

SAP → BERMEJO

STRATEGIC ACTION PROGRAM
FOR THE BINATIONAL BASIN
OF THE BERMEJO RIVER



Integrated Management Program for the Binational Basin of the Bermejo River (PROBER)

General Guidelines

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FOR THE BINATIONAL BASIN
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Integrated Management Program for the Binational Basin of the Bermejo River (PROBER)

General Guidelines



ARGENTINA



BOLIVIA

**BINATIONAL COMMISSION FOR
THE DEVELOPMENT OF THE UPPER BERMEJO
AND GRANDE DE TARIJA RIVER BASINS**

COBINABE



GEF - FMAM
GLOBAL
ENVIRONMENT
FACILITY



UNEP - PNUMA
UNITED NATIONS
ENVIRONMENT
PROGRAMME



OAS - OEA
ORGANIZATION
OF AMERICAN
STATES

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Introduction

The Strategic Action Program for the Binational Basin of the Bermejo River (SAP Bermejo) was formulated during the period 2001-2009 by the Governments of Argentina and Bolivia through the Binational Commission for the Development of the Upper Bermejo River and Grande de Tarija River Basins (COBINABE), in cooperation with Department of Sustainable Development of the Organization of the American States General Secretariat (OAS) and Division of GEF Cooperation of the United Nations Environment Program (UNEP), as implementing agency for the Global Environment Facility (GEF).

The formulation activities involved a series of studies, demonstration projects, and institutional strengthening actions based on a comprehensive approach of the Basin, addressed to assist to addressing the root causes of the main transboundary problems identified in the Basin and to promoting a complete comprehensive management and development program, taking into consideration the

public participation and survey mechanisms developed during the diagnostics stage.

The achievements and results of the SAP Bermejo are highly valuable and important to the sustainable development of the basin. In particular the SAP Bermejo highlighted the progress made in:

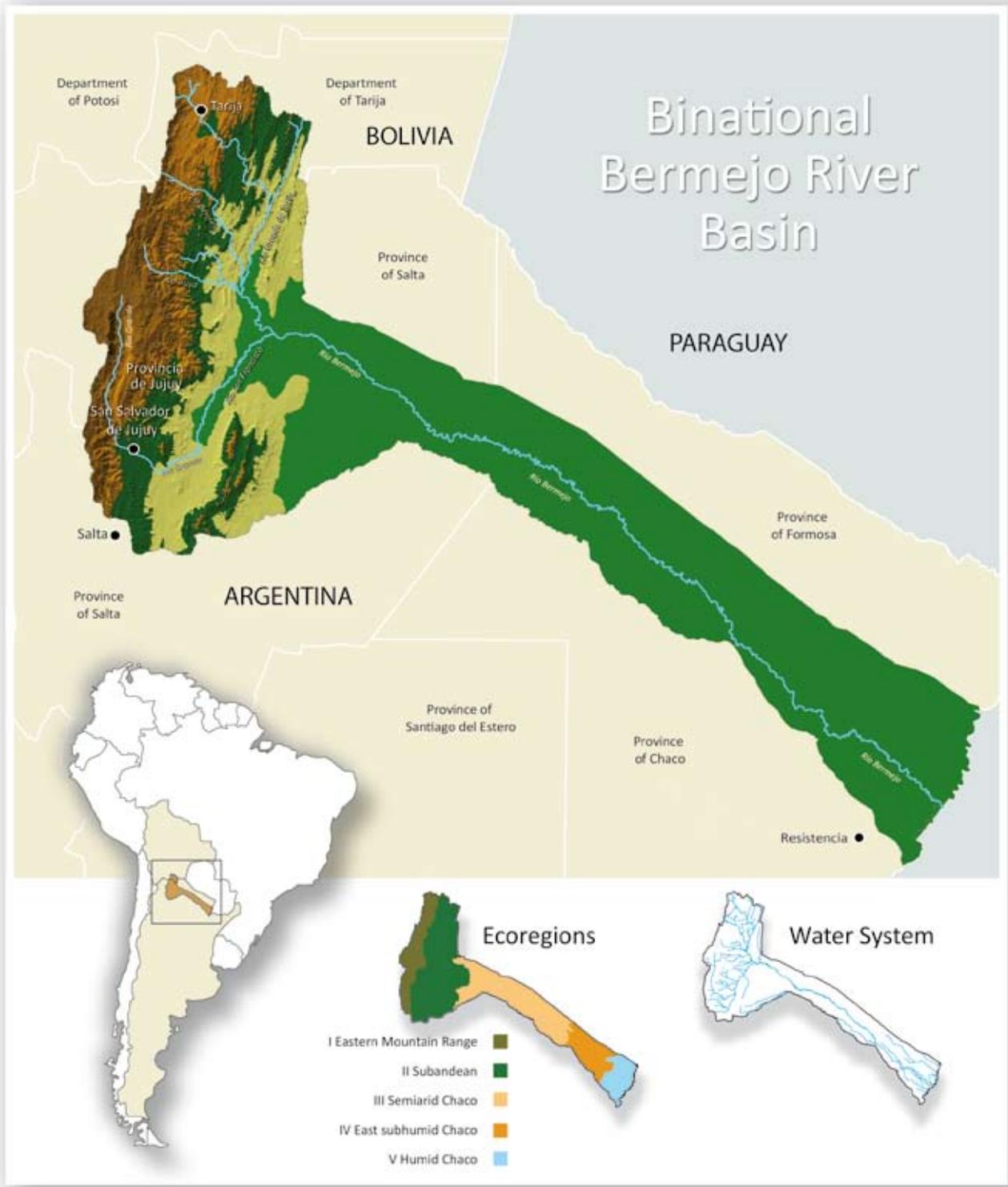
- i) institutionalization of the Basin agencies, both at the binational and national levels;
- ii) pollution prevention, environmental conservation, and rehabilitation actions;
- iii) participatory processes, with wide acceptance of the need for active stakeholder participation;
- iv) environmental education, and its multiplier effect on community awareness;
- v) access to information;
- vi) actions to reduce the negative impacts on the population suffering from the consequences of environmental; and,
- vii) replication of actions and approaches within the broader context of la Plata River Basin, particu-

larly with respect to management of sediments, water quality, the hydrometeorological network and groundwater.

It should be understood that the integrated management of water resources is essentially a slow and complex processes, where actions to address the social causes of environmental problems, such as creating effective social organizations, institutions, and mechanisms for participation and education, are critical to advance the sustainable development of the Basin. In the particular case of the Bermejo River Basin, which covers a large area, diversity of environments and landscapes, as well as possessing a dynamic hydrological regime, the sustainable management of water resources to improve the quality of life of its people and preserve at the same time, the River's eco-

systems and biodiversity, demands structural and nonstructural approaches of a magnitude greater than those developed in the SAP.

Thus, the Program of Comprehensive Management of the Bermejo River Binational Basin (PROBER) emerges as the principle instrument of COBINABE to ensure the sustainability of integrated management actions in the Basin initiated through the SAP Bermejo. The PROBER is, therefore, a key step to reaffirm the long-term development goal identified in the SAP and consolidate the work begun, by extending the specific interventions, adapting them within the context of historical conditions prevailing in specific locales, and creating a framework for improving the quality of life of residents and promoting development in the region in sustainable terms.



Executive Summary

The Bermejo River Basin is a key area within the hydrological system of la Plata River Basin. It is extremely important for the development of the region as a whole. The Basin spans 123,162 km², of which 10% (11,900 km²) is located in Bolivia, and the remaining 90% within Argentina. The basin is located in the provinces of Chaco, Formosa, Jujuy and Salta in the north of Argentina, and in the Department of Tarija in the south of Bolivia. The total estimated population is 1,330,000 inhabitants.

Based on its geomorphologic characteristics, the Basin is divided into the Upper Basin (comprised of the Upper Bolivian Basin and the Upper Argentine Basin) and the Lower Basin (wholly within Argentina). The Bermejo River is 1,300 km in length, and connects the mountainous ecosystems of the Andes Mountains with the ecosystems of the Chaco plain and the hydrological system of the la Plata River.

The Basin is characterized by intense hydrological, geomorphological and ecological processes.

The basin has a rich potential in terms of its natural resources, variety of ecosystems and biodiversity. However, there are a number of factors related to the natural fluctuations in water availability which restrict the development and use of these resources. Such factors include general water shortages during dry periods which reduce levels of production and their associated economic returns, and periods of hydrological excesses associated with floods, among others.

The Upper Basin suffers from serious natural and anthropogenic erosion problems, which correlate to nearly 80% of the sediments discharged into the Paraguay and Paraná rivers. The levels of erosion and sediment transport in the Bermejo Basin are among the highest of the world, in terms of their social, economic and environmental impacts.

The Bermejo River Basin represents high levels of social vulnerability, conditioned by limited access to surface and ground waters and a degraded

natural environment resulting from poor use of soils and the destruction of native forests.

Institutional Framework

The institutional framework that characterizes the binational Bermejo River Basin is complex, as is often the case with the interjurisdictional basins of transboundary hydrological resources.

Through the Treaty of Orán, signed on June 9, 1995, the governments of Argentina and Bolivia created the Binational Commission for the Development of the Upper Bermejo and Rio Grande de Tarija Rivers Basin (COBINABE), the purpose of which is “to cooperate in the programming of the social and economic development and in the sustainable management of the natural environment of the region.”

The following jurisdictional institutions participate in the management of the basin:

- Regional Commission of the Bermejo River (COREBE) in Argentina.
- Pilcomayo and Bermejo Rivers National Technical Office (OTNPB) in Bolivia.
- Government agencies in the provinces of Chaco, Formosa, Jujuy and Salta in Argentina.
- Government agencies of the Prefecture of Tarija Department in Bolivia.

Strategic Action Program

The Basin can be characterized by a strong contradiction between the availability of natural resources, the huge human and cultural potential, and the poverty suffered by a great part of its population.

Given the non-sustainable use of the hydrologi-

cal resources, the soils and existing biodiversity; the social, economic and environmental externalities; and, the transboundary nature of the problems, the governments of Argentina and Bolivia jointly sought alternative solutions to their common concerns relating to sustainable development programs, as identified through COBINABE. These initiatives were aimed at breaking the circle of poverty and deterioration of the ecosystems in the Basin, and proceeding with the sustainable use of the resources for healthy human and environmental development.

The Strategic Action Program for the Binational Bermejo River Basin (SAP Bermejo) was developed through the cooperative efforts of both countries, consolidating the support of the major stakeholders in each country, and with the international cooperation of the Global Environment Facility (GEF), the United Nations Environment Programme (UNEP), and General Secretariat of the Organization of American States (OAS).

The Transboundary Diagnostic Analysis (TDA) that underlies the SAP Bermejo highlighted the exceptional and localized nature of the environmental problems of the Basin and their root causes. It generated the international interest necessary to support the implementation of actions aimed at solving such problems.

Specifically, the TDA identified six major environmental problems with transboundary manifestations of global importance:

- i) soil degradation, intense erosional processes and desertification;
- ii) water shortages and restrictions on the use of hydrological resources;
- iii) degradation of water quality;

- iv) destruction of habitats, loss of biodiversity and deterioration of biotic resources;
- v) floods and other natural disasters; and,
- vi) deterioration of quality of life among the population and loss of cultural resources.

The Causal Chain Analysis undertaken facilitated differentiation of the underlying causes of each identified problem. Such causes were defined as common basic causes - the root or origin of the primary challenges facing the Basin. These causes included:

- absence of political, legal and institutional frameworks;
- inappropriate inter- and intra-jurisdictional planning and coordination;
- insufficient knowledge, commitment and participation of the community, and lack of public participation;
- inadequate financing and support mechanisms; and
- limited access to sustainable technologies.

The SAP was developed as an instrument to deal with these environmental problems and to promote the sustainable development of the Basin, reflecting the results of a wide ranging public participation and consultative process.

The integrated vision of the Basin facilitated a process through which a set of priority actions were identified and grouped into four Strategic Areas. These included:

- i) Institutional development and strengthening for the planning and integrated management of the Basin;
- ii) Environmental degradation prevention, protection and rehabilitation;
- iii) Sustainable development of natural resources;

- iv) Public awareness creation and public participation.

These actions occurred between 1997 and 2000, while the execution of the SAP Bermejo itself started in June 2001 and ended in December 2009. Within this period, 29 projects were executed. Argentina and Bolivia implemented 9 projects each, with the remaining 11 projects being jointly executed by both countries.

The objective of the SAP Bermejo was to successfully implement activities unified by a common vision for the Binational Basin within the different jurisdictions involved –the Argentine provinces of Chaco, Formosa, Jujuy and Salta, and the Department and communities of Tarija in Bolivia. Moreover, the execution of the SAP Bermejo acted as the impetus for the development of an integrated management process contributing to the basin's sustainable development, focused on its hydrological resources. This integrated management mechanism was implemented through demonstration and potentially replicable projects in key areas and addressing common themes related to the reduction of vulnerabilities in the system.

Of particular note, the SAP implemented an innovative and participatory process of integrated management of hydrological resources, which represented, at the time of completion, a “catalytic” instrument for the implementation of an Integrated Management Program for the Binational Bermejo River Basin (PROBER).

During its development and execution, the SAP Bermejo was respectful of meeting relevant social and institutional desires. Further, drawing upon experiences from within the basin, the SAP generated

additional proposals, as well as formal and informal educational movements, all of which currently underpin the strategy for the PROBER.

PROBER arose as an instrument of COBINABE to ensure the sustainability of the integrated management actions initiated under the auspices of the SAP Bermejo. Consequently, PROBER is a crucial element needed to reassert the long term development proposals outlined in the SAP. PROBER also serves to consolidate the lessons learned during the initial steps made during the formulation of the SAP, extending their specific objectives according to the contextual conditions, and creating an appropriate framework to improve the quality of life for the Basin's inhabitants and promote the development of the region in a sustainable fashion.

The Management Program (PROBER)

The Integrated Management Program for the Binational Basin of the Bermejo River Basin (PROBER) is the instrument of the COBINABE designed to assure the sustainability of the integrated management actions within the Basin, initiated through the SAP Bermejo.

The approach of the PROBER considers the integrated management of the hydrological resources and the integrated management of the Basin as reference concepts in the design of the integrated action strategy for the basin.

The development of the PROBER has been undertaken within the framework of COBINABE, and is the result of the permanent interaction of the COREBE in Argentina and OTNPB in Bolivia.

The development objective of the PROBER is:

“To improve the quality of life of the populations of the Binational Bermejo River Basin through the sustainable use of its natural resources.” To achieve such an objective, a 20-year time horizon was considered to be appropriate, and this timeline guided the definition of the relevant Strategic Areas, Components and Actions.

This development objective clearly enumerated the will of both Argentina and Bolivia in achieving sustainable development within the Bermejo River Basin. In particular, PROBER is considered as a planning and management tool designed to enhance sustainable development through an integrated approach, the empowerment of the local stakeholders and competent institutions, and the complementary actions undertaken by the jurisdictions in each country. This long term objective guides the purpose, specific goals, and strategic activities in each phase of the PROBER.

To reach this objective, the PROBER will use the experiences and lessons learned from the SAP Bermejo as well as the technical, institutional and organizational capacities assembled for the integrated and sustainable management of the Basin. The PROBER faces the challenges of ensuring the sustainability of (i) the integrated management of the resources of the Bermejo River Basin, especially in the context of the basin's transboundary hydrological resources, and (ii) the economic and social development of the populations settled therein. Accordingly, the PROBER continues to work toward the strengthening the shared vision of the hydrological basin as a planning and management unit, and is continually adjusting its orientation to meet the needs of the Basin's inhabitants and the jurisdictional institutions which fall within its framework.

