elements to

promote multilevel dialogue and articulation of key stakeholders. It is anticipated that ALT will internalize and keep in the long-term the strategies outlined above.

Institutional sustainability

189. The project is anchored in the water authorities and ministries of foreign affairs of Bolivia and Peru, and the ALT, which is an international public entity in charge of managing the TDPS. The countries have expressed their interest to support conservation in the TDPS by: (i) modernizing the structure of the ALT (a process that is underway), (ii) funding the ALT, and (iii) investing in co-financing this project. In addition, the project activities will contribute to strengthening the role of the water authorities and the integrated watershed management, and the role of ALT by means of internalizing actions for involvement and participation of key stakeholders, which has been a weakness up to now.

Financial sustainability

190. GEF resources will be invested in strategic actions to catalyze a robust integrated management of the TDPS. The post-project sustainability of actions is ensured by the ALT budget and actions and investments carried out by MMAyA, MINAM, and ANA.

Replicability

191. There is high probability of replicating the lessons learned from the project. GEF resources have been strategically assigned to activities with high potential to catalyze learnings, the experiences and lessons of the participatory process of preparing the TDA and SAP and the pilot projects will be documented and disseminated. It is expected that the lessons learned from the pilot projects (e.g., restoration of bofedales and reduction of pollution caused by small-scale gold mining) will be immediately used in the short term within the TDPS and other regions in both countries. The lessons leaned from this project will be certainly applicable to various contexts of the planet.

PART III: Management Arrangements

192. This is a binational project to be implemented under the National Implementation Modality (NIM), according to the standards and regulations of UNDP in Bolivia and Peru. UNDP is the GEF implementing agency and, consequently, will be ultimately responsible to GEF for the channeling of resources to the executing agencies, in accordance with UNDP rules and regulations. The executing agencies (also called implementing partners[72]) will be the Ministry of Foreign Affairs of the Plurinational State of Bolivia (MRE-B) and the Ministry of Environment of Peru (MINAM). In addition, the National Water Authority of Peru (ANA), the Ministry of Foreign Affairs of Peru (MRE-P), and the Ministry of Environment and Water of Bolivia (MMAyA) will directly participate in executing elements of the project. The host country will be Peru; consequently, the Lead Country Office (UNDP Peru) will coordinate the regional component, including the preparation of the TDA and SAP.

193. A Binational Project Steering Committee (BPSC) will be created to oversee and provide strategic guidance to the project (Figure 14).

194. The NGO Suma Marka, in charge of implementing the pilot 10-P-05, will receive funds for the financing of activities approved by the Project, under the budget line “72600 Grants”. Grants will be provided according to UNDP Guidance on Micro-Capital Grants.

Implementing agency

195. The United Nations Development Programme is the implementing agency and as such will provide project cycle management services as quality assurance and oversight of project implementation and supervision. UNDP will be responsible for monitoring, and evaluation of project interventions, achieving outcomes, and effective use of GEF resources. UNDP will provide project cycle management services as defined by the GEF Council (Annex 10), which include the following:

1. Provide financial and auditing services to the project.
2. Monitor the financial expenditure against project budgets.
3. Ensure that activities, including procurement and financial services, are developed in strict compliance with UNDP/GEF procedures.
4. Ensure that reporting to GEF is done within the framework of GEF requirements and procedures.
5. Facilitate learning, exchange, and dissemination of the project within the scope of the GEF.
6. Hire the midterm review and final evaluation for the project and initiate revisions and/or additional assessments as necessary in consultation with project partners.

196. The project will be implemented under the NIM modality through designated national institutions with the support of UNDP country offices in Bolivia and Peru. Each country will implement, under the NIM modality, the corresponding pilot projects (component 2 of the project). Peru, as host country, will also be responsible for the binational project components with support from the Lead Country Office of UNDP (UNDP Peru).

UNDP Support Services

197. Upon request from the governments of Bolivia and Peru, UNDP can provide Direct Project Services (DPS) according to its specific policies and convenience. In this case, the Implementing Partner will sign a Letter of Agreement (LOA) specifying the services to be provided and their costs. According

[72] In UNDP terminology, "implementing partner" is the entity responsible and accountable for managing a project. (This also includes related monitoring and evaluation of interventions). The entity is also responsible for obtaining the products/outputs of project activities, as well as for effective use of UNDP resources (UNDP, 2011).

to GEF requirements, the costs of these services will be part of the project management costs of the executing entity identified in the project budget. UNDP and the governments of the Plurinational State of Bolivia and the Republic of Peru recognize that these services are not mandatory and will only be provided in full compliance with the UNDP recovery of direct costs policies. The DPS will be charged annually using the UNDP Universal Price List.

198. UNDP will provide Project Assurance supporting BPSC through functions of objective and independent oversight of the project and monitoring. Supervision will be carried out by the Regional Technical Advisor for Water and Oceans of the UNDP Regional Centre for Latin America and the Caribbean in Panama (RSC-LAC), and UNDP country offices in Bolivia and Peru. The project assurance team will review and analyze project reports and the draft annual work plan and budget before they are submitted to BPSC and will make recommendations to optimize project performance.

199. UNDP will hire members of the Binational Project Coordination Unit (BPCU) (Figure 14) and will oversee their technical, administrative, and financial performance.

Implementing partners

200. In each country, there will be an agency responsible for the implementation of agreed national activities and that agency will also be the National Coordinator (CN). The implementing partners (IP) will be the MRE-B in Bolivia and MINAM in Peru. The IP may request the services of the UNDP country office (UNDP-CO) for the provision of DPS. In this case, the IP must sign a LOA specifying the services required and the corresponding costs.

Binational Steering Committee

201. A Binational Steering Committee will be created to oversee and provide strategic guidance to the project. The BPSC shall consist of: (1) official delegates from MRE-B, MRE-P, MMAyA, MINAM, and ANA, (2) the Resident Representative of the Lead UNDP Country Office, and (3) the Regional Technical Advisor in International Water and Oceans of RSC-LAC. The binational project coordinator (CBP) will act as secretary and participate in BPSC meetings without voting.

202. The BPSC will be responsible for making decisions about the overall management of the project and will maintain the strategic focus of its components. The BPSC will be responsible for: (1) monitoring the implementation of the project, (2) approving the annual budget and annual work plan (AWP) prepared by the CBP, (3) review the annual project report (APR) and provide comments and recommendations, (4) approve major changes to the plan or project strategy, (5) evaluate the performance of the project, analyze the midterm assessment reports and final evaluation of the project, and provide comments and recommendations, (6) arbitrate conflicts that may arise, and (7) approve the annual operating plan.

203. The BPSC shall meet at least twice a year in person. The chair of BPSC will alternate annually between representatives of MRE-B and MRE-P. The BPSC may be extraordinarily convened by the chairperson upon request by members.

204. To ensure the ultimate responsibility of UNDP for the outcomes of the project, BPSC decisions will be made according to standards that ensure managing for development results, best value for money, fairness, transparency, and effective international competition.

Binational Technical Committee

205. A Binational Technical Committee (BTC) will be established to provide technical support and facilitate the achievement of outcomes (Figure 14). The committee will promote and facilitate binational

cooperation and coordination for implementation of the project as well as dissemination and replication of learned lessons in the pilot projects. The BTC will be composed by the National Coordinators of Bolivia and Peru, technical delegates of the three vice ministries of MMAyA[73], the Vice Ministry of Environmental Management of MINAM and ANA. Also, may participate technical delegates who so decide Bolivia and Peru.

206. The BTC will meet quarterly in person or by teleconference. A coordinator will be appointed at the inaugural meeting. Coordination of BTC will alternate each year between representatives of MMAyA and MINAM. The CBP will act as secretary during the meetings and will participate without vote.

207. At the Project Inception Workshop (PIW), the composition[74] and method of operation of the BTC will be refined.

Binational Project Coordination Unit

208. The project will have a Binational Project Coordination Unit, consisting of: (1) a Binational Project Coordinator, (2) a Project Manager (ADP), (3) a monitoring and evaluation specialist, (4) a communications specialist, and (5) an administrative/accounting assistant (Figure 14). The BPCU will be based in Puno (Peru) and will be responsible for the daily execution of the project. There will be equity in the representation of the nationalities of the four specialists. The CBP and ADP will be one from each country, and likewise, the EME and ECOM will be one from each country. The administrative/accounting assistant will be from the non-host country and will be based in its territory (see below). Staff pay scales are shown in Table 21.

209. BPCU staff will be distributed between the two countries. The host country will accomodate the BPCU and will provide office space, facilities, and utilities in Puno, and other sites if necessary, during the four years of the project. The CBP, the Project Manager, and the monitoring and evaluation specialist will be based in the headquarters.

Table 21. Salary scale for BPCU staff.

Position	Salary (USD/month)
Binational Project Coordinator	3.000
Project Manager	2.500
Monitoring and Evaluation Specialist	2.000
Communications Specialist	2.000
Asistente administrativo / contable	1.500

Binational Project Coordinator

210. The CBP will be hired with GEF funds and will be responsible for the daily management and technical soundness of the project and will monitor the implementation of activities and prepare the

[73] Vice Ministry of Drinking Water and Basic Sanitation, Vice Ministry of Water Resources and Irrigation, and Vice Ministry of Environment, Biodiversity, Climate Change and Forest Management and Development.

[74] It is desirable to incorporate other technical entities related to the integrated water resources management in TDPS, such as SENAMHI in each country, IMARPE, or IPD-PACU.

reports. The CBP will have experience in project management and integrated water resources management, preferably with previous experience in management of transboundary water resources with culturally diverse groups.

211. The CBP will:

a. Will be the authority in charge of signing requirements to UNDP for disbursement of project funds based on the annual operating plan approved by the Binational Steering Committee.

b. Oversee and guide the actions of the project, with emphasis on the preparation of the TDA and SAP and the strengthening of transboundary IWRM.

c. Promote coordination among implementing partners, national entities involved in the project, the projects executing complementary actions in the TDPS, the BPCU team, and the teams and consultants to be engaged in specific activities.

d. Act as secretary of the BPSC and CTB, and keep minutes of the meetings.

e. Provide information and support to the implementation of the midterm and final evaluation of the project.

f. Supervise BPCU members.

212. The CBP, with support from the Project Manager will:

a. Ensure the logistical, administrative, and financial effectiveness of the implementing partners so that they perform their assigned roles.

b. Prepare project reports, work plans, budgets and accounting records.

c. Prepare the AWP and budgets to be submitted to BPSC for approval. He/she will also prepare quarterly reports and annual progress reports. These reports will provide details on progress made, difficulties found, and adjustments necessary to achieve project results.

d. Prepare terms of reference (TOR), technical specifications, and other documents.

e. Oversee the accomplishment of the TORs of national and international consultants.

f. Verify the effective and efficient implementation of project activities.

g. Organize meetings, workshops, travels and other project activities.

Project Manager

213. The AdP will be hired with GEF resources and will be in charge of the daily administrative and financial management of the project, as well as of preparing the administrative and accounting reports. The AdP will have experience in project management, preferably with prior experience managing GEF projects. The AdP will be supervised by the CBP. The Project Manager will:

a. Ensure the logistical, administrative and financial effectiveness of the implementing partners so that they perform their assigned roles.

b. Prepare project reports, work plans, budgets and accounting records.

c. Prepare the AWP and budgets, quarterly reports, and annual progress reports.

d. Support the CBP in identifying national or international consultants and suppliers.

e. Supervise the activities of the suppliers of goods and services.

f. Ensure the necessary support so that the activities of the project are implemented effectively and efficiently.

g. Organize logistics, meetings, workshops, travel and other activities necessary for the implementation of the project.

h. Supervise the administrative assistant/accountant.

Monitoring and evaluation specialist

214. The EME will be contracted with GEF resources and will be responsible for monitoring the progress of the project to ensure that the products and results are achieved within time and cost constraints. The EME will perform the monitoring and documentation of the pilot projects (component 2) and will guide the development of the monitoring program for the TDPS (component 3). This specialist will (a) compile and systematize information on the indicators of the project, (b) verify that the binational and national activities are implemented according to the AWP and budget, (c) prepare quarterly reports with recommendations for the CBP, and (d) provide necessary information and input for the mid-term and final project assessments. The EME will have experience in monitoring and evaluation of projects and initiatives related to IWRM, preferably with prior experience in monitoring GEF projects. This specialist will be supervised by the CBP.