The purpose of the PROBER is to provide continuity, and to extend and improve the management efforts for the sustainable development of the Bermejo River Basin, bearing in mind the potential offered by its natural resources and, in particular, the hydrological resources and their protection needs.

In general terms, the PROBER supports the following:

- The use of the Binational Hydrological Basin as a planning and management unit, focusing on the development of the hydrological resources, and working in accordance with the concept of integrated management of hydrological resources and their basins.
- A strong institutional framework, founded on international law, which facilitates and coordinates the implementation of agreements and mutual cooperation between Argentina and Bolivia, supported by the COBINABE, and its delegation to the technical institutions responsible for development management in the parts of the Basin under each country's governmental structure: COREBE in Argentina and OTNPB in Bolivia.
- The key role of social participation and the participation of competent institutional structures in the decision-making processes affecting relevant development actions and projects.
- The validation of the main conclusions of the TDA and the root causes analysis of the problems affecting the Basin, which resulted in the SAP Bermejo but acknowledging the need to update and enrich this analysis with new information generated both within and outside of the Basin.
- The replication and extension of successful actions within the framework of an integrated ap-

proach to:

- i) reduce erosion and transport of sediments through small multi-purpose works implemented through the initiatives of the various communities;
- ii) conserve soil and water through the implementation of appropriate management practices, supported by the applied research, in critical and vulnerable areas;
- iii) support to sustainable agricultural and livestock husbandry development;
- iv) plan for the integrated management of degraded micro basins to improve the quality of life of the rural populations and indigenous groups;
- v) protect important areas for the conservation and protection of the hydrological resources of the Basin, including riparian corridors (e.g., the Yungas forests and the foothills of the Andean Mountains) and margins as well as their biodiversity and critical ecosystems (i.e., the wetland areas of the Bermejo River Basin);
- vi) manage risks, and prevent or limit the occurrence of natural disasters;
- vii) monitor the levels of contamination and implement source control actions to maintain water quality; and,
- viii) generate and manage information, communications, and environmental education mechanisms to inform stakeholders about the hydrological resources of the Basin.

Moreover, the PROBER consolidates and deepens the scope of the SAP Bermejo and focuses on including:

- participation of the institutions responsible for

hydrological management, policy development and/or coordination in both countries, which were not originally considered in the SAP Bermejo, such as the Subsecretariat for Hydrological Resources in Argentina and the Ministry of Environment and Water in Bolivia, whose absence limited the execution of the activities;

- participation of other key professional and/or social institutions such as the Federal Water Council (COHIFE) in Argentina and the diverse organizations related to water management in Bolivia, including irrigation associations, basin committees and the Federación Única de Comunidades Campesinas de Tarija (union of indigenous communities), among others;
- actions derived from international commitments and national and social priorities, such as compliance with the Millennium Development Goals agreed by the United Nations to overcome poverty, create a better environment and prevent pollution of surface waters and aquifers within the Bermejo River Basin;
- comprehensive research into achieving the multi-purpose alternatives affecting the sustainable use of the available hydrological potentials (i.e., irrigation, power generation, fishing, recreation and tourism) in accordance with the wishes of local communities and stakeholders, meeting their economic and social needs as well as limiting potential environmental impacts in accordance with the relevant laws of each country as exercised through competent jurisdictions;
- societal participation through the informational programming, communication, and education in the communities;
- increased attention on measures to mitigate the negative effects of global change in general, and of climate variability and change in particular, highlighting the importance of the sustainable and integrated management of the hydrological resources of the basin;
- integrated management of hydrological resources and degraded meso- and micro-scale hydrological basins for the improvement of quality of life quality among the rural populations and indigenous groups; and,
- identification of irrigation areas and implementation of measures to protect vulnerable populations from landslides/subsidence and floods.

The PROBER will address four major Strategic Areas, and be guided by their respective Components and Actions, which are closely related to those on which the implementation of the SAP Bermejo was based.

As an integrated action strategy for the Basin born out of the SAP Bermejo, the PROBER has a 20-year time horizon, upon which its development objective is based. However, to make the Program a practical and effective operational instrument for COBINABE and both countries, two clearly defined phases have been identified: the short term phase having a duration of 3 years and the medium term phase having a duration of 5 years.

Based on the institutional strengthening achieved and the aim of using hydrological resources in accordance with an integrated vision of the Basin, the short term phase seeks to proceed with the implementation of the Actions through concrete projects in order to meet the investment and management needs of each country. Furthermore, the short term

phase will seek to improve, within a binational scope, the quality of life of the basin's various populations and to enhance the environmental sustainability of the Basin. This phase is based on the results validated by the SAP Bermejo.

In particular, the following is expected in the short term:

1. the implementation of projects with a trans-boundary scope and with national/jurisdictional priority that contribute to the sustainable development of the Basin;
2. the implementation of the Decision-Making Support System (DSS) in the operation of networks established under the SAP Bermejo;
3. the implementation of binational actions such as:
 - the control and monitoring of the water quality and the transport of sediments;
 - the management of binational corridors for environmental and biodiversity protection;
 - the identification and assessment of potential, sustainable multi-purpose uses of the binational hydrological resources;
 - the promotion of environmental education; and,
 - social empowerment and public participation at basin scale.

The medium term phase is considered as a logical consequence of the works that, in each Strategic Area, are developed in the short term phase for the integrated management of the Basin. During this phase, the execution of works derived from the previous period is expected to continue, provided that they are feasible and affordable/financeable. In addition, institutional consolidation processes are expected to proceed so long as the responsibili-

ties of the institutions are enhanced to cope with the more complex management processes and joint actions anticipated from a binational, national and jurisdictional perspective.

The proposed 20-year horizon (long term) is considered appropriate to reach the development objective; that is, to have a Binational Basin managed in a sustainable manner and in accordance with the goal of the PROBER. This horizon is the one which guided the definition of the Strategic Areas, Components and Actions included in the Integrated Management Program for the Binational Basin.

The execution of the PROBER will be a joint effort of both countries, through the COBINABE, and based on its technical and financial capabilities and the capacities of the jurisdictions and organizations involved. It is intended to be a binational effort of both countries. The challenge involved in complying with the proposed objectives is complex and requires new financial and technical support. This support is envisioned as coming from the international community, either through loans in those areas with economic and financial profitability or donations to address the social and environmental debts generated within the Basin. The final execution of the PROBER projects also requires the assessment and addition of potential local, regional, and national financing sources, as appropriate.

Execution proposal. Costs and financing

The comprehensive nature of the program and the interjurisdictional political-institutional framework of the Basin requires for the implementation of the PROBER the execution of formal agreements

between the COBINABE and the responsible institutions in both countries, and the provincial/departamental agencies in the sector and thematic areas in which it seeks action.

The strongly participatory nature of the PROBER and its purpose of developing the empowerment of communities requires the COBINABE and its associated national bodies to formalize opportunities for participation, information and education, and realization of instruments that execute and complete the implementation of planned activities within the Binational Basin.

As regards indicative figures of the selected projects, the estimated cost of the Program for this phase amounts to an approximate aggregate amount of US\$168 million, distributed by Strategic Area as shown in the Table.

The necessary financing to implement the short-

term PROBER actions includes obtaining funds from various international, regional, and national sources. Depending on the activity to be financed, the funds may be non-refundable grants or loans. Counterpart public funds are also planned to be incorporated in the financial strategies underlying these actions (from national, provincial and/or prefectural and municipal or private sources).

The proposed financing strategy will seek financial support from multilateral agencies such as the GEF, World Bank, Inter-American Development Bank (IDB), Andean Development Corporation (CAF), or others or bilateral cooperation from third countries (Donors) to implement both structural and nonstructural actions, as well as complementary actions necessary to strengthen the binational institutional framework of the short term PROBER.

Table 3.1. Costs of the Project during the short term phase (by Strategic Action area)

Strategic Area	Estimated Amount
I. Institutional consolidation for integrated water resources planning and management of the Binational Basin of the Bermejo River	2,720,000
II. Sustainable use of natural resources	130,651,870
III. Reduction in vulnerabilities through integrated water resources management, considering climate variability and change	31,582,590
IV. Social participation for the planning and integrated management of the Basin	2,910,000
Total US\$	167,864,460

Amounts are stated in United States dollars.

PROBER: Strategic Areas, Components and Actions

Strategic Areas Components	Actions
Strategic Area I: Institutional consolidation for integrated water resources planning and management of the Binational Basin of the Bermejo River	
I.1. Development of the institutional framework	I.1.1. Institutional consolidation of COBINABE as the Basin organization. I.1.2. Strengthening of COREBE and OTNPB and coordination of water and natural resources management entities of Argentina and Bolivia.
I.2. Adaptation of the legal framework for planning and management	I.2.1. Harmonization of the legal frameworks of jurisdictions of the Basin for integrated water resources management (IWRM). I.2.2. Implementation of zoning and land use regulation.
I.3. Design and implementation of the decision-making support system	I.3.1. Optimization of an information system for the management of the Binational Basin of the Bermejo River, incorporating the monitoring network of environmental parameters and the early warning and extreme events alert system. I.3.2. Implementation of the decision-making support system.
Strategic Area II: Sustainable use of natural resources	
II.1. Development of sustainable production in critical areas	II.1.1. Sustainable cattle management. II.1.2. Management of intensive agricultural systems. II.1.3. Sustainable forestry management. II.1.4. Development of agro-forestry systems for small producers. II.1.5. Development of tourism. II.1.6. Management of fishing and aquaculture resources.
II.2. Integral use of water resources (surface and underground waters)	II.2.1. Drinking water supply. II.2.2. Livestock watering, irrigation supply, agricultural drainage, and other uses. II.2.3. Ground water uses. II.2.4. Atmospheric waters.
II.3. Application of instruments and development of capacities for environmental management	II.3.1. Payment for environmental services. II.3.2. Clean development mechanisms. II.3.3. Reduction of carbon emissions.

PROBER: Strategic Areas, Components and Actions

Strategic Areas Components	Actions
Strategic Area III: Reduction in vulnerabilities through integrated water resources management, considering climate variability and change	
III.1. Prevention and mitigation of erosion, sedimentation and desertification processes	III.1.1. Creation of a sedimentological monitoring and information system. III.1.2. Implementation of control measures. III.1.3. Expansion of knowledge and development of management instruments. III.1.4. Dissemination of existing information.
III.2. Pollution prevention and control and environmental sanitation in water bodies	III.2.1. Monitoring of water quality. III.2.2. Environmental Sanitation of water bodies. III.2.3. Systematization of information on water quality. III.2.4. Training, communications, and information dissemination programs.
III.3. Risk management, prevention and reduction of natural disasters	III.3.1. Strengthening existing forecasting systems and development of an extreme events alert system. III.3.2. Training, communications and information dissemination programs.
III.4. Conservation of ecosystems and biodiversity	III.4.1. Protection of ecosystems and management of protected areas. III.4.2. Conservation of biodiversity related to water bodies and to the Basin. III.4.3. Rehabilitation and restoration of degraded environments.
Strategic Area IV: Social participation for the planning and integrated management of the Basin	
IV.1. Consolidation of participatory processes	IV.1.1. Promotion of societal participation. IV.1.2. Generation of capacities for societal participation.
IV.2. Environmental education	IV.2.1. Formal environmental education. IV.2.2. Informal environmental education. IV.2.3. Building awareness on environmental matters.
IV.3. Systematization of information, dissemination, and communication	IV.3.1. Dissemination of information and communication. IV.3.2. Development of new communications channels.

1. Bermejo River Basin

1.1. General features

The Bermejo River Basin is a key area in the water system of the region and for the development of the la Plata River Basin. It covers about 123,162 km², of which 90% is in Argentina and 10% in Bolivia, with an estimated total population of 1,330,000 inhabitants.

In terms of its geomorphological characteristics, the basin is divided into the Upper Basin (occupying territory in Bolivia and Argentina) and the Lower Basin (wholly within Argentina). The Upper Basin is defined by the four main tributaries of the Bermejo River: the Rio Grande de Tarija, the Upper Bermejo River which takes its name from Bermejo after Junta de San Antonio, the Pescado River and the San Francisco River. The Lower Bermejo River Basin receives water from a large number of tributary rivers and streams.

The Bermejo River has a length of 1,300 km. Its waters link the mountain ecosystems of the Cordillera of the Andes with the Chaco plains and the

water systems of the la Plata River, as it discharges into the Paraguay River and this, in turn, into the Paraná River.

The basin is characterized by the active and intense roles of various hydrological, geomorphological and ecological processes occurring within the basin. It has significant potential in terms of natural resources, variety of ecosystems and biodiversity. However, these same features also impose severe restrictions and create environmental risks and vulnerabilities, both bio-geophysical and social. The Upper Basin suffers severe erosion problems which are increased by poor land use practices. Upon reaching the plain, the river meanders without a stable and defined stream system. Through the action of the water, the Bermejo River contributes approximately 80% of the sediment entering the Paraguay-Parana rivers system. Erosion rates in the Basin and sediment transportation are among the highest in the world. Their social, economic and

environmental impacts go far beyond geographic boundaries of the Bermejo River Basin.

Due to extreme poverty in large sections of the population, particularly among indigenous communities and disadvantaged settlements, the Bermejo River Basin is an area of high social risk, further conditioned by limitations on access to water both surface and ground waters and by a natural environment that is being degraded by the accelerated loss of fertile topsoil due to misuse and the destruction of native forests.

1.2. Institutional framework

The Bermejo River Binational Basin presents, from the institutional perspective, all of the problems and complexities facing interjurisdictional basins with transboundary water resources. The key Basin institutions include:

- at the Binational level:
 - the Binational Commission for the Development of the Upper Bermejo River and Grande de Tarija River Basins (COBINABE)
- in Argentina:
 - the Regional Commission for the Bermejo River (COREBE).
 - the Governments of the provinces of Chaco, Formosa, Jujuy, and Salta.
- in Bolivia:
 - the National Technical Office of the Pilcomayo and Bermejo Rivers (OTNPB).
 - the Departmental Prefecture of Tarija and its municipalities.

The Binational Commission for the Development

of the Upper Bermejo River and the Rio Grande de Tarija Basins (COBINABE) was created by the Treaty of Orán, signed by the governments of Argentina and Bolivia on June 9, 1995. Its purpose is "to cooperate in planning for the region's economic and social development and management of the region's natural environment in a sustainable way."

The COBINABE has international legal status, autonomy of technical, administrative and financial management, and legal capacity to acquire rights and obligations in the area of the Upper Basin of the Bermejo and Grande de Tarija Rivers. It is funded by the governments of Argentina and Bolivia and acts as representative of both countries, which have given it authority to implement all actions necessary to fulfill its mission.

The Commission is composed of two delegates from each Member State: the First Delegate represents the Chancellery of each country, with rank of Ambassador, who chairs the respective delegations. The Second Officer is, in the case of Bolivia, the National Director of the Technical Office for the Pilcomayo and Bermejo Rivers (OTNPB), and in the case of Argentina, the Chairman of the Regional Commission of the Bermejo River (COREBE). The OTNPB and the COREBE collectively serve as Secretariat of the Commission.





Aerial view of the city of Tarija, Bolivia

1.3. Strategic Action Program

The Bermejo River Basin presents a strong contradiction between the abundant availability of natural resources, the enormous cultural and human potential, and the poverty of much of its population.