Communications specialist

215. The ECOM will be contracted with GEF resources and will be responsible for providing support for the development of communication and education on project activities. He/she will facilitate and promote dialogue, communication, and articulation between the key stakeholders of the TDPS. The ECOM will establish and operate the platforms of information and communication of the project (i.e., website, YouTube channel, accounts in social networks, email distribution list) and will ensure linkage with the websites of participating entities and IW:Learn. In addition, the specialist will ensure the dissemination of the progress and results in the process of preparation of the TDA and SAP (component 1) and pilot projects (component 2), and will guide the development of strategies on environmental education, communication, participation, and articulation among key stakeholders for IWRM in the TDPS (component 4). This specialist will (a) compile and systematize information on advances in communication, education, participation and articulation of key stakeholders, (b) prepare quarterly reports with recommendations for the CBP, and (c) provide information and support for the mid-term and final project assessments. The ECOM will have experience in environmental educational communication and working with culturally diverse groups, preferably with prior experience in IWRM and participation in GEF projects. This specialist will be supervised by the CBP, and will have his/her base of operation in the secondary base of the project. His/her work will be outlined in the annual workplan approved by the Binational Steering Committee.

Administrative Assistant / accounting

216. This person will be hired with GEF resources and will be supervised by the AdP. The administrative assistant/accountant will prepare financial and operational information, consolidate accounting information, and will provide direct support to the activities being implemented in the non-host country and those performed by the members of the BPCU in the secondary base of the project.

National Coordinators

217. The national coordinators will be high ranking officers designated by the national authorities of the IP.

218. The main responsibility of the CN is to ensure that the project generates the outcomes specified in the Project Document at the required quality levels within the constraints of time and cost and in compliance with established procedures. The CN will be responsible for (a) monitoring the implementation of national activities of the project, (b) requesting payments in accordance with annual

operating plans, and (c) conducting relevant procurement and acquisitions. Each country will assign officials to support the activities of the CN. The CN, support staff, and operating costs will be funded with cofinancing resources.

Connections with related activities

219. Overlap and duplication of financing will be prevented at all costs. There will be a close and permanent coordination with similar and complementary initiatives in the areas of intervention within the TDPS (e.g., BRIDGE, Poopó Basin Program) in order to capitalize on and enhance the impacts of the project. The CN will lead this task.

Administrative costs

220. The project cycle management services will be covered by the Project Management Cost (CAP) of the GEF implementing agency. The internal division of these items between country offices will be made according to UNDP procedures. The DPS will be charged using the UNDP Universal Price List when the IPs require UNDP administrative and financial support to implement project activities.

Contribution of implementing partners

221. The IPs, in coordination and through the CN, will provide contributions in kind to the project. The IPs will ensure the active participation of their staff, particularly in relation to IWRM in TDPS.

Agreement on intellectual property rights and use of logo on project products

222. In order to properly acknowledge GEF funding, the GEF logo will be printed on all project publications and, among other things, on equipment, vehicles, or structures acquired with GEF funding. Proper recognition of the GEF contribution will be included in the publications.

Ownership of equipment and goods

223. Property and equipment purchased as part of this project will belong to the UNDP country office during the implementation phase and will be transferred to local beneficiaries according to UNDP procedures and policies, subject to approval by the Implementing Partners. Only national organizations may be considered as beneficiaries. For their use, during project implementation, they will be delivered in trust to national institutions through the National Coordinators.

Audit

224. According to UNDP corporate regulations on audits, there will be internal and external audits individually to each implementer partner and these costs will be covered by the project. The audit firms will be identified by the Binational Steering Committee.

225. IPs will periodically provide, through the National Coordinators, to the corresponding UNDP resident representative certified financial statements, and an annual audit of financial statements regarding the status of UNDP resources (including GEF) according to the procedures established in the manuals of programming and finance. The audit will be performed by a certified auditing company. UNDP will be responsible for making the necessary arrangements for the audit in communication with the IPs.

226. UNDP and the IPs, through the National Coordinators, will provide responses to the audits, and the CBP and the support team will comply with the recommendations of the audit.
227. As part of the oversight function, UNDP will conduct spot check audits at least twice a year. UNDP shall have the right, at its own expense, to audit or review the books and records of the project and, if necessary, have access to the books and records of the entities that manage project resources.

Collaboration with related projects

228. To ensure the maximum benefit from the programme approach of this project, a series of coordination mechanisms with existing initiatives and projects will be established or with those that may develop later, including:
a. Identification of projects and relevant initiatives through the Binational Technical Committee.
b. Annual coordination meeting with relevant GEF projects and projects of other donors.
c. Participation in the International Waters Conferences (IWC) to take place in 2017 and 2019.
d. Letters of understanding with relevant projects and initiatives of other donors. Regular meetings will be established with those to jointly analyze the progress and refine cooperation and coordination activities to promote the integrated management of the water resources in the TDPS.

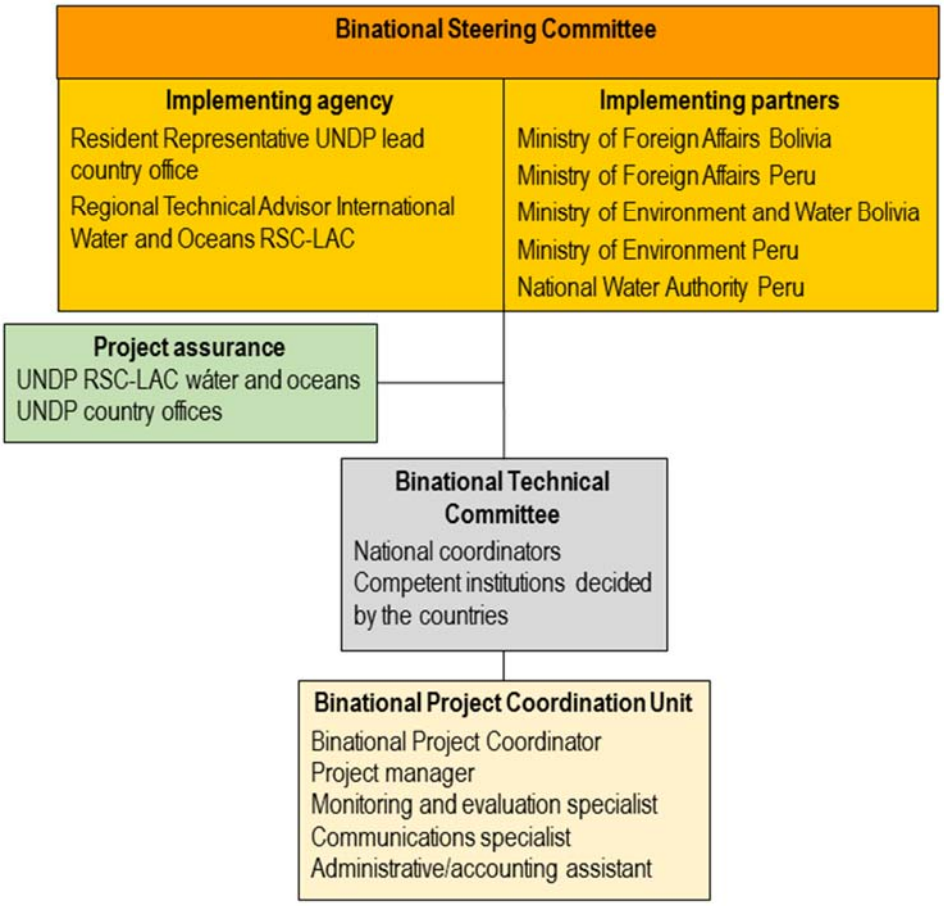

Figure 14. Project organizational structure

PART IV: Monitoring and Evaluation Plan

229. The project´s monitoring and evaluation (M&E) will be based on the procedures of UNDP and the GEF, and will be executed by the project team and the UNDP-COs with support from the RSC-LAC. The results framework, which is in Section II of the present document, includes the impact and outcome indicators with the respective targets and means of verification. The M&E plan includes an inception report, implementation reviews, quarterly and annual reports, a mid-term evaluation, a final evaluation and audits. The elements of the M&E plan are explained in the following paragraphs and the indicative costs are presented in Table 22. The M&E work plan will be fine-tuned in the Project Inception Workshop (PIW).

Project start

230. A project inception workshop will be held within the first two months of project start with all members of the BPCU, the governmental counterparts, the cofinanciers, the UNDP-COs and representatives of the RSC-LAC and UNDP-GEF units. The PIW is crucial to build ownership for the project and to plan the first year annual work plan based on the results framework.

231. The PIW should address the following matters:

a. Ensure that all participants understand the logic of the project and the expected outcomes and impacts.

b. Detail the roles and responsibilities of project participants: (i) the members of the BPCU, (ii) the UNDP-COs, and (iii) the implementing partners.

c. Examine and, if necessary, clearly establish the roles, functions, responsibilities and conformation of the project´s decision-making structures. The analysis will include the reporting and communication lines, and the conflict resolution mechanisms.

d. If necessary, review and fine-tune the TOR of the project staff.

e. Review the results framework and, if necessary, fine-tune the indicators, baseline, targets, means of verification and assumptions and risks.

f. Examine and, if necessary, fine-tune the risk analysis.

g. Review the list and scope of the additional studies required for TDA development (component 1).

h. Review the list and scope of the pilot projects to be implemented (component 2).

i. Plan the field visit for on-the-ground assessment to be implemented during the first year of the project.

j. Based on the results framework and the GEF monitoring tool prepare the first AWP. The AWP will include progress indicators and implementation targets to follow and verify that the project is being implemented within schedule and the agreed course.

k. Fine-tune and agree the M&E plan and its budget.

l. Outline and agree the responsibilities, procedures and obligations for annual audits.

m. Detail and agree responsibilities and procedures for financial reporting.

n. Set the dates for the first meeting of the Binational Steering Committee and the Binational Technical Committee. Both committees must have their first meeting within three months following the PIW.

232. An Inception Workshop report will be prepared and shared with participants to formalize the agreements, plan and targets set during the meeting.

Monitoring events and responsibilities during project implementation

Daily monitoring

233. Daily monitoring with respect to the AWP and the progress indicators will the responsibility of the Binational Project Coordinator, with support of the Monitoring and Evaluation Specialist and the Project Manager. The CBP will report to the lead UNDP-CO of delays and difficulties, to obtain appropriate support and implement corrective measures. The AWP will include progress indicators and implementation targets to verify that the project is being implemented within schedule and the agreed course. As part of the preparation of the annual plan the progress indicators and targets for the following year will be established; these will be included in the corresponding AWP. The monitoring and verification of the outcome and impact indicators will be done according to the schedule and methods indicates in the project´s results framework

Quarterly monitoring

234. The lead UNDP-CO will have quarterly meetings with the project team to verify advance based on the quarterly progress reports. If necessary, there will be more frequent meetings. The quarterly meetings will allow to promptly identify problems and difficulties and to take prompt corrective actions.

Annual monitoring

235. The Binational Steering Committee will review the advance and performance of the project. The key instruments for the evaluation are the **Annual Project Report** (APR) and the **Project Implementation Review** (PIR).

236. The lead UNDP-CO and the RSC-LAC will conduct annual visits to the TDPS to assess on-the-ground the progress of the project, but more frequent visits will be conducted if needed. The details of these visits will be included in the AWP. The members of the Binational Steering Committee may participate in the visits if the BPSC so decides. The lead UNDP-CO will prepare a Field Visit Report, which will be circulated, within one calendar month after the visit, to the project team, the members of the BPSC and the UNDP-GEF unit.

End of the project

237. During the last month of project implementation the Binational Steering Committee will conduct a final review. The instruments for the final review will be the **Final Evaluation Report** and the **Project Terminal Report**. The final review will (i) analyse the entire project, (ii) indicate if the expected outcomes were obtained and there was effective contribution to attain the expected impacts and global benefits, and (iii) examine the lesson learnt. The Binational Steering Committee will decide if it might be necessary to implement additional actions (national or binational) to ensure the sustainability of the project achievements and outcomes.

Monitoring reports

238. During project implementation the following reports will be prepared and circulated, which are compulsory elements of the monitoring and evaluation process:

Project Inception Report. This report will be prepared by the CBP, with support of the AdP, immediately after the execution of the PIW and will include:

a. The AWP for the first year, divided by trimesters, outlining the activities and the progress indicators and targets.
b. The dates for the field visits, the support missions from the UNDP-CO and RSC-LAC, and the meetings of the Binational Steering Committee and the Binational Technical Committee.
c. The detailed budget for the first year of the project.
d. The needed monitoring actions to measure project progress and performance during the first year of implementation.
e. A detailed description of the roles and responsibilities of the project participants: members of the BPCU, UNDP-CO and implementing partners.
f. A description of the start-up actions up-to-date.
g. The identification of changes in external conditions and risks that could affect project implementation.
h. The list of technical reports that the project will produce and the expected dates for their distribution.

The Project Inception Report will be reviewed by the UNDP-Cos and the RSC-LAC and afterwards presented to the implementing partners, who will have one calendar month to indicate comments or queries.

Annual Project Review (APR) and Project Implementation Report (PIR). These reports are prepared to monitor progress made since project start. The APR is a UNDP requirement as part of it quality assurance function, whereas the PIR is a GEF requirement. The elements of these reports are:

a. The **Annual Project Review** is a self-assessment prepared by the project team for the lead UNDP-CO. It provides inputs for the national report process and the Results-Oriented Annual Report (ROAR). The APR will be prepared yearly as an input for the annual progress and performance review conducted by the Binational Steering Committee. The APR will report the progress made with respect to the AWP and the contribution to attain the expected outputs and outcomes. The format of the APR is flexible, but it must contain at least the following sections: (i) risks, key issues and adaptive management, (ii) advance with respect to the progress indicators and targets, (iii) advance with respect to the expected outcomes and impacts, and (iv) lessons learnt and best practices.

b. The **Project Implementation Report** is an essential tool for monitoring and administration. The PIR will be prepared on June / July of each year by the lead UNDP-CO and the project team. The report will be analysed by the Binational Steering Committee to obtain a PIR agreed by all parts: project team, implementing partners, UNDP-COs and RSC-LAC. These reports will be systematised, reviewed and analysed by the RSC-LAC before being sent to the UNDP-GEF unit.

Quarterly Progress Reports prepared by the project team and submitted to the lead UNDP-CO and the RSC-LAC. Progress made shall be monitored in UNDP´s Enhanced Results Based Management Platform and the logbook of risks will be regularly updated in ATLAS.

Special Thematic Reports, focused on particular aspects of the project, will be prepared by the project team when required by UNDP or the BPSC. This kind of report will be requested by an UNDP official note stating the scope, activities and subject to report. These reports could serve to reflect on lessons learnt, analyse critical issues of the project, or rethink about the obstacles and difficulties found and to develop measures to confront them. The request of these reports must be kept to the minimum, however when needed an appropriate time will be given for its preparation.

Project Terminal Report. During the last trimester of year four the project team will prepare this report, using as an input the Final Evaluation Report. The Project Terminal Report will systematise (i) the achievements with respect to expected objective, outcomes and outputs, (ii) the learnings, (iii) the problems and difficulties found, (iv) the outcomes that were not achieved, and (v) recommendations for additional actions to ensure sustainability and replicability of the project outcomes. The report will

be analysed by the lead UNDP-CO and the RSC-LAC before it is submitted for the final review by the Binational Steering Committee.

Technical reports. These are documents prepared by consultants or the project team that address specific technical / scientific analyses of the project. In the present project a number of studies will be prepared during the construction of the TDA. The Project Inception Report will list the technical reports and the expected date for dissemination. If necessary, the list and the corresponding dates will be revised in the following AWP.

Publications. These will serve to disseminate the achievements and outcomes of the project, and could be technical / scientific or for general use. The preferred format will be digital (Adobe PDF) and disseminated through the websites of the project and participating entities. Only selected publications will be printed in paper. The project team will identify those publications that merit to be paper printed and must obtain the endorsement from UNDP and the implementing partners.

Independent evaluations

239. The project will have two external independent evaluations:

240. The **Mid-Term Review** (MTR) will be conducted on the last trimester of year 2 and will focus on progress with respect to the expected outcomes and will identify corrective actions that might be needed. The MTR will be based on the guidelines agreed by UNDP and the GEF[75]. The assessment will (i) focus on the effectiveness, efficiency and timeliness of project implementation, (ii) highlight issues requiring decisions and corrective actions, and (iii) present lessons learned about project design, implementation and management. Findings of the MTR will be incorporated as recommendations for enhanced implementation during the rest of the project. The organization, TOR and timing of the Mid-Term Review will be prepared after consultation among the parties to the project. The TOR for the MTE will be prepared by the lead UNDP-CO based on guidance from the RSC-LAC and the UNDP-GEF unit. The MTR report will (i) be presented to the Binational Steering Committee and (ii) submitted to the UNDP/GEF Evaluation Office for review and analysis. Also, the report and the answers / queries of the project team and the BPSC will be uploaded to the UNDP corporate systems, in particular the UNDP Evaluation Resource Centre (ERC). All the GEF Tracking Tools will be completed during the MTR.

241. The **Terminal Evaluation** will take place three months prior to the final meeting of the Binational Steering Committee and will be undertaken in accordance with UNDP and GEF guidelines[76]. The final evaluation will focus on (i) verifying the achievement of the expected outcomes as adjusted after the MTR (in case there were modifications), (ii) identify and analyse the project impacts and the sustainability of the outcomes, (iii) document the contribution to capacity development, (iv) verify the contribution to global benefits and environmental objectives, and (v) identify and document the lessons learned about project design, implementation and management. The Terminal Evaluation must recommend national and binational follow-up actions to ensure the sustainability of the project achievements and outcomes. The TOR and arrangements of the assessment will be prepared by the lead UNDP-CO based on guidance from the RSC-LAC and the UNDP-GEF unit. The Terminal Evaluation Report will be (i) submitted to the Binational Steering Committee and analysed in the final review meeting, and (ii) sent to the UNDP/GEF Evaluation Office for review and analysis. Also, the report and the answers / queries of the project team and the BPSC will be uploaded to the UNDP corporate systems, in particular the ERC. All the GEF Tracking Tools will be completed during the Terminal Evaluation.

[75] PNUD. 2014. Guía para la realización del examen de mitad de periodo en proyectos apoyados por el PNUD y financiados por el GEF. Programa de las Naciones Unidas para el Desarrollo (PNUD). Dirección PNUD - GEF. New York, USA: 71 pp.

[76] PNUD. 2012. Guía para realizar evaluaciones finales de los proyectos respaldados por el PNUD y financiados por el FMAM. Programa de las Naciones Unidas para el Desarrollo (PNUD). Oficina de Evaluación. New York, USA: 56 pp.

Audits

242. Audits will be conducted according to UNDP´s financial regulations, rules and audit policies and will be executed by an auditor legally recognised by the GoG or a commercial auditor called by the GoG.

Learning and knowledge sharing

243. The results will be disseminated within and beyond the project intervention area through a series of information sharing networks and forums, in particular the GEF IW:LEARN platform.
244. The project will identify and participate, as relevant and appropriate, in scientific, water resources management and biodiversity networks, which might facilitate the exchange of experiences and learning. In addition, the project will identify, analyse, document and share the learning and best practices that could be useful for the design and implementation of future similar projects.
245. Finally, the project will maintain coordination and communication lines with other projects implemented in the TDPS to prevent duplicity, share best practices and learnings, and to develop synergic interventions and actions.

Table 22. M&E work plan and budget.

Type of M&E activity	**Responsible partner**	**Budget USD Excluding project team staff time**	**Time frame**
Inception workshop and report	CBP UNDP-COs RSC-LAC	8,000	During the first two months after project start
Quarterly progress reports	Project team Lead UNDP-CO	None	Quarterly
APR/PIR	CBP UNDP-COs	None	Annual
Field visits	Lead UNDP-CO RSC-LAC Project team	16,000	Annual
Binational Steering Committee meetings	CBP Lead UNDP-CO	24,000	Semestral
Binational Technical Committee meetings	CBP Lead UNDP-CO	32,000	At least semestral
Mid-Term Evaluation	Lead UNDP-CO RSC-LAC	25,000	End of year 2

Type of M&E activity	Responsible partner	Budget USD Excluding project team staff time	Time frame
	Project team External evaluator (international)		
Terminal Evaluation	Lead UNDP-CO RSC-LAC Project team External evaluator (international)	28,000	Three months before the end of the project
Project Terminal Report	CBP and Project team	0	Three months before the end of the project
Audits	Auditors	40,000 (10,000/audit)	Annual
Total indicative cost Excluding staff time and travel expenses of the project team and UNDP		173,000	

PART V: Legal context

246. The project document (PRODOC) will be the instrument referred to in article 1 of the Standard Basic Assistance Agreement (SBAA) signed by the United Nations Development Programme and the government of Bolivia on 31 October 1974 and between the government of Peru and UNDP on 30 March 1956.

247. This project will be implemented by the Ministry of Foreign Affairs of the Plurinational State of Bolivia, the Ministry of Environment and Water of the Plurinational State of Bolivia, the Ministry of Foreign Affairs of Peru and the Ministry of Environment of Peru (implementing partners) in accordance with its financial regulations, rules, practices and procedures only to the extent that they do not contravene the principles of the financial regulations and rules of UNDP. Where the financial governance of an implementing partner does not provide the required guidance to ensure best value for money, fairness, integrity, transparency and effective international competition, the financial governance of UNDP shall apply.

248. The responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP´s property in the implementing partner´s custody, rests with the implementing partner. The implementing partner shall: (a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried, (b) assume all risks and liabilities related to the implementing partner´s security, and the full implementation of the security plan. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

249. The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the PRODOC are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 of 1999. The list can be accessed via
http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm
This provision must be included in all sub-contracts or sub-agreements entered into under the Project Document.

250. The UNDP Resident Representative in the lead country for the project is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by the UNDP-GEF Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes: (i) revision of, or addition to, any of the annexes to the Project Document; (ii) revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation; (iii) mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and (iv) inclusion of additional annexes and attachments only as set out here in this Project Document.

251. This document together with the CPAPs signed by the governments of Bolivia and Peru and UNDP together a Project Document as referred to in the SBAA [or other appropriate governing agreement] and all CPAP provisions apply to this document.

SECTION II. STRATEGIC RESULTS FRAMEWORK WITH GEF INCREMENT

The project will help to achieve the following Country Programme Outcomes as defined in CPAP or CPD: Bolivia. UNDAF 4. Promote and support the conservation and sustainable use of the environment. To this end, the priority will be to support government and community action to expand and improve the management of forests, conservation areas and protected areas, support for actions to reduce environmental degradation and desertification, and strenghtening the sustainable management of water resources. Peru. UNDAF ED4. The State, with the participation of civil society, the private sector, scientific and academic institutions, will have designed, implemented and / or strengthened policies, programs and plans, with a focus on environmental sustainability, for the sustainable management of natural resources and the conservation of biodiversity.
Country Programme Outcome Indicators: Bolivia: Indicator 2.5.2: Number of countries implementing national and local plans for integrated Water Resource Management. Peru: Number of State policies, plans and programs for social and economic development and private investment programs that incorporate objectives and targets for climate change resilience and environmental sustainability.
Primary applicable Key Environment and Sustainable Development Key Result Area 1. Mainstreaming environment and energy OR 2. Catalyzing environmental finance OR 3. Promote climate change adaptation OR 4. Expanding access to environmental and energy services for the poor.
GEF Strategic Objective and Program: IW-3 Support foundational capacity building, portfolio learning, and targeted research needs for joint, ecosystem based management of trans-boundary water systems.
GEF Expected Outcomes: IW 3.1. Political commitment, shared vision, and institutional capacity demonstrated for joint, ecosystem-based management of waterbodies and local ICM principles. IW 3.2: On-the-ground modest actions implemented in water quality, quantity (including basins draining areas of melting ice), fisheries, and coastal habitat demonstrations for “blue forests” to protect carbon. IW 3.3: IW portfolio capacity and performance enhanced from active learning/KM/experience sharing.
GEF Outcome Indicators IW Indicator 3.1. Agreed SAPs at ministerial level with considerations for climatic variability and change; functioning national inter-ministry committees; agreed ICM plans. IW Indicator 3.2. Measurable results contributed at demo scale. IW Indicator 3.3. GEF5 performance improved over GEF4 per data from IW Tracking Tool; capacity surveys.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
Project objective. To promote the conservation and	Number specific of binational commitments to address critical aspects of conservation and	0	$\geq$ 3 commitments 1. Water quality standards harmonized	Binational commitments	Both countries maintain their political commitment to strengthen the binational management of