The unsustainable use of its water resources, soils and existing biodiversity, coupled with the external social, economic and environmental issues, and the transboundary nature of the problems, led the governments of Argentina and Bolivia to seek alternative solutions to common sustainable development concerns through COBINABE, whose initiatives were aimed at breaking the cycle of poverty and ecosystem deterioration prevailing in the Basin, and at advancing the sustainable use of the Basin's resources for healthy human and environmental development.

The Strategic Action Program for the Bermejo River Binational Basin (the SAP Bermejo), developed between 1997 and 2000, was formulated as an expression of the joint will of the peoples of Argentina and Bolivia to utilize the shared resources of the Bermejo River Basin in a sustainable manner. The SAP Bermejo sought to integrate the support of stakeholders with the internal capacities of each country, through international cooperation facilitated by the Global Environment Facility (GEF), the United Nations Environment Programme (UNEP) and the Organization of American States (OAS).

The formulation of the SAP was a participatory planning process, whose most important final products were the Transboundary Diagnostic Assessment of the Basin (TDA) and the Strategic Action Program itself (SAP Bermejo), the implementation of which ran between 2001 and 2009.

1.3.1. Transboundary Diagnostic Assessment (TDA)

The TDA identified the major environmental problems of the Basin and their root causes, documenting the exceptional and particular features of such problems, and providing the foundation for the international interest in the implementation of actions aimed at addressing these problems.

The TDA provided the technical framework for the development of the SAP Bermejo, and identified six major environmental problems of global significance on the basis of technical analyses and participatory interactions:

- i) land degradation and intensive processes of erosion and desertification;
- ii) shortages and restrictions on the use of water resources;
- iii) degradation of water quality;
- iv) habitat destruction, biodiversity loss and degradation of biotic resources;
- v) risks posed by floods and other natural disasters; and,
- vi) deterioration of living conditions of population and loss of cultural value.

Some of the most important environmental problems relate to water resources and land management. These problems are, at the same time, partly a consequence of unsustainable human activities associated with environmental constraints that, in turn, condition socio-economic development.

The causal chain analysis allowed differentiation of the decisive roles that certain causes played in each of the identified problems. These critical roles were defined as common basic causes, or root causes, from which the environmental consequences stemmed.

The root causes of the key transboundary concerns were:

- a weak legal and institutional policy framework;
- inadequate planning and inter-/intra-jurisdictional coordination;
- insufficient knowledge, commitment and community involvement, and lack of public participation;
- inadequate funding and support mechanisms;
- inadequate access to, and use of, sustainable technologies.

The development of the TDA supported the need to instill in society and in institutions an inter-jurisdictional view of the basin, as a starting point to ensure the integrated and sustainable management of its shared resources. The document also laid down a set of strategic action areas as a framework for decision making and, in particular, for defining the objectives and content of actions and projects that should be implemented in the Basin. These actions and projects were reflected in the Strategic Action Program (SAP).

1.3.2. Strategic Action Program

The Strategic Action Program (SAP) was conceived as a tool to address the environmental issues identified in the TDA and to promote, through the responsible institutions, the sustainable development of the Interjurisdictional and Binational Basin of the Bermejo River. The SAP was a reflection of the outcome of an extensive participatory and consultative process.

The integrated view of the Basin allowed grouping together of all the priority actions identified

into four strategic areas:

- i) Institutional development and strengthening for the planning and integrated management of the water resources of the Basin;
- ii) Pollution prevention, resource protection, and environmental rehabilitation;
- iii) Sustainable development of natural resources; and,
- iv) Public awareness and participation.

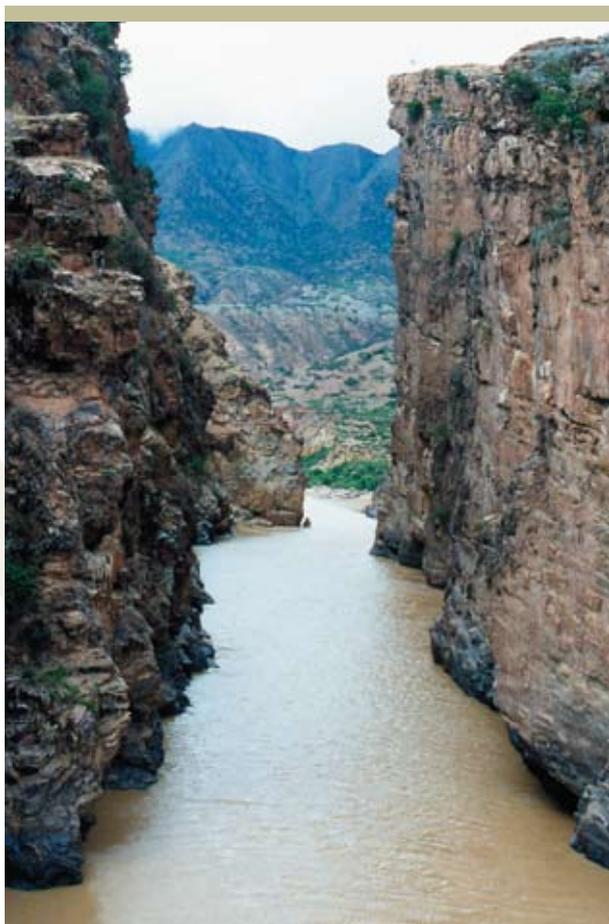
In each of these strategic areas of the SAP, a limited number of actions to address priority trans-boundary environmental problems were selected. These actions were considered to be an immediate

priority and included the implementation of specific prevention and environmental rehabilitation activities, the strengthening mechanisms for stakeholder participation, and the facilitation of the legal and institutional framework necessary for supporting the program and the sustainable development of natural resources. These actions also were considered to be an immediate priority in creating the conditions necessary for improving the quality of life of the basin population.

Implementation of the SAP Bermejo actions began in June 2001 and ended in December 2009. Twenty nine projects were implemented. Argentina



Town of Iruya, Republic of Argentina



La Angostura in the Tarija River, Bolivia

and Bolivia each implemented 9 projects, while the remaining 11 projects were carried out jointly by both countries.

1.3.3. Achievements

The implementation of the SAP Bermejo (2001-2009) involved the completion, in both countries, of studies, demonstration projects and institutional actions that addressed the most important issues identified in the TDA as the "root causes" of critical environmental problems. The SAP Bermejo helped to establish an innovative and participatory process for the integrated management of water resources. The SAP Bermejo formed, at the time of its completion, the "catalytic" instrument for the implementation of a Comprehensive Management Program for Water Resources of the Basin.

Strengthening, developing and articulating the actions carried out by all of the institutions in both countries, directly related to the management of the Basin, enhanced their capacities for integrated planning and management of both water and natural resources. These actions also guided the development processes in the Basin, promoting sustainability.

The implementation of the SAP Bermejo sought to create a unified view of the Binational Basin within the various jurisdictions involved; namely, the Argentine provinces of Chaco, Formosa, Jujuy and Salta, and the Department and the municipalities of Tarija in Bolivia, and initiated a process of integrated management for sustainable development, with an emphasis on water resources. This process was further consolidated through demon-

stration projects, potentially replicable in key areas, and actions related to the reduction of system vulnerabilities.

Based upon the inputs of local communities and jurisdictions, a set of specific actions were developed for the conservation, protection and rehabilitation of environments vulnerable to soil erosion, loss of quality of water and associated biodiversity, and floods, droughts and other natural disasters. Particular attention was given to erosional processes as natural hazards that increase environmental risks to local populations, many with high social vulnerability, and impacts on key environments beyond the Bermejo River Basin, affecting the entire

la Plata River Basin and its coastal zone.

The project developed pilot demonstration experiences through which it was shown that it is possible to improve agricultural production systems, with their associated social benefits, while incorporating practices for the protection of soil, water and natural ecosystems. Without intervention, the basin faces advancing deforestation and introduction of agricultural production methods that result in particularly serious increases in erosion-related soil losses from vulnerable areas.

The inclusion of civil society, local communities and stakeholders in making decisions on development in the Basin was integral to the devel-



Triangle of Bermejo, formed by the confluence of the High Bermejo and Grande de Tarija Rivers



Lower Bermejo River Basin

opment and implementation of the project. This public participation was accompanied by significant changes that occurred independently in both countries. These changes related to the laws and regulations governing societal inclusion in sustainable resource management; namely, the Guiding Principles of Water Policy, the establishment and operationalization of the Federal Water Council (COHIFE) and the approval of the National Water Resources Plan in Argentina, and the creation of the Ministry of Environment and Water, the restructuring of the OTNPB at the ministerial level, and the promulgation of the National Basin Plan in Bolivia, among others. These changes introduced a new organization and specific guidelines for social empowerment in the basin relating to water resources management.

The SAP Bermejo carefully and respectfully addressed social and institutional issues both in its preparation and in its execution. This generated proposals based upon experiences relevant to the Basin, while creating a formal and informal educational movement that established a new, solid foundation for strategy development in the field of Integrated Management of the Bermejo River Binational Basin. The PROBER, which was developed as an instrument of COBINABE, was designed to ensure the sustainability of integrated management actions within the Basin initiated by the SAP Bermejo.

The main achievements of the SAP Bermejo project in each of the four Strategic Areas are summarized below.

Area: Institutional development and strengthening for the planning and integrated management of the Basin

a) Developing and strengthening the institutional framework

- Over forty Memoranda of Understanding and Agreements for Mutual Cooperation were entered into in the form of agreements between the COBINABE and national, provincial and regional government agencies, international organizations, public and private universities, academic and scientific institutions, and stakeholder institutions such as professional organizations and NGOs.
- The Regional Coordination Committee was created and implemented within the COBINABE framework, composed of governmental representatives from the four provinces of Argentina and the Prefecture of Tarija and municipalities in Bolivia.
- The Regional Advisory Committee was created and implemented within the COBINABE framework, composed of representatives of universities; academic, scientific and technical organizations; and, other parties located within the Basin with an interest in the management of water resources and the environment. These Committees established mechanisms for the coordination, programming, monitoring and evaluation of the SAP actions.
- The Communication Plan was formulated with the objectives of encouraging the commitment of local interested parties, promoting public par-

ticipation through the dissemination of information, and contributing to a better understanding of the benefits produced by the integrated water and other natural resources management.

- The COBINABE received support in creating an Ad hoc Group, with representation from the Foreign Ministries of both countries, which developed and submitted to the countries drafts of the Rules of Procedure and the COBINABE Headquarters Agreement. COBINABE filled the resultant position of Binational Coordinator, who had responsibilities in both the technical and administrative areas of the Commission. The annual operating budget of the COBINABE was prepared, and approved by the competent authorities, resulting in the allocation of funds to the COBINABE from the national budgets of both governments.

b) Development of a regional legal, economic and environmental framework

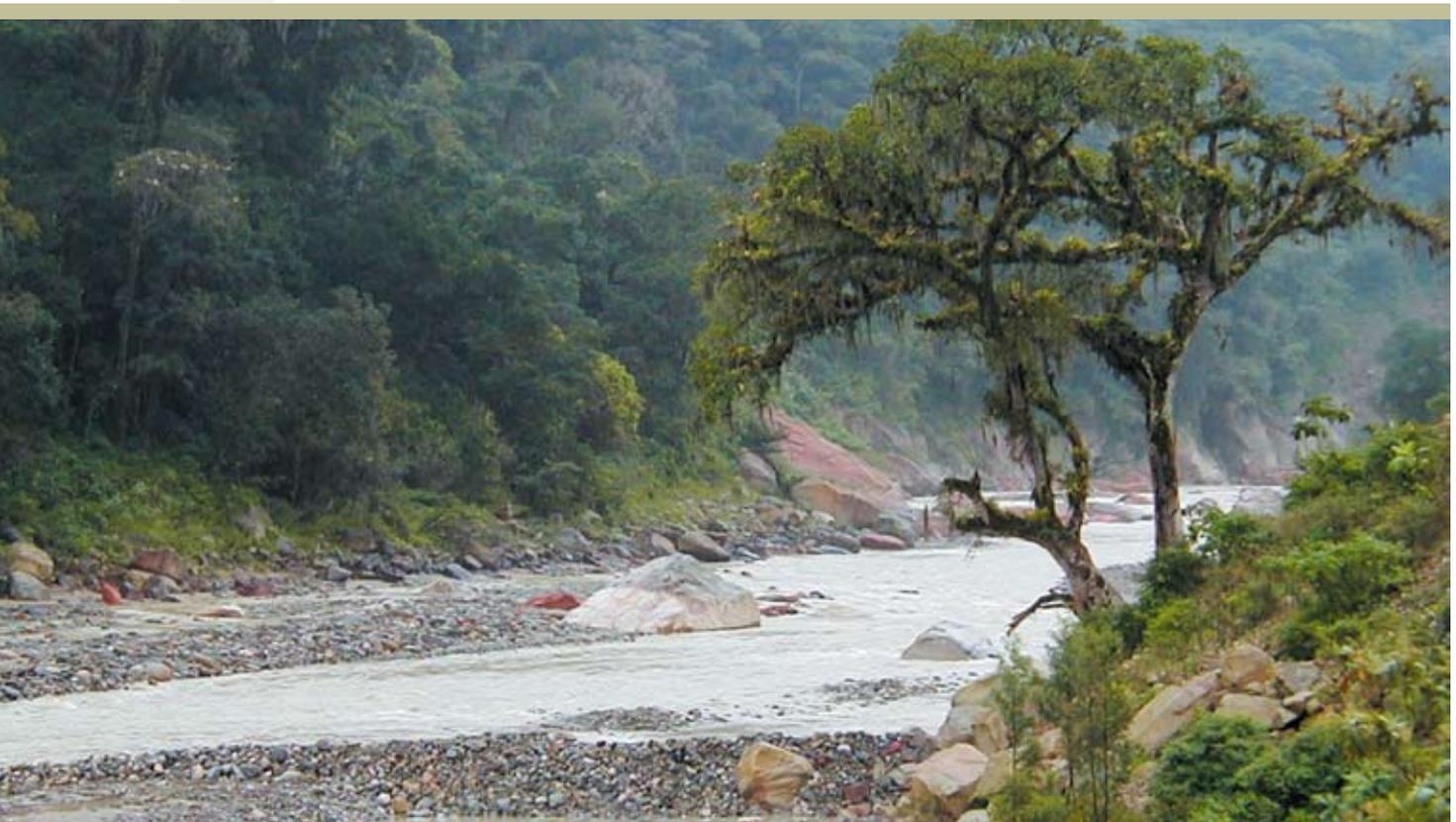
- National agencies responsible for management of the Bermejo River Basin within the jurisdictions of Argentina and Bolivia (COREBE and OT-NPB, respectively) were strengthened in terms of their human, technical, organizational and operational capacities in order to carry out the implementation of the activities under their respective responsibilities, both as national basin agencies and as part of the Secretariat of the COBINABE.
- At a local level, in the provinces of Argentina and the Prefecture of Tarija in Bolivia, the capacity of governmental and/or civil society with

jurisdiction or interests in the sustainable management of water and other natural resources in the Bermejo River Basin was strengthened. Measures were implemented to train technical and managerial staff, strengthen the organizational and staffing capabilities of the organizations, and support the successful implementation of actions associated with the performance of the tasks and responsibilities of the agencies in charge of management of water resources and the environment.

- To promote the harmonization of legal frameworks related to environmental laws, water

codes and standards for environmental impact assessment, comparative analyses were undertaken and recommendations made in order to establish common objectives and policies for the use and protection of shared water resources.

- The implementation of zoning and land use projects at the departmental level in Bolivia and through local pilot projects in Argentina developed knowledge of these instruments and encouraged their use as basic planning tools to guide land use and development of economic activities in accordance with the ability of the natural resources to support and sustain such



High Bermejo River Basin

uses, providing a basis for the further extension of their application throughout the Basin.