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
sustainable use of water resources in the Titicaca - Desaguadero – Poopó - Salar de Coipasa (TDPS) transboundary system, through the updating the Global Binational Master Plan[77].	sustainable use of water resources and advance of IWRM in TDPS		2. Agreement to reduce the polluting load of domestic and industrial sewage 3. Agreement for optimizing the TDPS monitoring system		the TDPS and to advance IWRM. It is a priority in the political agenda of the countries to address the major anthropogenic pressures that negatively affect the TDPS. There is good communication and collaboration among government agencies in both countries. The changes resulting from the general elections in Peru (2016) and Bolivia (2019) do not affect the binational management of the TDPS.
	Number of organizations for watershed management/ councils for basin water resources	1[78]	≥3	Instruments that establish organizations for watershed management/ councils for basin water resources	
	Government investment to control and mitigate major environmental pressures in the TDPS[79] (USD)	To be calculated at the start of the project[80]	Increase of ≥50%	State budget	
Outcome 1. The Transboundary Diagnostic Analysis (TDA) and the Strategic Action Programme (SAP) for the TDPS have been formulated and adopted.	Approval of TDA and SAP. The SAP is based on IWRM and watershed management	The original PDGB does not include the IWRM perspective. Both countries have adopted the concept of watershed management.	Year 3. TDA formally approved by both governments. Year 4. SAP formally approved by both governments.	Instrument on binational recognition[81] of TDA and SAP	TDPS key stakeholders are involved and actively participate in the development of SAP.
			Year 4. SAP incorporates IWRM strategies for each hydrographic unit, (levels	SAP	

[77] The Binational Global Master Plan for the TDPS water system is the framework for joint action agreed between Bolivia and Peru. The original PDGB was ready in 1995. The PDGB is equivalent to the Strategic Action Programme as defined by GEF within the International Waters focal area.
[78] Management entity for Katari River basin (Bolivia).
[79] Major pressures are understood to be: [1] discharge of untreated domestic sewage, [2] discharge of untreated industrial wastewater, [3] improper disposal of solid waste, [4] discharge of mine tailings and pollution due to poorly managed environmental liabilitties. The indicator is measured on the basis of a constant value that uses the year 2014 as a reference.
[80] The baseline will be the investments made in 2014.
[81] Approval by the Project Steering Committee will be sufficient.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
			3 and 4) in the TDPS (14 units)		
Outcome 2. Improved institutional capacity to implement IWRM in the TDPS system in both countries.	Number of officials of national, regional, and local governments trained on IWRM (people/ hydrographic unit of levels 3 and 4)	0	Year 2. >10 staff/ hydrographic unit, levels 3 and 4 Year 4. > 25 officials / hydrographic unit, levels 3 and 4	Memoirs of training events, including registry of participants[82].	TDPS key stakeholders are motivated to implement IWRM. Political factors do not limit collaboration among key stakeholders in national, regional, and local governments. Social and productive organizations are actively involved in TDPS management.
	Number of social and productive organizations trained in IWRM (people / hydrographic unit of levels 3 and 4)	0	Year 2 > 20 persons/ hydrographic unit, levels 3 and 4 Year 4 > 50 persons/ hydrographic unit, levels 3 and 4		
Outcome 3. Practical learning generated in pilot experiences contribute to the development of the SAP and to decision making.	Number of municipal, regional and national policies based on the outcomes of pilot projects	0	Year 3. > 2 Year 4. > 10	Decisions by public bodies that explicitly refer to the outcomes of the pilot projects.	Key stakeholders in national, regional, and local governments and social and productive groups value the results of the pilot projects and use them for their decision-making.
Outcome 4. Updated, accurate, and relevant information on TDPS	Level of satisfaction[83] with the quality of information and	0	Year 2. > 50% satisfied Year 4.	Survey among representative samples in each hydrographic unit,	The target groups[84] have the means to access information.

[82] It must include at least the following information: (1) full name, (2) personal identification number, (3) organization, and (4) signature.
[83] To be assessed by using a four-point scale: [1] dissatisfied, [2] somewhat satisfied [3] satisfied [4] very satisfied.
[84] i.e., national, regional and local authorities, as well as social and productive organizations.

	Indicator	Baseline	Targets at the end of the project	Source of verification	Risks and Assumptions
management is available and accessible to allow implementation of the SAP with an adaptively approach, including attention to social and gender variables.	accessibility for national, regional and local authorities, and social and productive organizations.		> 80% satisfied.	levels 3 and 4 (14 hydrographic units)	The target groups are interested in using TDPS information for their activities and decision-making processes.
Outcome 5. Key stakeholders know the core issues of the TDPS, become empowered and act in the context of IWRM to advance workable solutions.	Level of knowledge of public authorities and social and productive leaders about the issues in the TDPS and on existing instruments for binational management of the system.	60%	Year 2 = >70% Year 4 = >80%	Survey among representative samples in each hydrographic unit, levels 3 and 4 (14 hydrographic units)	The target groups have the means to access information websites TDPS key stakeholders are interested in the issues present in the system.
Outcome 6. Key stakeholders actively participate in a coordinated manner to address the core problems in the TDPS system.	Number of platforms[85] with active involvement from public authorities and social and productive leaders.	2[86]	Year 2 $\geq$ 4 Year 4 $\geq$ 8	Assessment on continued presence of key stakeholders in each platform in years 2 and 4.	Political differences and particular interests do not limit the involvement and participation of key stakeholders in the platforms. There is a fluid and constructive dialogue between stakeholders from both countries.

[85] At least the following platforms will be evaluated: (1) Management body for Katari River Basin [Bolivia], (2) Platform for Poopó Basin [Bolivia], (3) Multisectoral Commission for Environmental Prevention and Recovery of Lake Titicaca Basin and its Tributaries [Peru], (4) Water Resources Council of Titicaca watershed [Peru] [when consolidated], (5) Binational Technical Commission on Suches River (Bolivia – Peru), (6) Binational Technical Commission on Maure-Mauri River, (7) National Commissions for ALT Affairs (CONALT Peru and CONALT Bolivia).
[86] Water Resources Council of Titicaca Basin [Peru] and Inter-Institutional Platform for the Master Plan of Katari Basin [Bolivia].

Outputs	Activities
1.1. Additional studies to support the preparation of a TDA for the TDPS	a. Form a core group for the development of the TDA[87] (GN-TDA) based on the GEF methodology[88]. The core group will be binational, technical, and interdisciplinary. It will consist of permanent delegates from technical entities of both countries and will have expert support from the UBCP[89]. b. GN-TDA training in the process of developing the TDA and SAP. c. Compile and systematize information and diagnoses available for the TDPS. Identify whether additional studies are needed at the stage of project preparation. d. Contract and implement studies that complement the available information. i. Harmonize methodologies and update the calculation of the water balance of the TDPS system. ii. Update the database on hydro-climatic data and obtain data on use of surface and groundwater in the TDPS system. iii. Study on availability and current use of groundwater in the TDPS system. iv. Assessment of the status, threats, and vulnerability to climate change in aquatic ecosystems. [1] Complement the situation analysis of the hydrographic unit of Lake Titicaca. v. Assessment of the status, threats and vulnerability to climate change in aquatic ecosystems. [2] Full study on the hydrographic unit of Desaguadero River. vi. Assessment of the status, threats and vulnerability to climate change in aquatic ecosystems. [3] Full study of Lake Uru Uru. vii. Assessment of the status, threats and vulnerability to climate change in aquatic ecosystems. [4] Full study of the hydrographic unit of Lake Poopó. viii. Study on vulnerability, threat, and risk regarding climate change in TDPS. Prepare proposed strategy for strengthening resilience to climate change in the TDPS. ix. Assessment on the conservation status of indicator species[90]: [1] Titicaca giant frog *(Telmatobius culeus)*. Prepare proposal for binational conservation strategy for this species[91]. x. Assessment on the conservation status of indicator species: [2] endangered *Orestias* fish (i.e., *O. cuvieri*, *O. pentlandii*, and *O. albus*). Prepare proposal for binational conservation strategy for these species xi. Analysis of the situation of fisheries in Lake Titicaca and preparation of proposal for binational fisheries management strategy. xii. Situation analysis of aquaculture in Lake Titicaca and preparation of proposal for binational aquaculture management strategy. xiii. Analysis of the situation of fisheries in Lake Poopó and preparation of proposal for fisheries management strategy. xiv. Collection of primary information on water users and uses in each watershed of levels 3 and 4 of the TDPS (14 hydrographic units), with a gender-based perspective. Identify local visions, projections, and future expectations. xv. Systematize and analyse information on TDPS water quality. xvi. Inventory of mining environmental liabilities and assessment of their impact on the TDPS. Prepare proposals for strategies for closing mining environmental liabilities in the basins of Lake Poopó, Desaguadero River, Suches River and Seco River.

[87] Called TDA Development Team, in GEF methodology.
[88] GEF (2013a), GEF (2013b), and GEF (2013c).
[89] The binational project coordinator will provide the main technical advice during the process of developing the TDA and SAP. The communications specialist will provide support to build the communication network among participants in the process of developing the TDA and SAP and will inform and engage key TDPS stakeholders. The monitoring and evaluation specialist will document the process and lessons learned.
[90] Based on the methodology of categories and criteria of the IUCN Red List (IUCN, 2012).
[91] Based on the IUCN methodology for development of conservation strategies for species (IUCN / SCC 2008).

Outputs	Activities
	xvii. Assessment of existing monitoring initiatives and design of a monitoring program for the TDPS. Performance evaluation of initiatives that monitor TDPS status indicators[92]. Identify and establish key indicators for the comprehensive monitoring system and designing an optimized monitoring and reporting model. Additionally, design of a management-financial model to support the long-term monitoring program. xviii. Additional studies, not previously identified, but which are considered a priority. At the end of the first year, the CBP together with the Binational Technical Committee will identify necessary additional studies and will prepare a proposal that will be submitted for consideration to the Binational Steering Committee. e. Select and hire consultants to support the process of developing the TDA and SAP[93]. f. Consolidation of information and preparation of draft TDA[94] through a series of sessions and multidisciplinary analysis of the core support group consultants.
1.2. TDA validated by the countries.	a. Disclosure of the draft TDA through the websites run by ANA, MINAM, MMAyA, ALT and the project. b. Validation workshops with key stakeholders in each of the four major hydrographic units in TDPS (Titicaca, Desaguadero, Poopó, and Salar de Coipasa). Key women and indigenous groups and organizations will be involved and record of their participation will be maintained. c. Prepare final version based on observations and comments generated in the validation process. d. Presentation to the Project Steering Committee for official validation by the countries. e. Publication of approved TDA on the websites run by ANA, MINAM, MMAyA, and the project, as well as on the IW: LEARN platform. A summary in a format appropriate for disclosure will be prepared to make it accessible for diverse audiences in TDPS.
1.3. Strategic Action Programme formulated by a participatory process, integrating an IWRM approach, adopted by both countries.	a. Select and hire technical promoters to support the participatory process of SAP development. b. Establish a core group for SAP development[95] (GN-SAP) based on the GEF methodology[96]. The GN-SAP will include technical staff and stakeholders of both countries. To ensure the continuity of the process, GN-SAP will include GN-TDA members. GB-SAP will consist of permanent representatives of entities of both countries and will have technical support from UBCP and from support consultants. c. Training of GN-SAP and technical promoters during SAP development process. Technical promoters will be trained to be culturally sensitive, to take into consideration the needs of women and indigenous groups, and to address cultural barriers. d. Binational workshops to define the strategic framework of the SAP (TDPS vision, objectives, key elements for action). The results will be summarized in a conceptual document with a format for dissemination to be used in the next process steps and will be widely communicated to key stakeholders in TDPS.