- The Tarija Land Management Plan 2006-2025 was completed and approved by resolution of the Departmental Council of the Prefecture as a policy tool to optimize land use and development.

Area: Pollution prevention, environmental protection and rehabilitation of the environment

a) Soil management and erosion control in critical areas

- Flood control structures, sediment retention dams, shoreland protection works, storm drain cleaning and consolidation of channels were implemented to reduce erosion and to control the transport of sediments in critical areas of the Basin, particularly in the Tolomosa, Santa Ana, Iruya River Basins and Huasamayo sub-basin.
- Over 80 dams of varying sizes and construction techniques were built to fit local conditions. The works and their specific locations were selected by the communities involved and were accompanied with comprehensive non-structural measures such as soil protection practices, fencing, reforestation and afforestation with woody vegetation including fruit trees, education actions, and activities to promote organized participation.
- Successful practices that contributed to reducing environmental degradation were implemented, contributing to the increased longevity of water sources and the attendant social welfare benefits to the communities involved. These

practices included non-structural measures for erosion control and the preservation of natural ecosystems, focusing on: livestock management actions to reduce grazing pressure, community practices affecting the use of grasslands and forest nurseries, and implementation of waste management practices in small communities.

- Works and actions were undertaken to manage erosion and sediment in the Upper Basin in the catchment area of the San Jacinto Dam in Bolivia, with associated demonstration actions in the micro-basins identified as the major producers of sediment. These actions were undertaken together with the communities.
- Small-scale irrigation infrastructure was developed and implemented, including provision of training and advice to local farmers in the production and marketing of crops as well as in sustainable practices for soil and water management. The integrated assessment of these systems demonstrated their efficiency and the feasibility of achieving both social and environmental benefits related to the financial investment made.

b) Consolidation of protected areas and biodiversity protection

- The SAP Bermejo planned to restore the connection between nearby protected areas through a Binational Ecological Corridor connecting the Tariquía Flora and Fauna National Reserve in Bolivia with the Calilegua and Baritú National Parks in Argentina. This action allowed expansion of the area of biodiversity and natural re-



Torrent of mud in the Iruya River Basin in the province of Salta, Republic of Argentina

sources protection, eliminating fragmentation of habitats in the formation of the Yungas. This proved particularly important because it identified a large number of springs and streams, and protected forest cover in the recharge area of the local aquifers.

- Several management plans for protected areas were developed. These plans together with the implementation of ecotourism practices in the protected areas, coupled with concrete actions to further the protection of springs and and biodiversity, contributed to the sustainability of carbon fixation in the Yungas and reduction of vulnerability of these fragile ecosystems.

c) Protecting and restoring water quality

- Environmental sanitation measures were implemented in the Guadalquivir River Basin and pollution control measures were instituted in the Bermejo Triangle.
- Progress was made in the identification of groundwater resources in semi-arid Chaco region within the Basin. The characteristics of the Toba Aquifer System in Argentina and Bolivia, which has its recharge area in the Andean foothills, were documented. This Aquifer extends into the territory of Paraguay under the name of the Yerendá Aquifer. As a result of the surveys and information collected and analyzed in workshops sponsored by the project, it was agreed, as part of the SAP Bermejo, to name this trina-tional aquifer the Yerendá-Toba-Tarijeño Aquifer System (SAYTT). The importance of this aquifer to the integrated management of the overlying

surface waters led to a further study by the Intergovernmental Coordinating Committee of the Countries of the la Plata Basin (CIC) and improved knowledge for protection, management and sustainable use of the Aquifer as a priority in the Framework Program for this large Basin.

- A mechanism for joint monitoring of water quality and development of a database was implemented.

Area: Sustainable development of natural resources

a) Sustainable practices for the rehabilitation of degraded areas in the regions of Chaco and Yungas

- Development actions were implemented for the sustainable utilization of natural resources in the improvement of the quality of life of lo-



National Park Calilegua in the province of Jujuy, Republic of Argentina

cal people, giving sense to the institutional, preventive and restoration measures necessary to ensure sustainability. This included the implementation of the demonstration of sustainable production practices in a variety of fields, together with the strengthening of participation by local community organizations and indigenous populations.

b) Community outreach programs for the promotion of sustainable production and natural resources management

- Demonstration projects on the sustainable management of pastures for goats and cattle were successfully implemented. Such projects had an impact on soil protection, crop development using

small-scale traditional conservation techniques, pilot-scale sustainable farming, improvements in water resources management through systematization of the areas under irrigation, and agro-systems management, as well as on awareness creation supporting the sustainable management of resources in Wichi and Criolla communities.

c) Soil conservation practices and sustainable agriculture in the catchment area of San Jacinto reserve

- A soil management and erosion control plan for lands surrounding irrigation areas was implemented. These result can be replicated in areas under irrigation in the Central Valley of Tarija as well as elsewhere under similar conditions.



View of the city of Iruya in the province of Salta, Republic of Argentina

Area: Public awareness and participation

a) Environmental education programs

- Knowledge of issues regarding the protection and sustainable use of the resources of the Basin was strengthened through the incorporation of the concepts of sustainable development and environment within the public education system, both in the Argentine provinces and in the Bolivian school districts within the Basin. The Environmental Education Program was implemented in Argentina through Framework Agreements and Protocols with the Ministries of Education of the various provinces, and included content related to the Bermejo River Basin and the environment in general, in formal education programs. Additionally, school experiences that helped to create awareness and commitment to the preservation of the watershed were carried out in Bolivia as part of the Education Reform Program and were implemented through an Agreement between the Department of Education and the respective Ministry.
- Trainers and teachers were trained and experiences at schools in the Basin were documented, utilizing materials specifically designed and developed by educational professionals and technicians belonging to the communities in the region. Furthermore, actions were undertaken in the informal education system with the aim of equipping the civil community as a central player in the tasks of environmental conservation and sustainable development.

b) Public participation programs

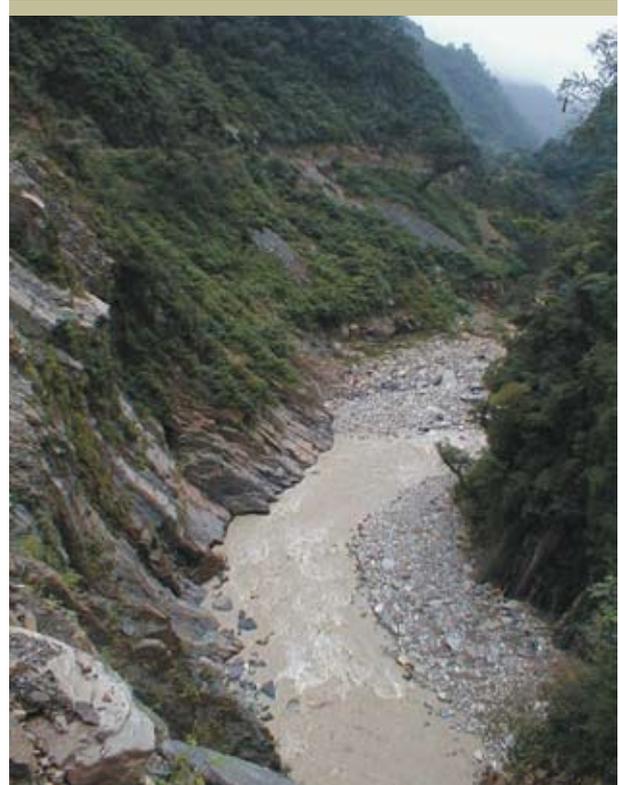
- Communications activities were implemented and the results disseminated through workshops and briefings, journals and pamphlets on the project, institutional brochures, documentaries, radio information and participation of educators in national, regional and international events.
- A concerted vision of the Binational Basin was promoted across the governmental sector, in academic arenas, among NGOs and private companies, local communities and indigenous people to guide and validate the actions developed. The tools and participatory processes used in the implementation of the SAP were varied, and included meetings and consultative workshops, reflections and work groups formed on various issues, the construction of networks of production and trade exchange between communities, training workshops for teachers and pupils, the development of experiences in education and in the community, and in the participatory preparation of work plans.

c) Information system for the Bermejo River Basin

- The Integrated Information System (SIG Bermejo) and the COBINABE website on the internet were developed as the main instruments for dissemination of and provision of access to information on the Basin, for promoting and improving levels of public awareness of environmental problems, and

creation of citizen awareness and transparency of information for the management of the Basin.

- The Integrated Information System, as a tool for monitoring as well as for the systematic and objective assessment of environmental control practices in the Basin, included:
- The operationalization of the Binational Hydro-meteorological Network, which included the acquisition and transfer of rainfall and hydro-metric data in real time from 14 remote stations located in key locations within the Basin in Argentina and Bolivia. This network was characterized as a participatory project, in terms of its design, installation, commissioning, and sustainability of its operation. Its sustainability was assured with the incorporation of the System into national networks of Argentina and Bolivia, which took over its operation and maintenance.
- The design, installation and initial operation of the Network for Monitoring Water Quality, comprising over 40 sampling points, four of which were in Binational reaches of the Bermejo River, systematically measures physical, chemical and biological parameters on a six month basis. Analyses are completed through water laboratories in each of the four provinces of the Basin and in the Department of Tarija. This network was based on the implementation of inter-agency agreements between national and local agencies, as well as on strengthened local capacities developed as a result of the implementation of the monitoring campaigns undertaken by the SAP.



Course of the Upper Bermejo River Basin

1.4. Policies for integrated water resources management

During the implementation of the SAP Bermejo, the Governments of Argentina and Bolivia have advanced their policies for integrated water resources management and integrated development of Basins, and the preparation of legal and institutional instruments on these issues.

Today, both countries have consolidated conceptual frameworks for integrated water resources management and integrated management of basins, which provide the basis for a transboundary approach to the management of the Bermejo River Basin. These frameworks, which are summarized below, provided a guide for the preparation of the PROBER.

Guidelines on water policy in Argentina

In 2002, the governments of the provinces of Argentina and the federal government signed the Federal Water Agreement and the Guiding Principles of Water Policy. The following year, the Federal Water Council was created, and, in 2007, the National Federal Plan for Water Resources (PNFRH) was developed. This Plan considered the need for an integrated plan for water management, which took into account the social, environmental and economic factors having influence on water, as well as the territorial and governance aspects. It was basically an agreement to coordinate organizational methodologies and demonstrate a commitment to managing water resources in accordance with the provisions of Sections 41 and 124 of the National

Constitution, which established a "new federalism of consensus."

The PNFRH, developed by the National Sub-secretariat of Water Resources and the Federal Water Council has, inter alia, the purpose of encouraging the implementation of provincial plans, as, constitutionally, the provinces have the legal authority over water and other natural resources. The PNFRH was founded on the following general principles:

- i) ensuring the provision of safe water and sanitation to the entire population, according to the principle of equity;
- ii) optimizing the use of water for productive uses, according to the principles of efficiency and sustainable development;
- iii) reducing and preventing water pollution, according to the principle of sustainable development;
- iv) minimizing the impacts of floods and droughts, according to the principle of minimizing risks; and,
- v) protecting and preserving the environment, in accordance with the principle of sustainable development.

Guidelines on water policy in Bolivia

Since 2007, Bolivia has implemented four programs that have an impact on the topic: the Development Program of the National Water Resources Strategy; the Program for Strengthening of Water Sector Information; the Program to Combat Desertification and Drought; and, the National Basin Program, focused on integrated water and basin management. The concept and vision of water and its management in Bolivia is based on the possibility of recreating a

harmonious relationship between society and nature, where water should be a principle factor in the relationship, its articulation, harmony with societal goals, and integration with development practices and policies. Within the National Development Plan, Bolivia defines the following principles:

- i) water is a natural resource, finite and vulnerable, and it serves social, environmental and economic functions;
- ii) the state recognizes the ancestral use of water by the indigenous communities, farming and native peoples, and respects and protects their water rights, natural authorities and customs;
- iii) the use and exploitation of water resources must be viewed comprehensively, giving priority to human consumption, agricultural production and the needs of the flora and fauna;
- iv) water management must integrate and relate the role of the central state with decentralized management and participatory and democratic decision making;
- v) the basic unit of planning and management of water resources is the basin, linking public and social management in a spatial context;
- vi) the management of water resources should harmonize the current needs with those of future generations; and,
- vii) public policies should incorporate civil society, including rural communities, indigenous communities and native peoples, including the promotion of the effective participation of women, social organizations and stakeholders in the implementation of the integrated management of water resources.

Other objectives of the National Development Plan in Bolivia are:

- i) the generation of a new water governance structure;
- ii) development of institutional and personnel capacities;
- iii) creation of new water institutions, strengthening democracy and citizen participation at the local level; and,
- iv) recognition of the importance of multiculturalism, from the social management of water, decentralization of responsibilities and the articulation of public and private interests at the national and regional levels.

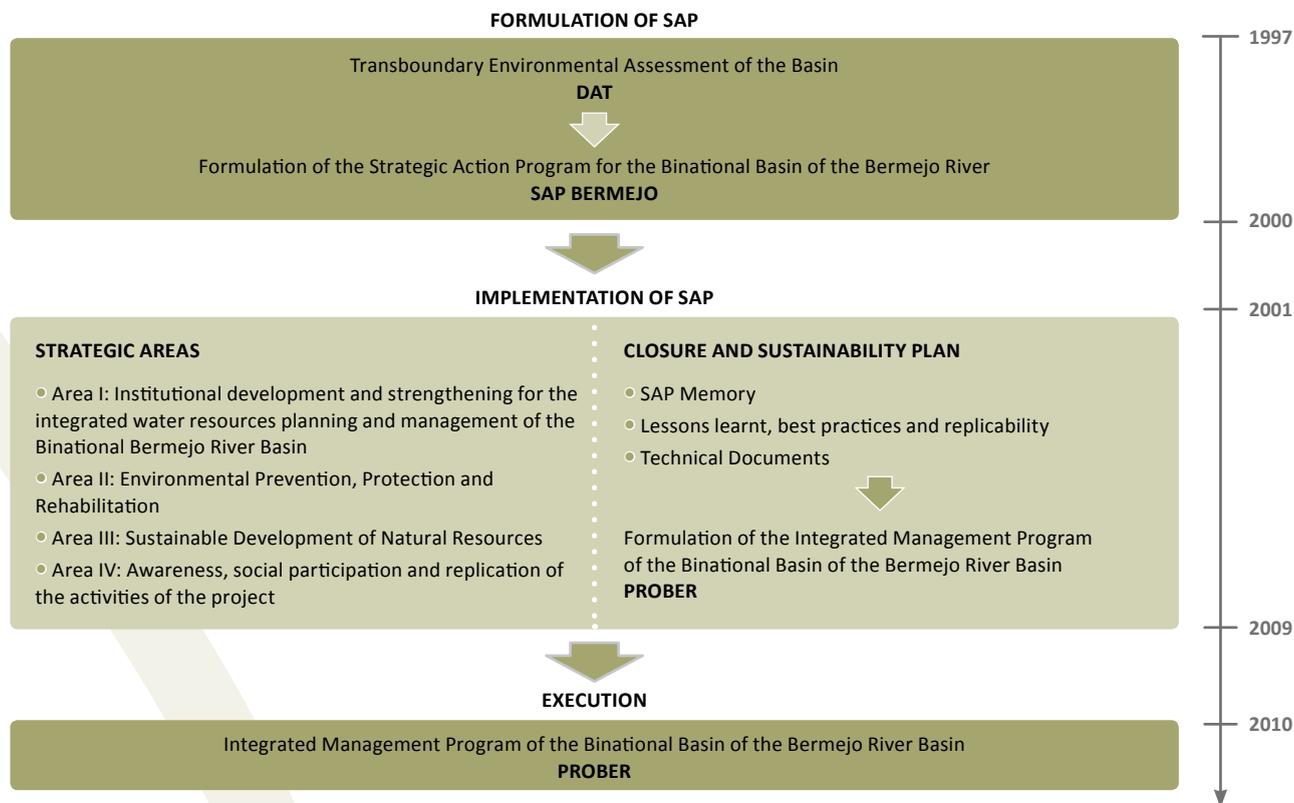
2. Management Program

The Integrated Management Program for the Bermejo River Binational Basin (PROBER) emerges as the principle instrument of the Binational Commission for the Development of the Upper Bermejo River and Grande de Tarija River Basins (COBINABE) to ensure the sustainability of the comprehensive management actions in the Basin. These actions were initiated as an outcome of the Strategic Action Program for the Binational Bermejo River Basin (SAP Bermejo) (Figure 2.1). Thus, the PROBER is a key step in reaffirming the goal of sustainable long-term development identified in the SAP Bermejo. In addition, the PROBER consolidates the work begun during the execution of the SAP Bermejo by extending its specific goals and adapting them according to the current legal and jurisdictional context, creating the appropriate framework to improve the quality of life of residents, and promoting the sustainable development of the region.