[92] This includes, inter alia, the binational monitoring plan on water quality and sediment in Suches River, hydrometeorological monitoring Maure-Mauri River, binational participatory monitoring of water quality of Lake Titicaca, and community-based monitoring initiatives.
[93] The supporting consultants will be: (1) soil scientist/agronomist, (2) sociologist/anthropologist, (3) economist, (4) sanitary engineer, (5) biologist/ecologist, and (6) GIS geographer. The consultants will be led by the CBP; they will contribute to the analysis of information and development of the TDA, and then to the conceptualization and preparation of SAP.
[94] The reference table of contents for TDA is in Annex 3 of GEF (2013b).
[95] Called SAP Development Team, in the GEF methodology.
[96] GEF (2013a), GEF (2013b), and GEF (2013c).

Outputs	Activities
	e. Development of SAP through participatory planning processes in each hydrographic unit of levels 3 and 4 (14 units) of the TDPS[97]. In each hydrographic unit: [1] a promoter will be designated to drive the process, [2] existing platforms will be used (Council of Water Resources of the Titicaca Basin of Peru, CTB Suches, CTB Maure-Mauri) or multidisciplinary working groups with key stakeholders (ensuring participation of key women and indigenous groups and organizations) in the area will be established, [3] activities will be built on the existing basin management instruments (Binational Master Plan for the Sustainable Management of Suches River Basin, Master Plan for Katari Basin and Binational Plan for the Management of Maure-Mauri River), [4] workshops and meetings will be held[98] to define the coordination and integration actions necessary to address the main problems identified in the TDA and develop IWRM in theTDPS. f. Integration of actions in the hydrographic units of Lake Titicaca (nine hydrographic units Level 4) and Desaguadero River, (three hydrographic units Level 4) by means of participatory workshops with key stakeholders in each area. g. Final integration of all elements into the SAP for the TDPS. The GN-SAP will prepare the SAP final draft[99]. The draft document will be disseminated and posted on the website of the project to make it available for key stakeholders. h. Final review of the SAP draft with government authorities in both countries: ANA, MINAM, MMAyA, MRE-B, MRE-P, Departmental Government of La Paz, Departmental Government of Oruro, Departmental Government of Puno. i. Preparation of final version of SAP. j. Approval of SAP by the governments of Bolivia and Peru. k. Publication of approved SAP on websites run by ANA, MINAM, MMAyA, and the project and on the IW:LEARN platform. A summary version in dissemination format will be prepared to make it accessible to diverse TDPS publics.
2.1. Training of key stakeholders in IWRM.	a. Design of a course on transboundary IWRM (curriculum and training materials) for officials from national, regional, and local governments. The design will include the preparation of a set of short videos (<5 minutes/video) that will summarize the main concepts and tools of the course. The course will focus on (i) describing the TDPS as a transboundary system, (ii) understanding the practical application of IWRM in the TDPS, and (iii) knowing the tools to build multi-level governance in the context of the TDPS. b. Design of a course on IWRM (curriculum and training materials) for social and productive organizations of the TDPS. The design will include the preparation of a set of short videos (<5 minutes/video) that will summarize the main concepts and tools of the course. The course will focus on (i) describing the TDPS as transboundary system, (ii) understanding the practical actions that social and productive stakeholders can implement to help develop IWRM in the TDPS, and (iii) knowing how they can be integrated into developing multilevel governance in the context of TDPS. The course and materials will take into account and highlight the role of women and indigenous groups in water resources management. c. Establish agreements with schools in the TDPS for them to serve as hosts of training events and incorporate IWRM courses in their training activities and community outreach. The agreements will require fair participation of women and indigenous groups in the training events. d. Training of trainers in TDPS schools. Trainers will be trained to be sensitive to the needs of women and indigenous groups and to address cultural barriers. e. Teach transboundary IWRM to officials at the national, regional, and local governments in years 2 and 3 of the project.

[97] This step is equivalent to the process of national and regional consultation in GEF methodology.
[98] Workshops and meetings will be designed taking into account specific needs of women and indigenous groups.
[99] The reference table of contents for TDA is in Annex 4 of GEF (2013b).

Outputs	Activities
	f. Teach IWRM courses for social and productive organizations in TDPS in years 2, 3 and 4. The courses will take into account specific needs of women and ingenous participants. g. Upload videos containing summaries of the courses to the project YouTube channel, IW:LEARN, and websites of the water authorities of both countries. h. Develop a communication network among individuals involved in trainings and keep them informed on developments in TDPS management, and encourage the exchange of experiences, collaboration, and the building of trust among them. The design of the communication network will consider cultural barriers which might limit the participation of women and indigenous groups.
2.2. Actions to strengthen the institutional arrangement for binational management of the TDPS.	a. There will be a technical assistance fund whose use will be requested by the Binational Project Coordinator and approved by the Binational Steering Committee. The fund will cover costs of technical assistance to support institutional strengthening on binational TDPS management based on the outcomes of the process of defining the new ALT management model. b. Exchange of experiences (guided tours and teleconferencing) on multilevel governance with administrative agencies and key stakeholders of transboundary water bodies. The events involve as far as possible regulatory and control institutions, central, regional, and local governments and social and productive key stakeholders.
3.1. Eleven pilot projects on relevant issues of the TDPS	a. Prepare and sign specific contracts with each executing entity. The contracts will detail the mechanisms for delivery of funding, reporting, justification of expenditures, and progress reports. b. Pilot project implementation by executing agencies. c. Supervision and monitoring of pilot projects.
3.2. The systematization of the results of pilot projects and the analysis of their applicability to the TDPS system are accessible and available to all stakeholders in the area.	a. Dedicate space for the pilot projects on the project website. The entrance page will have a summary of the purpose for implementing the pilot projects and news about them. There will be a page for each pilot project with details, relevant information and access to the pilot project blog. b. Document the progress of each pilot on a blog. The blog will be a digital journal where the project implementer will publish (at least weekly) experiences and reflections on the process as it develops. The records will detail the involvement and participation of women and indigenous groups along pilot implementation. c. Semiannual virtual forums. The monitoring and evaluation specialist of the UBCP will organize a virtual forum every six months in which the implementers of the pilot projects will present their progress and experiences, provide feedback to each other, and reflect on the experience gained. Local groups involved in implementing the pilot projects will participate in the forums, special care will be taken to prevent cultural barriers which might limit the participation of women and indigenous groups. The virtual forums will be videotaped and posted on the YouTube channel of the project so that they can be available to the public and stakeholders. Information on the forums and their results will be made available via electronic media, such as Facebook, Twitter, other available platforms, and email. d. Memoirs of the pilot projects. The experiences, outcomes, and lessons learned from each pilot project will be systematized in a document. The documents will be analysed by external reviewers who will also prepared notes on the implementation of lesson learned in other geographical contexts. The documents and notes of the reviewers will be published in a memoir (digital document in PDF format) to be made available to the public through project websites and IW:LEARN. e. Binational symposium. The results obtained from the pilot projects will be presented in a binational meeting with participation of TDPS stakeholders. The participation of key women and indigenous groups will be encouraged.
4.1. TDPS monitoring program	a. Create a binational, interinstitutional, and multidisciplinary working group (TDPS monitoring working group) with technical and academic stakeholders.

Outputs	Activities
	b. The working group will review and refine the proposal for the comprehensive TDPS monitoring program (see 1.1 above). c. Contract the design of the financial mechanism to support long-term implementation of the TDPS comprehensive monitoring program agreed by the working group. The proposal will be discussed and refined with authorities of both countries. d. The TDPS monitoring working group will integrate the financial mechanism and prepare the final version of the comprehensive TDPS monitoring program. e. An agreement between countries will be negotiated to adopt the comprehensive TDPS monitoring program, ensure the participation of the technical and academic institutions, guarantee data and information exchange and sharing, setup the mechanisms for data and information storage, custody and access through ALT, and establish the funding and management mechanism of the program (i.e., agreement to optimize the TDPS monitoring system). f. The working group will identify and select specific actions to collect primary information on key indicators in the framework of the comprehensive TDPS monitoring program. g. The project will fund, with GEF and cofunding resources, the initial collection of information on the selected key indicators. For example: (1) binational monitoring of water quality and sediments in the Suches River, (2) monitoring of population size of giant frogs, (3) binational monitoring of the biomass of fish resources in Lake Titicaca. h. Improve user interface for TDPS information website to facilitate access and use of monitoring data. Consolidate access via a single website with links to complementary sites.
5.1. Website for the dissemination of project results, including the exchange of experiences through IW:LEARN and participation in IWC[100].	a. Develop, upload on line, and maintain a website for the project. The project site will be linked to the IW:LEARN website. The site will be sensitive to the needs of women and indigenous groups. b. Create and maintain a YouTube channel for the project. Videos of the project will be also uploaded on the IW:LEARN YouTube channel. The videos will be sensitive to the needs of women and indigenous groups. c. Create and maintain a project Facebook account, as well as other electronic communication platforms. The messages will be sensitive to the needs of women and indigenous groups. d. Organize and maintain a distribution list with the TDPS stakeholders' e-mail accounts. The messages will be sensitive to the needs of women and indigenous groups. e. Every two months, prepare and distribute a newsletter by email, which will be sent to all TDPS stakeholders. The newsletter will be sensitive to the needs of women and indigenous groups. f. Participate in two IWCs to present outcomes and exchange experiences.
5.2. Strategies for environmental education and communication for IWRM in the TDPS.	a. Prepare an inventory and document practices and traditional knowledge related to water resources management, conservation, and sustainable use of native ecosystems (e.g., bofedales, tholares, totorales), agriculture, and husbandry of camelids and small native animals. The inventory will take into account and highlight the role of women and indigenous groups in these activities. The results will be shared and validated in thematic workshops with local groups. The information will be systematized in a digital publication with a format suitable for distribution that will be disseminated through the web sites of national entities (e.g., ANA, MMAyA), ALT, and the project. The publication will be designed to culturally sensitive and accessible to women and indigenous groups.

[100] The International Waters Conference (IWC) is a biennial event that brings together stakeholders in the GEF International Waters Portfolio. The seventh conference (IWC7) was held in October 2013, in Barbados.

Outputs	Activities
	b. Design of a strategy for environmental educational communication. The strategy will include the elements of formal education, non-formal education, and informal education, and sub-strategies focused on: (i) common elements which allow visualizing the TDPS as a whole, and (ii) specific elements for the hydrographic units that face higher pressure (i.e., Lake Titicaca, Suches River, Katari River, Lake Poopó, and Maure-Mauri River. The strategy will include specific actions to: (i) encourage discussion on lessons learned in the pilot projects (see outcome 3), (ii) promote the use of traditional knowledge, and (iii) to value and use technical-scientific information on water resources and the status of the TDPS. The strategy will be culturally sensitive and will consider the needs of women and indigenous groups.
	c. Implementation of the environmental educational communication strategy. The project will finance: (i) preparation of materials for formal, non-formal, and informal education, (ii) training of trainers on environmental education, (iii) radio campaign on environmental education for IWRM in the TDPS (including calling attention to major problems), (iv) guided tours for groups of media representatives (radio, television, press) to visit areas where the key issues of the TDPS and examples of good practices and innovative initiatives can be seen. All actions will be culturally sensitive and will consider the needs of women and indigenous groups.
	d. At the end of the third year, the effectiveness of the environmental communication strategy will be evaluated and its components will be refined so that it can effectively articulate with the SAP.
6.1. Strategy for citizen participation and articulation among stakeholders in support of IWRM in the TDPS system.	a. Design of the citizen participation strategy aimed at build confidence and articulation among key stakeholders. The strategy will be culturally sensitive and will consider the needs of women and indigenous groups.
	b. Implementation of the citizen participation strategy. The project will finance multilevel binational meetings among key stakeholders on specific issues, in the context of the TDPS integrated management, for example: (i) gold mining in Suches River, (ii) mining in the Lake Poopó basin, (iii) pollution in Cohana Bay, (iv) pollution in Puno Bay, (v) fisheries and aquaculture in Lake Titicaca , (v) water management on Maure-Mauri River, (vi) conservation and sustainable use of totorales, (vii) conservation and sustainable use of bofedales, (viii) conservation and sustainable use of tholares. Each meeting will be documented by means of a memoir, which will be distributed electronically to key stakeholders and via the project website.
	c. The communication specialist will promote connections and communication among key stakeholders by means of the available electronic communication networks. The messages and means of communication will be culturally appropriate and sensitive to the needs of women and indigenous groups.