2.1. Approach and objectives

The PROBER, as proposed by the COBINABE, is the product of the ongoing interaction of the SAP Bermejo technical teams in Argentina and Bolivia, with the participation of the Regional Commission of the Bermejo River (COREBE) in Argentina and the Pilcomayo and Bermejo Rivers National Technical Office (OTNPB) in Bolivia, under the guidance of respective National Directors. The PROBER incorporated the achievements made during the implementation phase of the SAP Bermejo, and the results of the participatory workshops carried out during the final phase of the SAP implementation project. These workshops dealt with substantive issues facing the Basin, particularly those related to the management of erosion and sedimentation, sustainable development, environmental education, and public participation in basin management.

Figure 2.1. SAP Bermejo Project. Sequence of actions



The PROBER action strategy aimed at integrating the technical tasks of using and managing natural resources, with the purpose of reducing environmental degradation, with the management and administrative activities mainly dedicated to addressing the social and institutional factors that would enable the sustainable use and management of water resources in the context of integrated basin management. Specifically, the PROBER sought to coordinate the the rights and responsibilities of communities and resource users, collectively the Basin stakeholders.

The PROBER's development objective is that:

The inhabitants of the Bermejo River Binational Basin have improved their quality of life through the sustainable management and use of natural resources.

This objective clearly indicates the willingness of Argentina and Bolivia to achieve the sustainable development of the Bermejo River Basin, considering it as a planning and management unit to promote the sustainable development of the Basin in an integrated manner, through the

process of empowerment¹ of local parties, competent institutions and jurisdictions that each country has created for this purpose. This long-term goal provides a guide for defining the purpose, objectives and strategic activities at each stage within which the PROBER has been structured; namely, the short- and medium-term implementation plans.

To achieve this objective, PROBER will use the experiences and lessons learnt from the SAP Bermejo, as well as the technical, institutional and organizational capacities created by the two countries

for the integrated and sustainable management of the Basin. It responds well to the challenges of: supporting the integrated management of the Bermejo River Basin, with an emphasis on its transboundary water resources, and promoting the economic and social development of the populations settled therein. Therefore, it continues the process of strengthening the vision of the basin as a planning and management unit, and adjusts its orientation by recognizing the central and leading role of the inhabitants of the Basin, its stakeholders and the judicial institutions within this framework.

1 Empowerment as used herein means the process whereby poor or vulnerable sectors progressively access control over their lives, participating with other players in the development of activities and structures that allow people to participate in and decide on matters that directly affect them.



Margin protection with gabions

The PROBER intends to continue, expand and enhance management efforts for the sustainable development of the Bermejo River Basin, exploiting the potential offered by its natural resources, particularly water, through measures to protect and rehabilitate the waters of the Bermejo River and its tributaries.

The specific objectives of the PROBER underly the definition of the Strategic Areas are to:

- i) Consolidate and expand planning capacity of and integration between existing bodies as a way to guide and focus the process of sustainable development for the benefit of local and regional peoples and communities.
- ii) Develop and implement productive activities in priority areas, seeking to improve the quality of life in distressed communities, promote food security and contribute to progress in achieving the Millennium Development Goals.
- iii) Expand and consolidate efforts to reduce the vulnerabilities of the ecosystem to human activities through integrated management of water resources, focusing on integrating water into a broader management program for the sustainable development of the Basin.
- iv) Consolidate the participatory water resources management process in the Basin, through the empowerment of all parties involved in the PROBER.

Overall, the PROBER provides for:

- Enhancing the concept of a binational Basin as the planning and management unit, with water resources at the heart of its development, based on the concept of integrated water resources management and integrated basin management.
- Strengthening and consolidating the institutional



Group of artisan women in Subandean Mountains

framework established as the international legal basis for managing the Basin (COBINABE), facilitating and managing the agreements and mutual cooperation activities between Argentina and Bolivia, as well as promoting institutional articulation, coordinating technical development, and promoting coordinated management in parts of the Basin under the sovereignty of each country through COREBE in Argentina and OTNB in Bolivia.

- Enhancing the central role of the social participation process and the institutional bodies responsible for making decisions on development actions and projects.
- Validating the main conclusions of Transboundary Diagnostic Analysis (TDA) and the root causes analysis of priority transboundary problems affecting the Basin, which resulted in the SAP Bermejo. However, the need to update and enrich this analysis with new factors to take into account is acknowledged, whether generated in areas outside the basin or from the internal dynamics itself.
- Replicating and extending the successful actions carried out under the auspices of an integrated approach in the Basin, particularly those related to:
 - i) Sediment reduction through construction of multi-purpose small investment works, according to community initiatives;
 - ii) Soil and water management conservation in critical and vulnerable areas, supported by applied research;
 - iii) Sustainable agricultural development;
 - iv) Planning for the comprehensive management of degraded watersheds to improve the quality of life of rural populations and

native groups;

- v) Protection of areas of significance for conservation and protection of water resources, and creation of emerging corridors (such as, that between the forest of Yungas and the Andean foothills) and protection of the riparian zone, attending simultaneously to the protection of biodiversity and critical ecosystems (e.g., Bermejo wetlands);
- vi) Managing and reducing risks from natural disasters;
- vii) Monitoring and controlling of human actions to maintain quality of water;
- viii) Generation and managing information and communication mechanisms as well as environmental education on water resources in the Basin.

Furthermore, the PROBER consolidates and deals in depth with critical issues addressed in the SAP Bermejo in relation to:

- Participation of the institutions responsible for water management, policies and/or coordination in both countries, not considered in the SAP Bermejo originally, such as the Secretariat for Water Resources of Argentina and the Ministry of Environment and Water of Bolivia, whose absence imposes some restrictions on the performance of interventions.
- Participation of other key professional or social organizations, such as the Federal Water Council (COHIFE) in Argentina and the various organizations involved in water management in Bolivia, the Association of Irrigation, Basin Committees, and the Federation of the Farming Community of Tarija, among others.

- Integration with the international commitments reflecting national and social priorities, such as the commitment to achieve the Millennium Development Goals , agreed by the United Nations to overcome poverty, with the objective of making the Bermejo River basin a case study in achieving such goals.
- Comprehensive research into the potential of available water resources to fulfill multiple purposes (i.e., irrigation, power generation, fishing, recreation, and tourism) in accordance with the demand of local communities and stakeholders to fully respond to the issues of enhancing economic and social welfare as well as minimizing environmental impacts, according to the laws of each country, through the competent judicial bodies.
- Actions to enhance stakeholder participation, including information dissemination, communications, and education within the target communities.
- Mitigation of the negative effects of global change in general and climate variability and change in particular in driving sustainable and integrated management of the water resources in the Basin.
- Integration of water resources management and watershed management of meso- and micro-basins in order to achieve sustainable management, restoration, and rehabilitation objective leading to the improvement of the quality of life of rural populations and native groups.
- Identification of areas at risk and implementation of prevention and protection measures within vulnerable communities to limit the impacts of landslips and floods.

2.2. Time schedule

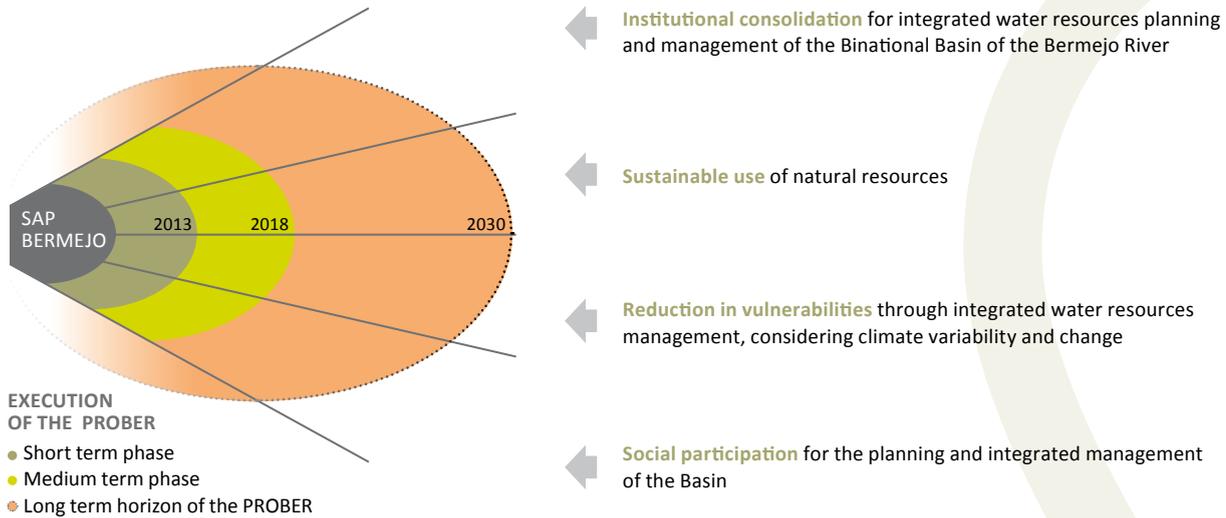
As a strategy for integrated action within the Basin, the PROBER has a long-term time horizon of 20 years, upon which the achievement of the development objectives are based. However, in order to make the Program an operational and practical instrument that enables COBINABE and the two governments to implement the SAP Bermejo, two clearly defined stages have been identified; namely the short term with a duration of three years, and the medium term with a duration of five years as illustrated in Figure 2.2.

Short-Term stage

Within the next three years (2010-2013), based upon the institutional strengthening achieved during the SAP formulation and implementation programs and the recognition by the stakeholders of a comprehensive view of Basin, concrete investment and management programs in each country and at the binational level are envisioned to improve the quality of life of the basin populations, while enhancing the environmental sustainability of the Basin. This stage focuses on the results achieved by the demonstration projects conducted in the formulation of the SAP Bermejo.

Within the short-term, it is envisioned that the role of COBINABE is consolidated through the coordination, monitoring, and implementation of binational activities addressing transboundary issues affecting the integrated development of the Basin, particularly in terms of the exchange of information between the basin countries and communica-

Figure 2.2. Temporary scheme of the PROBER



tion with stakeholders. In particular, the short-term goals provide for:

- i) The management and implementation of PROBER-related projects of transboundary and national/jurisdictional interest contributing to the sustainable development of the Basin.
- ii) Implementation of a Decision Support System (DSS) and monitoring program within the context of existing hydrometeorological monitoring networks.
- iii) Implementation of binational projects such as:
 - control and monitoring of water quality and sediment transport;
 - management and monitoring of binational environmental corridors;
 - definition of the potential for environmentally sustainable use of the binational waters;
 - promotion of environmental education; and,
 - empowerment and promotion of stakeholder participation at the Basin level.

The costs associated with these activities are presented in Chapter 3.2 (Implementation Proposal: Scope and estimated costs).

The necessary institutions to implement the PROBER are:

- i) COBINABE with respect to binational actions;
- ii) COREBE with respect to actions in Argentina; and,
- iii) OTNPB with respect to actions in Bolivia.

In each country, and subject to COBINABE binational agreements for the implementation of PROBER (see Chapter 3.1 and associated investments, the short-term actions are envisioned to:

- Establish the Bermejo River basin as a reference Basin in meeting the Millennium Development Goals in terms of achieving access to safe water and sanitation, with its resultant health benefits and enhancement of the quality of life of its communities, and the rehabilitation and protection of surface water and groundwater.

- Advance technological innovation for sustainable agricultural development, management and conservation of soil, utilization of water resources, and preservation of forests to achieve food security for the Basin populations and regional economic development, with primary attention to the poor and indigenous communities located in the most physically and environmentally vulnerable areas.
- Fully study the alternatives for multiple use of water resources in the Basin.
- Prevent and mitigate pollution of water resources and maintain control of water quality in the Basin.
- Promote and support social participation processes in accordance with the legal and regulatory frameworks of each of the Basin countries.

This seeks to ensure the adoption of the necessary technical, financial and institutional arrangements to ensure the empowerment of stakeholders and specific social participation in these activities, as well as the technical capacity to perform the work.

Medium-term stage

This stage is considered as a logical extension of work initiated within each Strategic Area, Component and Action Line developed during the short-term phase of the implementation of actions for the integrated management of the water resources of the Basin. This stage extends the work initiated during the short-term phase, furthers the process of institutional consolidation, broadens the responsibilities of the institutions overseeing the more complex management processes, and implements

more significant actions throughout the Basin. The implementation of projects in each country will be designed by and conducted under the auspices of the competent jurisdictions in both Argentina and Bolivia (COREBE and OTNPB, respectively), according to their internal priorities. The COBINABE, in turn, guides and supports the efforts of each national government and their competent jurisdictions based on the strategic priorities of the PROBER.

This step is proposed for implementation over a period of five years (2014-2018), following the initial implementation phase. The projects to be implemented during this phase are envisioned to be initiated within a timeframe appropriate to the institutions and agencies and financial conditions available to execute them, regardless of the timeframe within which the PROBER is structured. At the end of this phase, the PROBER will be evaluated based upon selected indicators, and its future direction will be adjusted accordingly.

Long-term phase

A 20-year horizon is considered appropriate for achieving the development objective; i. e., having a Binational Basin that is managed in a sustainable way, consistent with the PROBER purposes, and meeting the Millennium Development Goals. This time horizon has guided the definition of the Strategic Areas, Components and Action Lines included in this Integrated Management Program for the Basin.

The implementation of the PROBER will be an effort of both countries through the COBINABE, based on their own national technical and financial capabilities, and those of their constituent jurisdic-

tions and civic organizations involved in the development and management of the Basin. It is basically a binational effort of both countries. The challenge of meeting the proposed targets is greater and requires new financial and technical support mechanisms both within each country and from the international community, either through loans in those areas with the economic and financial profitability to repay such investments, or through donations to address the social and environment debts that have been created in the Basin.

The final definition of the PROBER-related projects will require the consideration and inclusion of potential funding sources, as well as implementation of mechanisms and strengthening of the insti-

tutions which will manage the various criteria and ways of allocating the available resources, both human and financial.

2.3. Strategic Areas

The Program of Integrated Management for the Sustainable Development of the Binational Basin of the Bermejo River (PROBER) is a strategic planning instrument that uses and implements the experiences gained in the formulation of the Strategic Action Program for the Binational Basin of the Bermejo River Basin (SAP Bermejo), implementing this strategy in accordance within an institutional



Reservoir San Jacinto, Bolivia

and inter-jurisdictional framework that promotes broad-based participation, and which suggests a group of actions to be implemented by the various stakeholders and interested parties having interests and responsibilities for the planning and integrated management of the shared water resources contributing to the sustainable development of the basin. The governments of Argentina and Bolivia, working through the Binational Commission for the Development of the Basin of the Bermejo River and the Grande de Tarija River (COBINABE) and its associated organizations, have stated their intention to

turn the Binational Basin of the Bermejo River into an example of cooperation in the area of sustainable development and international cooperation.

The PROBER is structured in accordance with the four Strategic Areas—together with their different Components and a logical group of Actions—that were developed by the SAP Bermejo (see Figure 2 and Table on page 11). The projects that arise from the PROBER reflect a process of identification and validation by the stakeholders and the institutions of the Basin involved in each of the Strategic Areas.

Graph 2.3. Structure of the PROBER

Strategic Area	Components	ACTION LINES → PROJECTS
I. Institutional consolidation for integrated water resources planning and management of the Binational Basin of the Bermejo River	I.1. Development of the institutional framework. I.2. Adaptation of the legal framework for planning and management. I.3. Design and implementation of the decision-making support system.	
II. Sustainable use of natural resources	II.1. Development of sustainable production in critical areas. II.2. Integral use of water resources (surface and underground waters). II.3. Application of instruments and development of capacities for environmental management.	
III. Reduction in vulnerabilities through integrated water resources management, considering climate variability and change	III.1. Prevention and mitigation of erosion, sedimentation and desertification processes. III.2. Pollution prevention and control and environmental sanitation in water bodies. III.3. Risk management, prevention and reduction of natural disasters. III.4. Conservation of ecosystems and biodiversity.	
IV. Social participation for the planning and integrated management of the Basin	IV.1. Consolidation of participatory processes. IV.2. Environmental education. IV.3. Systematization of information, dissemination, and communication.	

Strategic Area I

2.3.1. Institutional consolidation for integrated water resources planning and management of the Binational Basin of the Bermejo River

This Strategic Area focuses on consolidating and strengthening the planning and integrated management capacity of the existing organizations in the Basin in accordance with their capacities for action, as a way to direct and focus the sustainable development process for the benefit of the communities and the local and regional population of the Basin. The actions are especially designed to strengthen the coordinated planning and management capacity of the COBINABE and the governmental organizations of the Basin according to their respective responsibilities, as a way to direct and focus the integrated and sustainable management of water resources, the integrated management of the Basin, and the social management of the water and environment so as to improve the quality of life of the communities and the local population settled in the Basin of the Bermejo River.

The actions undertaken within this Strategic Area will continue and extend the efforts to consolidate the existing international and legal institutionality that facilitates the mutual cooperation between Argentina and Bolivia. Within this Strategic Area, the role of the COBINABE as planning entity, agent, and coordinator of actions of common interest, and of its corresponding national organizations having technical and institutional responsibilities for the management and the development of the Basin within each country--the Regional Commission of the Bermejo River (COREBE) in Argentina and the National Technical Office of the Bermejo and Pilcomayo River (OTNPB) in Bolivia—will be strengthened. While these activities are being developed, the actions to be undertaken in each country will be considered in accordance with the respective constitutional and legal frameworks of the countries, including the actions of the Regional Committee of Coordination, the Regional Advisory

Committee, and the Binational Committee of Coordination within the framework of the COBINABE, by promoting the cooperation and active participation of the institutions that are responsible for the development of the policies and the management of the water resources in each country, and of other organizations related to policy development and water resources management, as well as to other stakeholders in the Basin.

The national organizations having jurisdiction within the Argentine and Bolivian portions of the Basin, COREBE and OTNPB respectively, acting as the Secretariat of the COBINABE will implement, according to their organizational, operational, technical, and human resource capacities, the reorganization and consolidation of their actions as efficient technical offices, by using suitable and updated technological tools to be able to respond in due time to the requirements of the PROBER in each jurisdiction.

It is also necessary to make progress on the formulation and participatory implementation of a regional regulatory framework that includes the basic aspects of the management of the shared water resources, and that facilitates the integrated management of the water and other natural resources. Accordingly, the proposed actions seek to extend the pilot demonstration works of the SAP Bermejo related to the control and analysis of the institutional and legal frameworks, and the application of environmental rules and regulations. These actions also will support the works being implemented within the two countries, in order to give sufficient legal and regulatory support to planning, implementing, and managing the execution of the various actions required for the integrated management of the water, land, and biodiversity in the Bermejo River Basin.

It will be a priority to develop these actions in accordance with a common set of objectives and policies for enhancing environmental quality, especially those related to the development and implementation of a regional regulatory framework for the management of shared water resources and facilitating the integrated management of the Basin's water. Thus, the actions intended to develop and establish the Guideline Levels relating to the main uses of water are deemed especially important.

Consolidation and extension of the application of the zoning criteria for the land and environmental resources of the Basin is required, taking into account the works completed in the formulation of the SAP Bermejo, both in Bolivia and in Argentina. In this way, the technical, institutional, legal, and political aspects required to apply a land use zoning

framework will be identified and evaluated as a basic planning instrument in the Argentine provinces, designed to guide land use and develop economic activities according to the capacity of the natural resources to support such development, and to strengthen and implement the Organization Plan designed for the Department of Tarija at a municipal level, in Bolivia.

Finally, actions will be developed within the already instituted Environmental Information System to create a Decision Making Support System for the management of the water resources and the planning of the sustainable development in the Bermejo Basin. It is intended that this Decision Making Support System be functionally integrated with the Information System for the la Plata River Basin that is being developed by the Intergovernmental Coordinator Committee of the countries in the la Plata River Basin. This will extend the dissemination of information gathered in different jurisdictions into a regional context, making it available for various stakeholders.

The Components and Actions proposed for the PROBER in Strategic Area I are shown in Table 2.4.

Components and Actions

Components of the Strategic Area I

1.1. Development of the institutional framework

The institution to develop and implement the PROBER is the COBINABE, created by the Orán Treaty in 1995. The institutionalization and operation of the Regional Coordination Committee has

strengthened the management framework identified in the SAP Bermejo and the organizations of the Basin. These experiences have shown that the coordination of actions at the different governmental levels (national, provincial/state, local/municipal) and the coordination of their actions with those of other sectors, such as the education sector, require significant effort in order to reconcile the needs and interests of the parties with those of the local population.

The complexity of the institutional realities of managing a binational basin requires a legal and institutional basis for the management of the water resources that focuses on the inseparable relationships between water and soil, the inter-relationship

between the quantity and quality of water, and the multiple uses of the resources by various economic sectors, and their compatibility with environmental management.

It also is very important to point out that the governmental organizations at the national and provincial levels are different in countries with a federal structure such as Argentina, compared with the more decentralized governance structure of countries such as Bolivia with respect to their responsibilities for promoting sustainable development. A program whose purpose is to strengthen the knowledge and protection of a little-developed and little-known resource requires time for inter-institutional and inter-governmental coordination

Table 2.4

Strategic Area I: Institutional consolidation for integrated water resources planning and management of the Binational Basin of the Bermejo River

Components	Actions
I.1. Development of the institutional framework	<p>I.1.1. Institutional consolidation of COBINABE as the Basin organization.</p> <p>I.1.2. Strengthening of COREBE and OTNPB and coordination of water and natural resources management entities of Argentina and Bolivia.</p>
I.2. Adaptation of the legal framework for planning and management	<p>I.2.1. Harmonization of the legal frameworks of jurisdictions of the Basin for integrated water resources management (IWRM).</p> <p>I.2.2. Implementation of zoning and land use regulation.</p>
I.3. Design and implementation of the decision-making support system	<p>I.3.1. Optimization of an information system for the management of the Binational Basin of the Bermejo River, incorporating the monitoring network of environmental parameters and the early warning and extreme events alert system.</p> <p>I.3.2. Implementation of the decision-making support system.</p>

in the decision making process.

The sustainability of the programmed and implemented actions will depend on the benefits conveyed to stakeholders through access to new production practices, the improvements in the associated infrastructure, and the formation of production and commercial associations as a way to minimize social vulnerability and improve the quality of life of the communities involved. The success and future sustainability of the proposed actions depends on the inclusion of the appropriate institutional players and the key organizations.

Actions within this Component are aimed at consolidating and strengthening the coordination, and planning and management capacity of the COBINABE and the technical and institutional capacities of its member organizations—OTNPB and COREBE—in order to facilitate the integrated management of the water resources of the Basin and sustainable development within both the binational and jurisdictional scopes. The actions to be executed specifically include:

- i) consolidation of the inter-institutional coordination and the stakeholder participation as regards plans, policies, rules, and interventions having a binational scope;
- ii) promotion of the development of institutional capacities of public and private entities and social organizations and users for the promotion, implementation, simplification and execution of activities, projects and initiatives;
- iii) improvement of the communication and dissemination of information, experiences and knowledge; and
- iv) formulation and execution of investment proj-

ects as regards initiatives of national and binational interest for the sustainable development of the Basin.

The actions considered within this component include:

1.1.1. Institutional consolidation of COBINABE as the Basin organization

The purpose of this action is to consolidate and strengthen the capacity of the COBINABE to serve as the coordinating agency for the integrated management of the water resources and the promotion of activities for the sustainable development of the Binational Basin of the Bermejo River by giving the COBINABE all of the required resources to achieve an increased effectiveness and institutional capacity for technical and managerial action as well as greater financial support.

The actions to be developed include, among others, support to the COBINABE for: implementing its rules currently in force; enhancing its effectiveness and operations that help in the treatment and analysis of specific concerns, including the making of rules and the resolution of conflicts; identifying commonalities and differences in the rules in force in each country; and advising the COBINABE on legal matters, trying to harmonize the key elements that contribute to the sustainable management of the water resources and the sustainable development in the binational Basin.

Mechanisms to facilitate the technical and operational coordination of the activities of the Commission (through the Binational Coordination Committee, Regional Coordination Committee and



Upper Bermejo River Basin

Regional Advisor) will be developed. The active participation of representatives of the different stakeholders in the Basin will be encouraged and supported, promoting and creating, through the experiences gained in the SAP Bermejo, instance framework for planning, monitoring, controlling, and decision making created under the PROBER.

The COBINABE Communication Plan also will be implemented under this activity, in order to position the COBINABE as of the key institution in the binational management of the water resources of the Bermejo River Basin. A wide e range of communication media will be used, a follow-up of the institutional management indicators will be performed, and the participation of the Organization in international forums and seminars will be facilitated.

1.1.2. Strengthening of COREBE and OTNPB and coordination of water and natural resources management entities of Argentina and Bolivia

Through this action, organizational, operational, technical, and human resources capacities will be enhanced within the national organizations in the Argentine and Bolivian portions of the Basin. These organizations are responsible for the execution of the PROBER within their pertinent jurisdictions, in order to comply with their legal mandates and the social responsibilities for the management of the Basin's water resources.

For the COREBE in Argentina, the actions will be oriented to improving the operational capacities of the institution in order to achieve operational decentralization and so contribute to the development of an integrated information and decision making



Logotype of the COREBE and drawing of the provinces of the Republic of Argentina composing it

system. Likewise, the purpose of the actions will be to establish an organizational configuration and set of organizational tools that make the operation of the Organization more efficient and better able to implement the PROBER. COREBE will be positioned as the principle governmental entity within the Basin at the national and international levels through the following actions:

- i) elaboration of methodologies for the integrated management of the water resources, soils, and biodiversity;
- ii) identification, formulation, execution, and assessment of projects;
- iii) promotion and inter-institutional coordination with the applicable authorities related to water resources and environment in the provinces;
- iv) provision of assistance to the provinces in the promotion and support of the capacities of the local stakeholders; and
- v) dissemination of the knowledge gained from the projects and programs implemented through the different activities and communication instruments.

For the OTNPB in Bolivia, the actions incorporated in its strategic plan will be oriented toward consolidation of the organization as technical advisor to the COBINABE through the following actions:

- i) development of capacities and empowerment of the institution for the generation of proposals and the elaboration of projects for the integrated management of the water resources and the integrated management of the Basin;
- ii) promotion of research applied to critical matters associated with the monitoring and development of the Basin;

- iii) implementation of databases and documentation; and
- iv) promotion of agreements and exchanges in order to achieve shared objectives and planning in the integrated management of water resources and in the integrated management of development projects in the Basin.

1.2. Adaptation of the legal framework for planning and management

This activity seeks to update the legal framework for the management of water and natural resources in force in both countries from the national, provincial, and municipal perspectives, to harmonize the regulations in force, and to prepare proposals to incorporate new normative elements into the regulatory framework that contribute to its improvement so as to strengthen the integrated management of water and other natural resources.

1.2.1. Harmonization of the legal frameworks of jurisdictions of the Basin for integrated water resources management (IWRM)

Through this activity, common normative principles will be identified and the core principles of binational agreement strengthened to enhance integrated management of shared transboundary resources. Based on the technical/legal evaluation conducted by the Ad Hoc Group, key elements which direct binational strategies for the sustainable management of the water resources in the Bermejo Basin and surrounding areas will be strengthened, common principles between the laws in force will be harmo-



Front of the building of the OTNPB - Tarija, Bolivia

National Technical Office of the Pilcomayo and Bermejo Rivers

nized. Likewise, this activity will seek to harmonize the national and jurisdictional regulations in relation to the use and management of the water resources, particularly in terms of water quality.

1.2.2. Implementation of zoning and land use regulation

The land use planning process is a strategy aimed at incorporating topics related to the environment and the use and management of water resources in formal planning; a strategy recommended in the “Cumbre de la Tierra” and multinational events over more than two decades. Originally, the experiences with land use planning were developed in Bolivia, and were essentially related to the “planning of land use” (PLUS) at a municipal level. The whole of the Bermejo River Basin in Bolivia is located within the Department of Tarija, and is subject to a Land Use Plan prepared up to 2005 within the SAP Bermejo framework. In Bolivia, it is considered to be a complete document and a normative instrument, which includes a land use plan, an organizational plan for the populated areas, an analysis and proposals for improvement of the transportation, energy, and communications networks, and a plan for meeting unsatisfied needs for basic and social services. At a municipal level, the Department of Padcaya, that represents the longest Department in the Basin, has a land use plan prepared in accordance with the national rules and regulations. Consequently, actions will be directed to completing the land use plans in the departments of Bermejo and Entre Ríos, in Bolivia, that have currently partially prepared plans of this type.

In the Republic of Argentina, work will be done on Strategic Land Use Plans (PETs) prepared by the national government. Such plans develop a strategy for identifying land development projects and propose new projects in partnership with the provinces, under the National System of Development and Land Use Planning (SiNDOT), strengthening the planning networks.

Through the SiNDOT, a planning methodology will be implemented focusing on three core areas:

- i) commissioning and consolidating the Land Information System;
- ii) connecting with and providing technical assistance for the land use development and zoning; and
- iii) commissioning and consolidating the Land Use Strategic Plan.

Further, common criteria for an agro-ecological zoning of the Basin will be developed and implemented, setting forth the capacities and limitations of the environment under different sustainable production models, updating the existing information available in the Basin.

I.3. Design and implementation of the decision-making support system

Among the institutional strengthening actions executed under the auspices of the SAP Bermejo, the development of the Information System for the Management of the Sustainable Development of the Bermejo River Basin (SIG Bermejo) provided a tool to integrate the information obtained in different jurisdictions and make this information readily available to the different stakeholders throughout

the Basin. A database structure and associated graphic and alphanumeric information layers were created, using standardized information relating to different thematic areas, participating institutions, documentation centers, cartographic projects, and hydrometeorological networks, etc.