SECTION III. TOTAL BUDGET AND WORK PLAN

Lead CO Peru

Award ID:	00087268	Project ID(s):	00094352
Award Title:	Integrated Water Resources Management in the Titicaca-Desaguadero-Poopo-Salar de Coipasa (TDPS) System		
Business Unit:	PER10		
Project Title:	Integrated Water Resources Management in the Titicaca-Desaguadero-Poopo-Salar de Coipasa (TDPS) System		
PIMS no.:	4383		
Implementing Partner (Executing Agency)	Ministry of Environment (MINAM) of Peru, Ministry of Foreign Affairs of Peru.		

GEF Outcome / Atlas Activity	Responsible party	Source of funds	ERP/ATLAS Budget Description / Input	Atlas Code	Year 1	Year 2	Year 3	Year 4	Total	Note
					USD	USD	USD	USD	USD	
1	MINAM	GEF	Contractual Services - Individual	71400	284,700	311,700	191,200	22,200	809,800	1
			Travel	71600	11,000	18,500	44,500	5,000	79,000	2
			Equipment and Furniture	72200	32,000	48,000			80,000	3
			Contractual Services - Companies	72100	385,000	380,500	36,000	-	801,500	4
			Audio Visual&Print Prod Costs	74200			8,500		8,500	5
			Miscellaneous Expenses	74500	24,000	36,000			60,000	6
			Trainning	75700	115,250	230,000	238,000		583,250	7
			Grants	72600	42,000	28,000			70,000	8
	ANA		Contractual Services - Individual	71400	44,000	66,000	-	-	110,000	9
			Travel	71600	20,000	30,000	-	-	50,000	10
			Equipment and Furniture	72200	148,000	222,000	-	-	370,000	11
			Materials and Goods	72300	169,200	248,800	-	-	418,000	12
			Audio Visual&Print Prod Costs	74200	11,300	14,300	-	-	25,600	13
			Miscellaneous Expenses	74500	18,940	36,060	-	-	55,000	14
			Training	75700	8,560	12,840	-	-	21,400	15
	GEF subtotal outcome 1				1,313,950	1,682,700	518,200	27,200	3,542,050	
2	MINAM	GEF	Contractual Services - Individual	71400	13,200	13,200	13,200	6,600	46,200	16

			Audio Visual&Print Prod Costs	74200				2,500	2,500	17
			Miscellaneous Expenses	74500	2,000	4,000	2,000	2,500	10,500	18
			GEF subtotal outcome 2		15,200	17,200	15,200	11,600	59,200	
3	MINAM	GEF	Contractual Services - Individual	71400	14,400	29,400	29,400	12,600	85,800	19
			Travel	71600	5,000	5,000	5,000	1,000	16,000	20
			Contractual Services - Companies	72100			30,000		30,000	21
			Grants	72600			157,650		157,650	22
			Miscellaneous Expenses	74500		50,000	10,000		60,000	23
			GEF subtotal outcome 3		19,400	84,400	232,050	13,600	349,450	
4	MINAM	GEF	Contractual Services - Individual	71400	21,600	21,600	21,600	18,000	82,800	24
			Travel	71600	10,000	72,950	46,000	28,950	157,900	25
			Contractual Services - Companies	72100	96,900	30,000	25,000	10,000	161,900	26
			Audio Visual&Print Prod Costs	74200	1,800	66,800	11,800	11,800	92,200	27
			Professional services	74100	6,000	4,000	4,000	4,000	18,000	28
			Training	75700	39,000	72,500	12,500	12,500	136,500	29
			GEF subtotal outcome 4		175,300	267,850	120,900	85,250	649,300	
PM	PNUD	GEF	Contractual Services - Individual	71400	60,600	60,600	60,600	72,600	254,400	30
			Travel	71600	15,000	28,600	15,000	34,500	93,100	31
			Hardware acquisition	72800	23,650				23,650	32
			Communications	72400	1,300	1,300	1,300	1,300	5,200	33
			Supplies	72500	2,000	2,000	2,000	2,000	8,000	34
			Rental & Maintenance-Premises	73100	1,000	1,000	1,000	1,000	4,000	35
			Rental & Maint of Other Equip	73400	500	500	500	900	2,400	36
			Professional services	74100		25,000		28,000	53,000	37
			Audit	74100	10,000	10,000	10,000	10,000	40,000	38
			Direct Project Cost	74598	12,500	12,500	12,500	12,500	50,000	39
GEF subtotal project management					126,550	141,500	102,900	162,800	533,750	

GEF TOTAL	1,650,400	2,193,650	989,250	300,450	5,133,750

BOLIVIA

Award ID:	00082995	Project ID(s):	00092785
Award Title:	Integrated Water Resources Management in the Titicaca-Desaguadero-Poopo-Salar de Coipasa (TDPS) System		
Business Unit:	BOL10		
Project Title:	Integrated Water Resources Management in the Titicaca-Desaguadero-Poopo-Salar de Coipasa (TDPS) System		
PIMS no.:	4383		
Implementing Partner (Executing Agency)	Ministry of Foreign Affairs of the Plurinational State of Bolivia, Ministry of Environment and Water (MMAyA) of the Plurinational State of Bolivia		

GEF Outcome / Atlas Activity	Responsible party	Source of funds	ERP/ATLAS Budget Description / Input	Atlas Code	Year 1	Year 2	Year 3	Year 4	Total	Note
					USD	USD	USD	USD	USD	
1										
	GEF subtotal outcome 1				-	-	-	-	-	
2	MMAyA	GEF	Contractual Services - Individual	71400	143,722	177,122	38,461	-	359,304	40
			Travel	71600	9,661	11,061	3,430	-	24,152	41
			Contractual Services - Companies	72100	103,200	106,600	48,200	-	258,000	42
			Rental & Maint of Other Equipment	73400	38,000	55,,000	2,000	-	95,000	43
			Materials and Goods	72300	196,693	225,893	69,146	-	491,732	44
			Supplies	72500	200	-	-	-	200	45
			Audio Visual&Print Prod Costs	74200	21,404	25,400	5,200	-	52,004	46
			Training	75700	48,808	53,800	17,000	-	119,608	47
	GEF subtotal outcome 2				561,687	654,875	183,438	-	1,400,000	
3										
	GEF subtotal outcome 3									
4										
	GEF subtotal outcome 4									
PM			Direct Project Cost	74598	7,500	7,500	7,500	7,500	30,000	39

GEF subtotal project management	7,500	7,500	7,500	7,500	30,000
GEF TOTAL	569,187	662,375	190,938	7,500	1,430,000

Summary of GEF and Co-financing Budget per Year

Project	Year 1		Year 2		Year 3		Year 4		Total	
	GEF	Cofin	GEF	Cofin	GEF	Cofin	GEF	Cofin	GEF	Cofin
1	739.950	3.167.284	856.700	3.167.284	518.200	3.167.284	27.200	3.127.284	2.142.050	12.629.136
2	1.165.887	5.421.482	1.513.075	5.421.482	213.638	5.421.482	26.600	5.323.149	2.919.200	21.587.596
3	19.400	769.658	84.400	769.658	232.050	769.658	13.600	769.658	349.450	3.078.632
4	172.800	442.223	270.350	442.223	123.400	442.223	82.750	442.223	649.300	1.768.893
Project management	119.050	416.286	134.000	416.286	95.400	416.286	155.300	416.286	503.750	1.665.143
Total	2.217.087	10.216.933	2.858.525	10.216.933	1.182.688	10.216.933	305.450	10.078.600	6.563.750	40.729.400

Budget Notes

Note	Details
1	USD 36,000. Binational project coordinator (CBP), allocation of time for preparation of TDA and SAP. USD 9,600. Specialist in monitoring and evaluation of the project. Allocation of time to document the process of preparation of the TDA and SAP USD 19,200. Communication specialist of the project, allocation of his/her time over the four years to build the communication network among the participants and key stakeholders of the TDPS during the process of preparation of the TDA and SAP. USD 505,000. Complementary studies carried out by individual consultants. This includes USD 75,000 for additional studies not identified previously but which are considered a priority. At the end of the first year the CBP, jointly with the Binational Technical Committee, will identify the necessary additional studies and will prepare a proposal to be sent to the Binational Steering Committee for consideration. USD 44,000. Consultants to support the process of preparation of the TDA and SAP. They will contribute to the analysis of information and preparation of the TDA and then to the conceptualization and preparation of the SAP. USD 147,000. Technical promoters who stimulate the participatory process for SAP construction in each of the 14 hydrographic units of level 3 and 4. USD 14,400. Binational project coordinator (CBP), allocation of his/her time to achieve this result. USD 4,800. Monitoring and evaluation specialist. Allocation of time to document this outcome. USD 4,800. Communication specialist. Allocation of time to build the communication network among participants in this outcome and key stakeholders in TDPS. USD 25,000. Consultant prepare a detailed analysis for conducting an inventory of mercury and diagnosis of environmental techniques for pilot 11.
2	USD 20,000. Travel of the binational project coordination team for follow-up of studies and meetings during preparation of the TDA and SAP. USD 9,000. Travel, during years 2 and 3, of consultants to support the process of preparation of TDA and SAP. USD1500/consultant. USD 35,000. Travel, during year 3, of technical promoters to boost the participatory process of building the SAP in each hydrographic unit. USD2.500/promoter. USD 15,000. Travel during to facilitate the development of formal partnerships along the gold supply chain at the national and international level for pilot 11.
3	USD 80,000. Equipment for the installation of processing systems and training centres for pilot 11.
4	USD 710,000. Complementary studies carried out by companies/organizations during years 1 and 2. This includes USD 120,000 for additional studies not identified previously but which are considered a priority. At the end of the first year the CBP, jointly with the Binational Technical Committee, will identify the necessary additional studies and will prepare a proposal to be sent to the Binational Steering Committee for consideration. USD 19,500. Workshops of the GN-TDA for consolidation of information and preparation of the TDA (year 2). Two-day workshop, approximately 25 participants. Cost includes local, food, stay and materials. Participants will cover their costs of transportation. USD6.500/workshop x 3 workshops = USD19.500

Note	Details
	USD 6,000. Validation workshops for TDA with key stakeholders in the four largest hydrographic units (year 2). Four workshops a day, approximately USD15 per person for food and snacks, around 100 people/workshop.USD6.000. USD 15,000. Workshops of GN-SAP to define the strategic framework of the SAP (i.e., vision of the TDPS, objectives, main action items). Two-day workshop, approximately 25 participants. Cost includes venue, food, lodging and materials. Participants will cover their costs of transportation. USD5.000/workshop x 3 workshops = USD15,000 (year 3). USD 16,000. Workshops for integration of actions in the hydrographic units of Lake Titicaca and Desaguadero River with key local stakeholders (year 3). Two-day workshops; each with approximately 60 participants/workshop. Cost includes accommodation for one night, food, venue, and materials. Participants will cover their costs of transportation. USD8.000/workshop x 2 workshops = USD16.000. USD 5,000. Workshop for final review of the draft of the SAP with the Government authorities of the two countries (year 3). One-day workshop, approximately 30 participants. Cost includes a night's accommodation, venue, food, and materials. Participants will cover their costs of transportation. USD5.000 USD 15,000. On year 1, design of a course on transboundary IWRM. The design will include the preparation of a set of short videos (< 5 minutes/video) that summarize the main concepts and tools of the course. USD 15,000. On year 1, design of a course on transboundary IWRM for productive and social organizations in TDPS. The design will include the preparation of a set of short videos (< 5 minutes/video) that summarize the main concepts and tools of the course.
5	USD 4,000. On year 3, layout and preparation of digital publication of the TDA and a version summarized in a format appropriate for publication/release (PDF and HTML formats) for dissemination online (USD 2,000). Also on year 3, dissemination document will be printed (5,000 copies) (USD 2,000). USD 4,500. Layout and preparation of digital publication of the SAP and a brief summary (PDF and HTML formats) for dissemination online (USD 2,000) (year 3). Dissemination document will be printed (5,000 copies) (USD 2,500) (year 3).
6	USD 60,000. For activities related to establishing partnerships with other relevant initiatives that promote responsible gold and diversification of the economy based on ASGM for pilot 11.
7	USD 15,000. On year 1, GN-TDA training workshop to develop the TDA - SAP process. Two-day workshop, approximately 25 participants. Cost includes trainer, trainer travel expenses, venue, food, lodging, and materials. Participants will cover their costs of transportation. USD 25,000. On year 3, training workshop of GN-SAP and technical promoters for the process of developing the SAP. Two-day workshop, approximately 40 participants. Cost includes trainer, trainer travel expenses, venue, food, lodging and materials. Participants will cover their costs of transportation. USD 50,000. Fund for technical assistance support to strengthen the institutional framework of binational management of the TDPS. This will be based on the results of the process of definition of the new management model for ALT. The activities will include consultants (international or national), binational meetings and training. Allocation: year 1 USD25.000, year 2 USD15.000, year 3 USD 10.000. USD 25,000. On year 2, exchange of experiences through guided tours on multilevel governance with managers and key stakeholders of other transboundary bodies of water. The events will involve, to the extent possible, offices in charge regulation and control; central, regional and local governments and key stakeholders in social and productive organizations. Guided tour: 6 persons x USD2000/ticket (USD 12,000) + 5 days hotel & meals x 300/day x 6 people (USD 9,000) + translator USD500 per day x 5 days (USD2.500) + miscellaneous (USD1.500) =