This database is a relational data base and was developed within a SQL Server System, while the database supporting the Geographical Information System (GIS) was developed in the Shape File format. An internet website was also designed to make access to the database possible through the Internet. Data loading modules also were developed and implemented in order to enable partner agencies to update the information in the system. The data available at the time of creation of the system were uploaded, new geographical layers were generated, and two manuals (operational and technical) were published. Thematic cartography, alphanumeric databases, and Environmental and Geographical Information Systems were developed in each province. While most of this information is produced and managed by different organizations and institutions with specific interests and purposes according to their individual mandates, coordination and technical quality assurance continues to be required for managing the information at the Basin level. In this sense, strengthening of the system and development of a tool to facilitate the generation of knowledge, support the decision making process, contribute to education, and support social participation in the processes of managing the water resources and sustainably developing the Binational Basin of the Bermejo River constitutes an ongoing challenge.

1.3.1. Optimization of an information system for the management of the Binational Basin of the Bermejo River

The specific purposes to be served by the optimized Information System are to complete and extend the SIG, in order to have reliable information on different environmental parameters for the purpose of assessing, planning, and managing the land and water resources of the Basin. Some of the anticipated actions include:

- Definition of the components and actions required, so that the Bermejo SIG evolves into a Decision Making Support System available to support the implementation of the PROBER.
- Establishment of mechanisms to manage the system, considering and promoting inter-institutional coordination of actions among responsible entities, and making best use of the existing capacities, both of public and private entities.
- Reconciliation of methodologies and procedures utilized by the different entities generating information in the Basin.
- Consolidation of processes for systematically obtaining and processing data, together with the definition of mechanisms that assure the dissemination and free access to the information in real time.

1.3.2. Implementation of the decision-making support system

By strengthening and optimizing the available tools (i.e., the SIG Bermejo), a new Decision Making Support System can be developed. This new system will develop a tool to facilitate the generation of knowledge, aid in the decision making process, and support the education and social participation in the management of the water resources and sustainable development of the Binational Basin of the Bermejo River. The system must be compatible with the systems developed by the national technical organizations of the COBINABE. The structure is seen as a main portal and a network of nodes and additional portals through which stakeholders can obtain information necessary to support sustainable economic activities in the Basin, including action fields on specific matters and linkages to the other sites. The structure should take into account an ecosystematic vision of the Basin. The system will integrate, among others, the environmental monitoring network (including hydrometeorology, water quality, and sediment transport parameters) with the early warning system for extreme events created under the auspices of the la Plata River Basin project.

Strategic Area II

2.3.2. Sustainable use of natural resources

This Area seeks to improve of the quality of life of the people of the Binational Basin, by focusing on the factors that derive from the commitments that, arising as community needs, have motivated participation by Argentina and Bolivia in international agreements such as achieving the Millennium Development Goals . Proposed production activities will focus on the areas defined in the SAP Bermejo as critical due to the poor quality of life of the communities settled there and their vulnerabilities to uncontrolled anthropogenic interventions. Moreover, the strategy emphasizes food security among the native populations and poor communities, and proposes improvements in the efficiency and development of irrigation and other water uses as well as the multiple use potentials of the water resources available in the Basin.

The achievements of the SAP Bermejo will be continued by strengthening the development, implementation, and support of the production practices contributing to enhancing economic and social interests in a manner consistent with the a healthy and functional natural ecosystem. Thus, actions directed to promoting development of sustainable production systems will be consolidated and further developed by incorporating land, water, and ecosystem protection practices, especially in the most vulnerable areas. Components and actions proposed within this strategic area derive from the commitments arising from community needs that have motivated the participation of Argentina and Bolivia in international agreements such as the Millennium Development Goals. The concept of food security among the native populations and indigenous communities will be emphasized through improving the efficiency of the use of the available water resources for serving multiple uses in the Basin for the benefit of local

and regional populations.

Components and Actions corresponding to the Strategic Area II are shown in Table 2.5 below.

Components and Actions

Components of Strategic Area II

II.1. Development of sustainable production in critical areas

This Component seeks to enhance and consolidate actions undertaken within an environmentally sustainable and land use planning framework, helping to improve the quality of life of the local populations and strengthen the technical and production institutions and organizations, at both the local and regional scales. In addition, this Component seeks to promote the importance of sharing successful experiences and exchanging solutions at the binational scale.

It comprises the following strategic lines:

II.1.1. Sustainable cattle management

Through these actions, technological models for increasing livestock activity in forest grazing systems will be promoted, favoring the replication of successful models of pasture and forest grazing and forest planting in previously cleared areas gained by the Centers for Agricultural Technologies of Formosa, Argentina, and supporting livestock management aimed at milk production. This latter element will seek to identify new markets and promote the transition between the migratory livestock management techniques and a partially-stabled and genetically-improved livestock management program. Moreover, technolo-

gies to intensively develop the breedstock will be pursued, in order to maintain forest cover within forest-based grazing systems. It comprises the following specific actions:

- a) Development and application of technological models for intensification of livestock activity in forest grazing systems: The use of native and introduced pastures and the development of zoning and land use plans that allow livestock development consistent with the maintenance of forests (for wood production, biodiversity, etc.) is an emerging and innovative use of land for economic and ecosystem management purposes. This activity requires further exchanges between agricultural and environmental pro-

Table 2.5
Strategic Area II: Sustainable use of natural resources

Components	Actions
II.1. Development of sustainable production in critical areas	II.1.1. Sustainable cattle management. II.1.2. Management of intensive agricultural systems. II.1.3. Sustainable forestry management. II.1.4. Development of agro-forestry systems for small producers. II.1.5. Development of tourism. II.1.6. Management of fishing and aquaculture resources.
II.2. Integral use of water resources (surface and underground waters)	II.2.1. Drinking water supply. II.2.2. Livestock watering, irrigation supply, agricultural drainage, and other uses. II.2.3. Ground water uses. II.2.4. Atmospheric waters.
II.3. Application of instruments and development of capacities for environmental management	II.3.1. Payment for environmental services. II.3.2. Clean development mechanisms. II.3.3. Reduction of carbon emissions.

professionals in order to create and test alternatives for application under various production scenarios, especially in the Chaco Plains of the Lower Basin. These models may be replicated in other places in the Basin.

- b) Replication of successful models of pastures and forest grazing systems in forest plantations with cleared areas: Further work is required along different lines of investigation, including caprine genetic improvements, feeding, and health. In part, this work includes the validation of results and extension of knowledge gained in the SAP Bermejo to local and/or extra-provincial producers. This work will be done in cooperation with the Centers for Agricultural Technologies of the Province of Formosa (Argentina), building on their work in productive fodder models, forest grazing systems, and enrichment of the native forest through fruit and horticultural development.
- c) Support for livestock production in the Central Valley of Tarija: Management of the caprine livestock (including fodder production, among other tasks) and the development of the livestock aimed at milk production is proposed to be advanced through identification of new markets, promotion of the transition from migratory livestock management to a partially-stabilized and genetically-improved livestock management approach. This action will help improve the profitability of cattle and decrease the pressures on pastures, especially in natural pastures to reduce pasture-related erosion in the Central Valley and degradation of the fodder potential of the Sub Andean region.



Conservation of carob bean in Chaco Salteño, Republic of Argentina

II.1.2. Management of intensive agricultural systems

Through this activity, successful experiences will be replicated with the assistance of the Centers for Agricultural Technologies in order to create experience in production techniques and economically and environmentally sustainable farm management practices. The activity also promotes the introduction of regulations and appropriate practices related to agricultural activity in the entire Basin.

II.1.3. Sustainable forestry management

Through this Activity, the formulation of provincial and departmental forestry development plans will be promoted and supported, together with other initiatives regarding sustainable forestry, disseminating experiences and, especially, seeking to replicate the practice of forestry certification. The activity will strengthen the institutions at national, departmental, and municipal levels responsible for forest management. The actions to be taken accompany other initiatives in progress in the Basin with respect to forestry issues, including the Small Grants Program (the SGP of Argentina, supported by the Global Environment Facility, and implemented by the United Nations Development Programme).

The Activity comprises the following specific actions:

- a) Support for the formulation of Provincial Forestry Development Plans: Technical and financial support for the creation of Forestry Development Plans in the provinces of Argentina in the Basin is proposed to strengthen the programs

of the community organizations, develop new scenarios for sustainability, implement environmental conservation practices, and formulate new technical and environmental international regulations, within the scope of Federal Law 26331 and through the application of the National Fund for the Enrichment and Conservation of Native Forests.

- b) Forestry Certification Criteria: In the Upper Basin of the Bermejo River, certified forestry operations within the private sector are being developed in a strongly sustainable manner, making corporate stakeholders key players in the forestry industry in the Basin. Through this action, experiences in the application of the principles and criteria of forestry certification are to be analyzed, disseminated, and replicated at the level of forestry undertakings of the region.
- c) Institutional strengthening for the forestry management in Tarija: This action will enhance the abilities of those organizations in charge of the sustainable development of forestry activities to better perform their activities of forestry management. This activity will be comprised of staff training, equipment supply, and creation of coordination mechanisms between different administrations (national, departmental, and municipal).

II.1.4. Development of agro-forestry systems for small producers

Through this Activity, productive lines of agricultural-forestry for small producers will be developed and supported, seeking to deal with the problems related to lack of structure and organization, access to credit

and sustainable technologies, and difficulty in commercialization, by creating alternatives to improve income levels and create better expectations for quality of life without leaving the rural community.

It comprises the following actions:

- a) Promotion and support of the implementation of agricultural-forestry systems: Based on the important experiences gained in the Bermejo Basin both during the formulation of the Strategic Action Plan (Bermejo SAP) and the conduct of other projects and experiences of other institutions, the following actions will be taken: organizational strengthening, promotion of validated practices, and sharing of experiences at a regional and transboundary level. Additionally, the existing initiatives that require an additional support to be consolidated will be supported through provision of supplies and technical assistance, especially regarding the strengthening of the institutions, for the purpose of assuring the sustainability of their actions. As a result of this action, a manual of validated practices for small producers will be developed. This manual will provide testimony and knowledge of the experiences with replicability potential.
- b) Design and implementation of the micro-loans program: This action is aimed at creating credit support that is accessible by small producers, with social guaranties. Through these investments, incentives for sustainability and improved production measures are given to small producers. The program will allow increasing production, improving quality, and incorporation of small farmers into extra-regional commercialization processes.

II.1.5. Development of tourism

Rural tourism as a productive alternative has grown significantly during the last years, particularly in the Bermejo Basin. An environmentally-friendly type of tourism, respectful of culture and local customs and managed by the inhabitants, becomes a strong strategic action to promote generation of rural income, within the framework of the sustainable management of natural resources. One of the great advantages represented by the rural tourism is its compatibility with other productive traditional activities undertaken by the inhabitants of the Basin, effectively “taking” the market to the place. This activity is aimed at consolidating and spreading the pilot demonstration activities developed by the SAP Bermejo and at creating other initiatives to increase the regional tourism market as a way to improve the income of local communities.

It comprises the following actions:

- a) Promotion of the natural and cultural values of the Bermejo Basin: The Basin, as a tourist destiny, must be developed and specially promoted, because it represents an original destiny, complementary to what the region offers. With this purpose, a Promotion Program for the Bermejo Basin will be developed starting with the compilation, publication, and dissemination of promotional materials.
- b) Support by means of micro loans to initiatives relating to rural and communal tourism: Support to the initiatives of local communities offering rural tourism services, displays of original cultures, and the biodiverse and exuberant landscapes of the Bermejo Basin is proposed.

Financial instruments that may be obtained by these communities will be created to allow them to increase their potential to benefit from this growing activity in the region.

- c) Program of continuous improvement of tourism services: Several projects have improved the quality of tourism services offered by the diverse landscapes of the Bermejo Basin. However, these must be supported by training to assure the quality of what is being offered, by the experience shared with tourists, and achievement of appropriate service standards.
- d) Development of complementary areas of regional tourism: A number of roads, paths, reserves, and service providers are completely isolated and separated. The purpose of this activity will be to develop a strategic network of areas and services, in the search of complementarities, so that a varied range of options can be offered to draw tourists and complement other destinations within the countries.
- e) Development of scenic routes: Work is proposed to be done together with the municipalities and rural communities to promote local tourism, control wastes, maintain signage, and control the quality of tourism services in support of rural tourism.
- f) Development of the multiethnic routes among the native population centers of Tarija: This action will enable the design, construction, promotion, and operation of a circuit that allows tourists to become familiar with the culture, economy, and biodiversity associated with the native populations (Guaraní, Weenhayek, and Tapiete) in the foothills of the eastern range of



Forestation in Campo Tapial, Iruya, Republic of Argentina

the Andes, the transition area between the Sub Andean region and the Chaco plains. This action is proposed to generate direct income and accompany the process towards achieving self-managed community-based companies.

II.1.6. Management of fishing and aquaculture resources

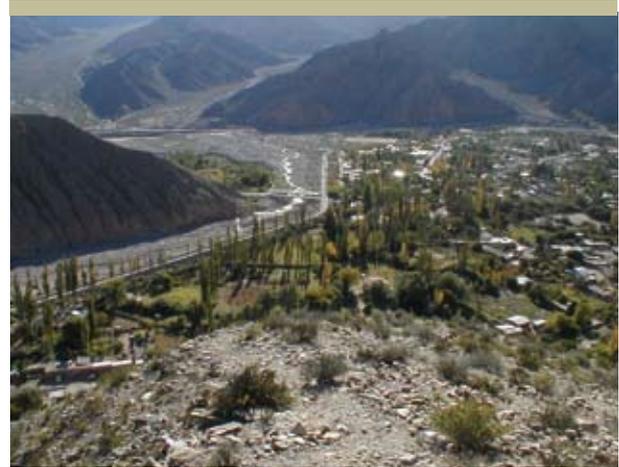
Traditional fishing is part of the activities of the different communities in the Upper and Lower Basins, comprising native Indians, Creoles and farmers. In some cases, it is part of the subsistence economy of the communities of high socio-economic vulnerability, and, in other cases, it generates a surplus for commercial sale and even forms part of different production chains.

The sustainable use of fisheries and aquaculture resources is directly related to the maintenance of acceptable water quality and habitat conditions, which must be taken into account in the management of the Basin's water resources, for instance in the definition and maintenance of environmental flows.

While in many cases, these activities are traditionally developed in the Basin, they are not always performed under ecological and economically sustainable conditions and a variety of improvements could be introduced, especially in areas with food or health deficiencies.

In this sense, the following activities are proposed:

- a) Management of fishing resources: This action comprises an interdisciplinary diagnosis of the situation and use of fisheries resources; harmo-



View of the city of Tilcara, Jujuy, Argentina

nization of policies, criteria, scope, and procedures; identification of evaluation, control, and monitoring tools; selection of fishing methods; information dissemination, education, and training needs; and development of an action plan and regulations aimed at the conservation and repopulation of the Bermejo River fishery.

- b) Establishment of a biological monitoring system that allows evaluation of the degree of conservation of the piscicultural resources.
- c) Promotion of production, consumption, and commercialization cooperatives, with improved penetration into markets, including improved conservation of fishing products through traditional or innovative processes.
- d) Creation of higher value added: Included in this

activity is, among others, the promotion of non alimentary and nontraditional uses of fish, such as the manufacture of leather.