Note	Details
	(USD25.000). USD 70,000. 14 teleconferences (one in each hydrographic unit of levels 3 and 4 in the TDPS) during the first three years (two in year 1, six in year 2, and six in year 3). Teleconference: venue (USD 1,000) + food USD30 per person x 50 people (USD1.500) + simultaneous translation (USD1.000) + materials (USD500) + transportation assistance to local actors (USD1.000) = USD5.000. 14 teleconferences x USD5.000/ teleconference = (USD70.000). USD 63,000. Costs of meetings, workshops, and materials to build the SAP in each hydrographic unit with key stakeholders (year 3). USD4,500/ promoter x 14 promoters. USD 25,250. On year 1, training of trainers in educational centres/schools in TDPS, so they can teach training courses. Training for 3 people/hydrographic unit x 14 hydrographic units = 42 people. Three-day course. Cost includes three nights of lodging, transportation of participants and trainers, venue, materials, fees for trainers. USD 70,000. Courses on transboundary IWRM for government officials at the national, regional, and local levels in years 2 and 3 of the project. Two-day course, cost is USD250 per person, including lodging (one night), food and materials. Total cost: 350 people x USD200 per person = USD70,000. USD 40,000 on year 2 and USD 30.000 on year 3. USD 140,000. Courses on transboundary IWRM for social and productive organizations in TDPS in years 2 and 3. Two-day course cost USD250 per person, including lodging (one night), food and materials. Total cost: 700 x USD250 per person = USD140,000 USD 100,000. Training on best business, legal, administrative practices, to miners, courses and workshops about the OECD and other systems of certification, forums to gather miners and stakeholders to discuss and disseminate best practices.
8	USD 70,000. Grants for pilot project 10, under the implementation of NGO Suma Marka in Peru. The activities to be carried out include training of government staff through a capacity building program, development of a participatory diagnosis within the basin, studies, systematization of activities and production and dissemination of results. Grants will be provided according to UNDP Guidance on Micro-Capital Grants.
9	USD 110,000. Consultants for the preparation of technical documentation, development of website, baseline studies, assessment of mechanisms of sediment production and mercury pollution, determination of impact of aquaculture on water quality, for pilots 6, 7, 8 and 9.
10	USD 50,000. Travel for consultants and stakeholders to participate in events for the dissemination of the water resources management system, evaluation of areas affected by discharges, and participatory monitoring of water quality for pilots 6, 7, 8 and 9.
11	USD 370,000. Equipment for the installation of automatic meteorological monitoring system, communications system for stations network, establishment and building of infrastructure for sediment retention for pilots 6, 7, 8 and 9.
12	USD 418,000. Materials for the building of fences around the treatment plant, species of machophytes and microorganisms, treatment for removal, monitoring reports on sediment load and water quality and materials for assessment on environmental conditions, materials for the technique application test for natural attenuation, bioaugmentation and biostimulation, and evaluation of efficiency for the bioremediation system for pilots 6, 7 , 8 and 9.
13	USD 25,600. Systematization activities and continuos dissemination of results for pilot 9.
14	USD 55,000. Various expenses for the implementation of water resources management system, evaluation of treatment efficiency, and establishment of monitoring network for pilots 6, 7, 8 and 9.

Note	Details
15	USD 21,400. Training of staff responsible for the administration of the water resources management and training events on environmental quality monitoring for pilots 8 and 9.
16	USD 12,600. Binational project coordinator (CBP), allocation of his/her time to achieve this result. USD 19,200. Monitoring and evaluation specialist. Allocation of his/her time over the four years to document this result. USD 14,400. Communication specialist, allocation of his/her time over the four years to build the communication network among the participants of the outcome and key stakeholders in the TDPS.
17	USD 2,500. Editing and layout of memoir of pilot projects (document in Adobe Acrobat digital format).
18	USD 8,000. Biannual virtual fora (four fora = one in year 1, two on year 2, one on year 3). USD2.000/forum to cover costs of transportation of local stakeholders and venue with high-capacity internet connection. On year 4, binational symposium to present results of the pilot projects. One day event for about 80 people. Venue USD 500 + food USD10*80personas = USD800 + ground transportation of 20 people/country 40 people*USD30=USD1200. TOTAL USD2.500.
19	USD 12,600. Binational project coordinator (CBP), allocation of coordinator's time to achieve this outcome. USD 28,800. Monitoring and evaluation specialist. Allocation of time during the four years to document this outcome. USD 14,400. Communication specialist. Allocation of time in the four years to build the communication network among participants of the result and the key stakeholders in the TDPS. USD 30,000 (invested on years 2 and 3). Consultant services to design the financial mechanism to sustain the integrated monitoring program for the TDPS agreed by the Working Group for TDPS monitoring. Consultant team with specialists from both countries.
20	USD 16,000. Travel of the binational project coordination team to follow up this outcome.
21	USD 30,000. On year 3, hiring of specialized company to optimize the user interface of the platform for TDPS monitoring.
22	USD 157,650. On year 3, funding specific initiatives to gather primary information of key indicators prioritised by the Working Group for monitoring TDPS. The Working Group will submit the proposal for consideration and approval of the Binational Steering Committee. An agreement of donation will be signed with each entity that participates collecting information. These entities will be mainly universities and research centres. Grants will be provided according to UNDP Guidance on Micro-Capital Grants.
23	USD 60,000. On years 2 and 3, meetings of the Working Group for monitoring the TDPS, including meetings with technical and academic stakeholders to review and refine the design of the program proposal of comprehensive monitoring. Fund available to cover transportation, lodging and food for participants, and materials.
24	USD 12,600. Binational project coordinator (CBP), allocation of time to achieve this outcome. USD 9,600. Monitoring and evaluation specialist. Allocation of time in the four years to document this outcome. USD 19,200. Communication specialist, allocation of time in the four years to build the communication network among the participants of the outcome and the key stakeholders in the TDPS. USD 12,600. Binational project coordinator (CBP). Allocation of 5% of to achieve this outcome. USD 9,600. Monitoring and evaluation specialist. Allocation of time in the four years to document this outcome. USD 19,200. Communication specialist of the project. Allocation of time in the four years to support environmental communication and education activities.

Note	Details
25	USD 32,000. Travel of the binational project coordination team to follow up this outcome. USD 53,900. Participation in two IWC to present results and exchanging experiences (estimated to occur on years 2 and 4). Each mission includes 7 people: CBP and three representatives from each country. Mission cost: 7 persons x USD2.000/ticket (USD14.000) + hotel USD250 per day x 5 days x 7 persons (USD8.750) + food USD80/day x 5 days x 7 persons (USD2.800) + miscellaneous (USD1.400) = USD26.950. Total USD 26.950/mission x 2 missions = USD53.900. USD 72,000. Guided tours with journalists in the TDPS. Four tours. 15 people/tour x 3 days/tour x USD400 per person per day (accommodation, transport, meals) = USD18.000/tour. Two tours in year 2 and two tours in year 3.
26	USD 60,000. On year 1, inventory and documentation on practices and traditional knowledge about management of water resources, conservation and sustainable use of native ecosystems, agriculture, and husbandry of camelids and small native animals. USD 40,000. Design of environmental education communication strategy (years 1 and 2). USD 45,000. Radio campaign on IWRM in TDPS (years 2 to 4). USD 10,000. Evaluation of effectiveness of the environmental educational communication strategy for adjustment in the third year of the project (year 3). USD 6,900. On year 1, design of citizen participation strategy.
27	USD 7,200. Prepare and distribute a bi-monthly newsletter by email (years 1 to 4). Cost of design, layout and editing of text. USD 5,000. On year 2, prepare a digital publication in a format appropriate for dissemination of the inventory of traditional knowledge and practices. Includes layout and editing of text. USD 80,000. Formal, non-formal, and informal environmental education materials (years 2 to 4).
28	USD 18,000. Develop, post on line, and maintain a website for the project. Includes developer, graphic designer, software, and webhosting costs. USD6.000 on year 1, afterwards USD4.000/year.
29	USD 60,000. On year 2, training of trainers on environmental education. Four training events, 3 days/event and 25 people/event. USD15.000/event cost includes venue, accommodation, food, and materials. USD 26,500. On year 1, thematic workshops with key stakeholders to share and validate the results of the inventory of traditional knowledge and practices. Eight thematic workshops, USD2.000/workshop, total USD16.000. The cost includes venue and materials. USD50.000. Multi-level binational meetings with key stakeholders on specific issues. About 30 people per meeting. USD5.000/meeting x 10 meetings.
30	USD 43,200. Binational project coordinator, allocation of his/her time for overall coordination of project activities. USD 120,000. Project Manager, full time assigned to project management USD 14,400. Monitoring and evaluation specialist. Allocation of his/her time to activities related to general monitoring of the project. USD 4,800. Communications specialist. Allocation of his/her time for general communication of project activities. USD 72,000. Administrative Assistant/Accountant. full time assigned to project management
31	USD 60,000. Travel of the binational project coordination team to support and follow up of the outcomes. USD 13,600. On year 2, international ticket for evaluator USD2.000. Food and lodging for international evaluator USD300 per day x 10 days = USD 3,000. Food and lodging for national evaluators USD300/day x 6 days x 2 people = USD3.600. Tickets and national travel USD5.000. Total = USD13.600

Note	Details
	USD 19,500.On year 4, International ticket for evaluator USD2.000. Food and lodging for international evaluator USD300 per day x 15 days = USD 4,500. Food and lodging for national evaluators USD300/day x 10 days x 2 people = USD6.000. Tickets and national travel USD7.000.
32	USD 23,650. Adaptations of office (USD 5,000), furniture (USD 5,000), three laptop computers and two server-type desktop computers (USD 7,000), two digital projectors (USD 1,650), multifunction laser printer (USD 1,000), software licenses (USD 4,000)
33	USD 5,200. High speed internet, webhosting, landline.
34	USD 8,000. Office supplies (e.g., paper, toner)
35	USD 4,000. Office maintenance and repairs.
36	USD 2,400. Maintenance and repairs for furniture and equipment.
37	USD 53,000. On year 2, mid-term evaluation. International evaluator USD15.000 + two national evaluators; USD5.000/evaluator = USD25.000 On year 4, final evaluation. International evaluator USD18.000 + two national evaluators USD5.000/evaluator = USD28.000
38	USD 40,000. Project audits
39	USD 50,000. Estimated direct costs of the project based on the UPL.
40	USD 359,304 for the recruitment of consultants or consulting team to implement intervention models for demonstration in prioritized micro-basin, soil and water conservation measures, dissemination of results, implementation of conservation measures for vegetation, soil, and water dispersion, implementation of seedling nurseries, implementation of activities in three communities for developing the Water Use Plan, preparation and implementation of the Water Use Plan, development of socio-economic study on the potential of totora reeds, systematization of information, development of Monitoring Plan Development of database for water quality and quantity, development of mitigation plan for pilots 1,2,3, 4 and 5.
41	USD 24,152. Logistics and mobilization (transport, DSA, accommodation) for planning meetings with the stakeholders of the three areas of projects 1, 2, 3, 4 and 5.
42	USD 258,000. Topographic and modelling studies, surveying and mapping work, identification of sources and types of polluntans for pilot 1, 2 and 4.
43	USD 95,000. Rental of transport vehicle for pilot 1.
44	USD 491,732. Provision of smaller tools for practice of soil and water conservation measures by families, aatellite images, small construction works oriented to growth or conservation of ecosystems (bofedales), water adduction works to homes and nurseries for bofedal flora and vegetables, monitoring equipment, laboratory equipment, reagents for pilots 1, 2, 3, 4 and 5.
45	USD 200. Office supplies for pilot 5.
46	USD 52,004. Preparation and publication of 3,000 guides, video production on ancestral practices for river basin management for pilot 1, video for TV broadcasting on Conservation of Bofedales in three communities, video for TV broadcasting on the equitable distribution of water in three communities, preparation and publication of booklets on outcomes for pilot 2,
47	USD 119,608. Workshops and trainings with actors, stakeholders and participatory communities on conservation, water distribution, land use, agreements, implementation of remediation measures for pilots 1, 2, 3, 4 and 5.
44	USD 30,000. Estimated direct project costs of the project, based on the UPL.

Additional studies required for TDA development

	Study	Indicative cost (USD)	Type of contract	ATLAS Code	Duration (months)	Notes
1	Harmonize methodologies and update the calculation of water balance in the TDPS system.	80.000	Contractual Services - Individual	71400	6	This includes update on current water balance studies and information on the TDPS system. Also, it must be considered the approval of an agreed methodology for the calculation of the current water balance in the system, quantify components of the water cycle, establish relationships in the short and medium terms between different hydrological variables and providing information to support decision making. The water balance will be updated, incorporating effects of climate change. The consultant team must include a hydrologist and a climatologist.
2	Update the hydro-climatic database and have data on demand and use of surface and groundwater in the TDPS system.	80.000	Contractual Services - Companies	72100	6	Existing data must be collected, systematized, and analysed, and meteorological and hydrological data must be updated at the level of hydrographic units in TDPS. In terms of the demand and use of surface and groundwater, a complete set of information at the level of the system about uses and users of water and future water needs must be generated. Similarly, information about users who have some sort of authorization to use groundwater or surface water must be obtained. The team will comprise a hydrologist and a climatologist.
3	Study of availability and current use of groundwater in the TDPS system	50.000	Contractual Services - Companies	72100	6	This includes the compilation, systematization, and analysis of existing information. It must be complemented with a diagnosis of the status of knowledge about use, availability and quality of groundwater resources in TDPS. This requires a specialised hydrogeologist.
4	Evaluation of the status, threats, and vulnerability to climate change of aquatic ecosystems. [1] Complement the situation analysis of the Lake Titicaca hydrologic unit.	75.000	Contractual Services - Individual	71400	10	This includes the compilation and processing of existing information. The general diagnosis of the situation and threats on the hydrographic unit of Lake Titicaca will be updated. There will be a specific analysis on the situation of the Suches River hydrographic unit. Status, threats and vulnerability of the aquatic ecosystem of Lake Titicaca, aquatic communities, and individual species to climate change will be estimated. The situation of the ecosystem will be evaluated along with an analysis of climate trends and the impact of projected climate change in order to perform risk assessments. Likewise, the resiliency and the thresholds of the integrity of ecosystems to climate change will be analysed. This will be complemented by the development of a baseline or current status of the Lake Titicaca basin unit. A climate change expert and a biologist/ecologist will be needed.
5	Evaluation of status, threats, and vulnerability to climate change of aquatic	45.000	Contractual Services - Individual	71400	6	This includes the collection and processing of existing information. The general assessment of the status and threats of the Desaguadero River hydrographic unit will be updated. There will be specific analysis of the situation of the hydrographic unit

	Study	Indicative cost (USD)	Type of contract	ATLAS Code	Duration (months)	Notes
	ecosystems. [2] Comprehensive study of the Desaguadero River hydrographic unit.					Maure/Mauri River. The status, threats and, vulnerability of the Desaguadero River ecosystem to climate change will be estimated. The situation of the ecosystem will be assessed along with analysis of climate trends and the impact of projected climate change for risk assessments. Similarly, resilience and thresholds of the integrity of ecosystems in regards to climate change will be discussed. This will be complemented with a baseline or current situation analysis of the Desaguadero River hydrographic unit. This will require an expert on climate change and a biologist/ecologist.
6	Evaluation of status, threats, and vulnerability to climate change of aquatic ecosystems. [3] Comprehensive study of the Lake Uru Uru hydrographic unit.	20.000	Contractual Services - Individual		6	This includes the collection and processing of existing information. The general assessment of the status and threats of Lake Uru Uru will be updated. The status, threats and vulnerability of aquatic ecosystem of Lake Uru Uru, aquatic communities and individual species to climate change will be estimated. The situation of the ecosystem and aquatic communities will be evaluated along with analysis of climate trends and the impact of projected climate change for risk assessments. This will require an expert on climate change and a biologist/ecologist.
7	Evaluation of status, threats, and vulnerability to climate change of aquatic ecosystems. [4] Comprehensive study of the Lake Poppó hydrographic unit.	40.000	Contractual Services - Individual	72100	6	This includes the collection and processing of existing information. The general assessment of the status and threats of the Lake Poopó hydrographic unit will be updated. The status, threats and vulnerability of the aquatic ecosystem of Lake Poopó, aquatic communities and individual species to climate change will be estimated. The situation of ecosystem will be evaluated along with analysis of climate trends and the impact of projected climate change for risk assessments. Similarly, resilience and thresholds of the integrity of ecosystems to climate change will be analysed. This will be complemented with the development of a complete baseline or current status study of the hydrographic unit of Lake Poopó. This will require an expert on climate change and a biologist/ecologist.
8	Study on vulnerability to, threat, and risk from climate change in the TDPS.	40.000	Contractual Services - Individual	72100	5	This includes a study on risk and vulnerability to climate change, mitigation, and adaptation processes as well as preservation, conservation, restoration and/or remediation in the case of adverse events (frost, drought, hailstorms, and floods) that affect the TDPS system. This will require a specialist in climate change.
9	Assessment of the conservation status of indicator species: [1] the Titicaca giant frog (Telmatobius culeus).	80.000	Contractual Services - Companies	72100	14	This includes compilation and processing of existing information, primary information collection (e.g., incidence of chytridiomycosis, captures, supply and consumption chain, evaluation of genetic diversity of populations), and meetings of experts to assess the conservation status. This includes the preparation of a proposal for a binational conservation strategy.

	Study	Indicative cost (USD)	Type of contract	ATLAS Code	Duration (months)	Notes
	Prepare proposal for a binational conservation strategy for this species.					
10	Assessment of the conservation status of indicator species: [2] endangered fish of genus Orestias (i.e., O. cuvieri, O. pentlandii, and O. albus). Prepare proposal for binational strategy for the conservation of these species.	50.000	Contractual Services - Companies	72100	10	This includes compilation and processing of existing information, collection of primary key information and meetings of experts to assess the conservation status and prepare a proposed binational conservation strategy.
11	Analysis of the situation of fisheries in Lake Titicaca. Prepare proposal for a binational management strategy on fisheries.	40.000	Contractual Services - Individual	71400	6	This must be a consulting team made up by a fishing expert from each country and a socioeconomic specialist. This includes compilation and processing of existing information, meetings of fishery officers from national and local authorities to assess the status of the resources and fisheries management, as well as the preparation of a proposal for a binational fisheries management strategy.
12	Analysis of the situation of aquaculture in Lake Titicaca. Prepare proposal for a binational strategy on aquaculture management.	30.000	Contractual Services - Individual	71400	4	This must be a consulting team made up by an expert on aquaculture, an environmental specialist, and a socioeconomic specialist. This includes compilation and analisis of existing information, georeferenced cadastre of production units, meetings of government officials from both countries to assess the status of aquaculture, its environmental impact, its socioeconomic impact, as well as preparation of a proposal for a binational aquaculture management strategy.
13	Analysis of the situation of fisheries in Lake Poopó. Prepare proposal for a management strategy on fisheries.	40.000	Contractual Services - Individual	71400	5	This must be a consulting team made up by a fisheries specialist and a socioeconomic specialist. This includes primary diagnosis of the situation of fisheries (e.g., number of fishermen, forms of organization, levels of catch and fishing effort, value chain), workshops with government officials, local governments and fishermen to analyze the situation and prepare a proposal for intervention strategy.
14	Collection of primary information on users and uses of water in each	110.000	Contractual Services - Companies	72100	12	

	Study	Indicative cost (USD)	Type of contract	ATLAS Code	Duration (months)	Notes
	hydrographic unit level 3 and 4 of the TDPS (14 hydrographic units) with a gender-based approach. Identify local views and projections, and future expectations.					
15	Systematize and analyse the information of water quality in TDPS.	20.000	Contractual Services - Individual	71400	5	This includes the collection, organization, and analysis of information on water quality in the TDPS system. Moreover, it is essential to expand and improve the information on the quality of water in order to have a better analysis tool on availability and characterization of the quality of water sources, aiming at covering the needs of management and planning of water resources. This will require a water quality specialist.
16	Inventory of environmental liabilities caused by mining and assessment of its impact on the TDPS. Prepare proposed strategies to close mining environmental liabilities in the basins of Lake Poopó, Desaguadero River, Suches River, and Seco River.	160.000	Contractual Services - Companies	72100	12	Prepare an inventory of environmental liabilities caused by mine activities in the TDPS (including abandoned mines). The status and impacts of each liability will be assessed and requirements for (i) remediation of old operations (closed and abandoned mines), (ii) mitigation of ongoing operations, and (iii) prevention of impacts of future operations. Proposed strategies on management of mining liabilities will be prepared for the basins of Lake Poopó, Desaguadero River, Suches River, and Seco River. A specialist in environmental management in mining operations will be required.
17	Evaluation of monitoring initiatives and design of monitoring program for TDPS.	60.000	Contractual Services - Companies	72100	5	The performance of current monitoring initiatives will be assessed (including participatory monitoring of water quality). Key indicators for a comprehensive monitoring of the TDPS will be identified and selected, and an optimized model for monitoring and reporting will be designed. Additionally, a management–financial model must be designed to sustain the monitoring program in the long-term. A monitoring specialist and an economist will be required.
18	Additional studies not previously identified but considered considered a	75.000	Contractual Services - Individual	71400	6	These studies will be identified once the first year of the project is completed.

	Study	Indicative cost (USD)	Type of contract	ATLAS Code	Duration (months)	Notes
	priority.					
19	Additional studies not previously identified but considered considered a priority.	120.000	Contractual Services - Companies	72100	6	These studies will be identified once the first year of the project is completed.
	Total	1.215.000				

Supporting consultants for TDA and SAP development

Consultant	USD/month	Duration (months)	Total
Soil scientist /agronomist	2.000	4	8.000
Sociologist/anthropologist	2.000	4	8.000
Economist	2.000	4	8.000
Sanitary engineer	2.000	4	8.000
Biologist/ecologist	2.000	4	8.000
GIS geographer	2.000	2	4.000
Technical promoters (14)	1.500	7	47.000
TOTAL			191.000

SECTION IV. ADDITIONAL INFORMATION (SEE ATTACHMENTS)

Annex 1. Maps
Annex 2. Vertebrates in threat categories in TDPS
Annex 3. Description of ALT structure and operation
Annex 4. Ilo Declaration of 19 October 2010.
Annex 5. Esteves Island Statement of 23 June 2015.
Annex 6. Stakeholder map in Bolivia
Annex 7. Stakeholder map in Peru
Annex 8. Summary of the social and environmental situation in pilot projects areas
Annex 9. Pilot projects to be implemented
Annex 10. Project cycle management services
Annex 11. Situation analysis of integrated management of water resources in TDPS
Annex 12. Analysis of impacts on water resources in the TDPS
Annex 13. Environmental baseline situation in the pilot intervention sites
Annex 14. Analysis of the socioeconomic situation in the Bolivian sector of TDPS
Annex 15. Analysis of the socioeconomic situation in the Peruvian sector of TDPS
Annex 16. Model letter of agreement (LOA) between the United Nations Development Programme (UNDP) and the government for direct project services.
Annex 17. International Waters Tracking Tools
Annex 18. Social and Environmental Screening Procedure
Annex 19. Co-financing letters
Annex 20. List of relevant projects for coordination / collaboration

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