II.2. Integral use of water resources (surface and underground waters)

Bearing in mind that water is the cornerstone for the sustainable development of the Basin, and recognizing that the quantity and quality of water available is generally what limits the possibility of future development and the sustainability of current development, the works begun within the framework of formulating the SAP Bermejo will be continued to make it possible or to improve the use of the water resources in each of the Basin's



Training in tree nursery practices

component ecosystem, including the rehabilitation and optimization of existing and new irrigation systems. Moreover, proposals to improve access to water resources will be supported in order to achieve production and development goals and meet the needs of the population. Investigations and studies that give technical and scientific strength to identified structural and non-structural actions or those proposed in the future are

proposed. This component considers the following Actions:

II.2.1. Drinking water supply

This Activity comprises the development of basic studies and preliminary projects for drinking water supply works (including the abstraction, conveyance, and distribution systems) using surface and/



Farm lands related to the sediment retention works, Tarija, Bolivia

or ground water sources for human consumption by the rural, urban and periurban communities, settled in the Basin.

II.2.2. Livestock watering, irrigation supply, agricultural drainage, and other uses

In this Activity, existing studies of flow regulating works will be extended to consider multipurpose water uses, including the possible locations of new headworks and associated infrastructure as well as the development and implementation of alternative works aimed at socio-economic development of small- and medium-sized communities, taking into account the successful experiences with sediment control works and integrated management of micro basins performed during the formulation of the Bermejo SAP, that may be replicated together with the communities involved.

Moreover, research for the optimization of system designs for rural sanitation, including surface drainage channels and sub-surface drainages in areas that support production activities (agriculture, livestock farming, etc.) or in areas located within lands vulnerable to the action of contaminated effluents (e.g., effluent outflows from industrial plants, mining undertakings, sewage treatment plants, etc.)

II.2.3. Ground water uses

This Action will improve aquifer management and contribute to the sustainable use of linked surface-ground water resources for the benefit of the communities settled in the Basin.

In particular, the Yrendá-Toba-Tarijeño (SAYTT)

Aquifer System, having an area of about 350,000 km², is part of the South-American Chaco and represents the most important sweetwater reservoir in this area. The lack of surface water for the human and livestock consumption and irrigation purposes has been significantly improved by extracting ground water from this aquifer. For this reason, it is a challenge to guarantee the “Sustainable Management of Water Resources of the SAYTT”, assuring the continuity of recharge and maintenance of its quality, involving users and beneficiaries of the aquifer, for better management of the irrigated area, especially associated with variability and global climate change.

II.2.4. Atmospheric waters

This Action will boost the fulfillment of the endeavors aimed at meteorologic water use, including adaptation of existing systems and the development of new technologies of “water harvesting” in areas of the Basin suitable for this kind of practice. It includes small works to store precipitation for augmenting water supply at household level (uptake, storing and use of rain water) and also the replicability of the experiences from “water harvesting” that includes, at the level of subbasins and micro basins, check dams (for water and sediment) and water storage for productive purposes.

II.3. Application of instruments and development of capacities for environmental management

The purpose of this Component is to develop and disseminate tools to promote the sustainable use

and conservation of the natural resources of the Binational Basin of the Bermejo River. These supporting instruments refer to measures that provide incentives for sustainable development, and discourage practices that degrade the environment or exhaust natural resources. The development and implementation of these instruments requires the active involvement of the private sector and civil society (i.e., indigenous and farming communities, NGOs, etc.) as key players in environmental management, because command mechanisms are not enough by themselves to assure the conservation of ecosystems and the sustainable use of the resources. In the implementation of these instruments, special attention will be paid to vulnerable populations, respecting the rights of indigenous and original populations.

The Actions taken into account under this Component are as follows:

II.3.1. Payment for environmental services

Compensation for environmental services includes instruments designed to promote the conservation of natural resources through the payment or direct compensation for the maintenance or provision of an environmental service. This means that the external beneficiaries must in a direct, contractual, and conditioned way pay the owners and local users for adopting practices that assure the conservation and restoration of ecosystems. Within the framework of the PROBER, an analysis of environmental services provided to the region will be made (for instance, those associated with natural environments), evaluating possible mechanisms for implementation of payments for

ecosystem services (PES). While the matter of PES is a booming concept, there are no experiences regarding PES in the Bermejo Basin. Therefore, the identification of environmental services and their associated payment mechanisms should be carefully analyzed to determine the eventual benefits of implementing PES and avoiding affecting the most vulnerable sectors.

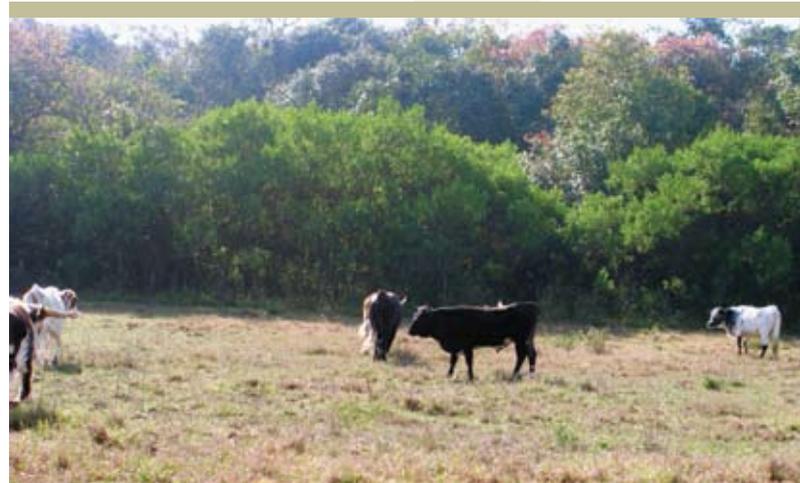
II.3.2. Clean development mechanisms

This mechanism basically comprises actions to reduce greenhouse gases emitted by an industry or other generator through the introduction of new mechanisms (transfer of technology) and higher capital investments, compliance with which achieves two purposes: providing access to clean technologies for the host country of the project, and reducing emissions that become “carbon credits” for the development of the project. In order to transform the decrease in carbon emissions into the issuance of negotiable bonds in the marketplace, it is necessary to take several steps either locally or internationally. The PROBER will identify clean development mechanism (CDM) forestry pilot projects, initially identified as the most feasible, evaluate their Replicability, and scaling them up in other areas of the Basin, creating at the same time capacities and experiences at a regional or local level.

II.3.3. Reduction of carbon emissions

The transformation and degradation of forests are important sources of greenhouse gases. The implementation of mechanisms for Reducing Emis-

sions from Deforestation and Forest Degradation (REDD) has appeared as a component of the system for protection against global change that is being negotiated to replace the Kyoto Protocol, which ends in 2012. The REDD Mechanism, besides reducing gas emissions through the sustainable management of forests, is connected with the protection of biodiversity and adaptation of the climate change. Given that this mechanism has still not been implemented effectively at the global level, the implementation of a REDD pilot project in the Bermejo River Basin may become an innovative experience both regionally or internationally.



Extensive livestock production in the Upper Basin

Strategic Area III

2.3.3. Reduction in vulnerabilities through integrated water resources management, considering climate variability and change

Strategic Area III comprises the extension and consolidation of the efforts developed to reduce the vulnerabilities of the ecosystem through the integrated management of water resources, as integrating components for achieving the greatest possible benefits from the sustainable development of the Basin. Within this Strategic Area, the importance of the global change in relation to its impacts on population migration; intensification of land uses; regionalization and globalization of commerce; and, changes in the uses of soils related to climate variability and change (processes of soil degradation, flooding, and droughts), occurring in the Basin.

By reducing vulnerabilities through the integrated management of water resources, the PROBER aims to broaden and consolidate the efforts made and experiences gained in the integration of new factors that may have an incidence in the area. Among these new factors, the importance of climate change is relevant, along with its impacts on population migration; intensification of land uses; regionalization and globalization of commerce; and, changes in soil conditions (processes of soil degradation, flooding, and droughts), in the Basin.

Prediction systems and alert systems for extreme events and disasters are considered through the monitoring and continuity of the network for hydro-climatic information generation as well as the extension and widening of the coverage of structural and non structural actions for erosion control and incremental reduction in sedimentation of anthropogenic origin.

Strategic Area III is based on four components, each of which with its relevant actions, is detailed in Table 2.6.

Components and Actions

Strategic Area III

III.1. Prevention and mitigation of erosion, sedimentation and desertification processes

The importance of the active and intensive water and geomorphological processes within the Bermejo Basin, with its important natural resources, variety of ecosystems and biodiversity, has been a key element in the development of the priority actions set forth in the SAP Bermejo. It is noteworthy that only the basins of certain rivers in China and Nepal have erosion and transport rates comparable to those observed in the Bermejo River Basin, making this system practically unique on the American continent. The Bermejo River Basin has been defined as a “natural laboratory regarding erosion and sedimentation”, delivering more than 100 million of tons of sediment annually to the Paraguay-Paraná-la Plata River fluvial system.

The Bermejo SAP has made an updated diagnosis of the production, transportation and destination of sediments in the Basin, significantly advancing the definition of the zoning of the risk of erosion and contributing to the knowledge of fluvial morphological evolution. At a local level (of the sub-basin) successful demonstration actions were developed, both structural and non structural, for erosion control and the reduction of transportation of sediments close to the communities of the Upper Basin, with small multipurpose works that were considered as economically and socially possible and financeable. Structural measures for flow con-

trol, sediment retention, riparian margin protection, rain water drainage, and cleaning and consolidation of river bed, among others, were successful practices that contributed to reducing environmental degradation, and at the same time, increasing the availability of water for human uses.

Additionally, a series of non structural measures were taken to control erosion and preserve natural ecosystems, especially in terms of livestock management, reduction of pressures on pasture lands, communal practices of use of pasture lands, creation of forest nurseries, and waste management in small communities. On the other hand, several

Table 2.6

Strategic Area III: Reduction in vulnerabilities through integrated water resources management, considering climate variability and change

Components	Actions
III.1. Prevention and mitigation of erosion, sedimentation and desertification processes	III.1.1. Creation of a sedimentological monitoring and information system III.1.2. Implementation of control measures. III.1.3. Expansion of knowledge and development of management instruments. III.1.4. Dissemination of existing information.
III.2. Pollution prevention and control and environmental sanitation in water bodies	III.2.1. Monitoring of water quality. III.2.2. Environmental Sanitation of water bodies. III.2.3. Systematization of information on water quality. III.2.4. Training, communications, and information dissemination programs.
III.3. Risk management, prevention and reduction of natural disasters	III.3.1. Strengthening existing forecasting systems and development of an extreme events alert system. III.3.2. Training, communications and information dissemination programs.
III.4. Conservation of ecosystems and biodiversity	III.4.1. Protection of ecosystems and management of protected areas. III.4.2. Conservation of biodiversity related to water bodies and to the Basin. III.4.3. Rehabilitation and restoration of degraded environments.

mathematical modeling studies were performed, including an analysis of susceptibility to erosion, generation and transportation of sediments, and investigation into fluvial-morphological dynamics. Experiences from the integrated management of micro basins in Bolivia are emphasized, together with those of the farmer communities, with multiple results showing the possibilities for creation of simultaneous benefits for the improvement of quality of life, access to water and enhanced productivity in plots with micro irrigation, and sustainable management of natural resources, in controlling erosion and sedimentation in water bodies, and the protection of infrastructure.

Likewise, the historical hydrosedimentological database was consolidated by digitization and systematization of information previously only available in hardcopy.

The actions proposed under this component significantly advance the knowledge of the problem of sediment resulting from the studies performed and works constructed; including lessons learnt from the Bermejo SAP; and promoting the wide dissemination of results obtained and replication of good practices.

III.1.1. Creation of a sedimentological monitoring and information system

This Action considers the optimization of the sediment monitoring network of the Bermejo Basin including the incorporation of new stations. These stations complement those already in existence and which are operational in the network, allowing the quantification and analysis of the contribu-

tion of sediments to the different river sectors or sub basins. It adds activities aimed at developing recommendations and methodological guides to improve measurements and increasing the quality of the data that are incorporated into the Information System.

Moreover, with the purpose of enriching the Information System, specific integration of hydrosedimentological and fluvial-morphological data included in the existing database is proposed, as well as its connection to the Decision Making Support System.

III.1.2. Implementation of control measures

A series of structural and non structural measures are proposed aimed at controlling the erosion process, erosion in river beds, degradation of water in dams, sedimentation in dams and reservoirs, erosion of stream banks, undermining of structures, and degradation resulting from the extraction of natural aggregates.

These measures consider the recommendations and premises set out in the Bermejo SAP aimed at improving and/or optimizing the designs of erosion control works in the rivers of the Basin, monitoring, and follow-up plans related to the works and environment. This will result in more sustainable development as well as the provision of valuable information to support future interventions.

III.1.3. Expansion of knowledge and development of management instruments

This Action is aimed at studying and monitoring the sediment dynamics of the Bermejo River Basin



Gabion dam in the area of San Jacinto, Bolivia

(production, transportation, and sedimentation) through the application and regular calibration of hydro-sedimentological and fluvial-morphological models implemented during the formulation of the Bermejo SAP, using data from the Information System.

Such models are a valuable management tool with which to evaluate the dynamics of sediments within the Basin and to anticipate the effects and impacts of erosion control measures. Activities referred to covering information gaps are incorporated, such as: specific production of sediments in sub-basins, and the development of experimental techniques for water resource-forestry restoration for flood control, among others.

III.1.4. Dissemination of existing information

This Action addresses the dissemination of information and available and future results to every stakeholder involved or interested in erosion control.

III.2. Pollution prevention and control and environmental sanitation in water bodies

Within the framework of prevention and contamination control at a transboundary level, it is noteworthy that the contamination which affects segments of the water courses begins in the rural areas, and worsens in the towns and important cities. In certain segments of the river, livestock and industrial wastes contribute significant organic and bacteriological contamination due to effluent discharges and poor management of the livestock. It

is considered that rates of organic contamination in the border rivers are quite high, but only affect a short distance due to high rates of dilution, which significantly reduces the scale of the problem. Even though organic, bacteriological, and industrial contamination is currently focused on specific points of the Basin, there is a growing risk of contamination in future if the adequate prevention measures are not taken.

Physical contamination, due to high concentrations of sediments transported during the wet times of the year, is the most significant form of transboundary contamination. The extreme rates of sediment transport affects the uses of water in the Basin and outside the Basin too, discharging to the Paraguay-Paraná-la Plata river system.

The Bermejo SAP consolidated the Water Quality Monitoring Network, which is composed of more than 40 sampling points, of which four are in the binational segments of the river. At these points, physical, chemical, and biological parameters were measured three times during the implementation of the Bermejo SAP, with analyses conducted by water laboratories in the four Argentine provinces in the Basin and the Department of Tarija in Bolivia.

Likewise, projects to produce solutions to the contamination problems in the Guadalquivir River were implemented by means of installing small sanitation systems with their respective treatment plants. In the case of the water courses of the Bermejo triangle, a sanitary situation diagnostic was made, a Sanitation and Water Quality Sustainability Plan prepared, a collection and treatment plant for wastewater, and drainage works were executed.

Actions proposed under the PROBER include:

III.2.1. Monitoring of water quality

This Action addresses the consolidation of the Water Quality Monitoring Network designed and agreed during the Bermejo SAP, by means of:

- i) Conduct of two annual sampling campaigns at the 40 sampling points in Argentina and Bolivia, for which physical, chemical, and biological parameters were identified and measured by the water laboratories of the four Argentine provinces and the Department of Tarija;
- ii) Adoption of the Methodological Guide for sampling, processing, and analyzing water samples, as an operational support tool;
- iii) Identification of eroding segments of water courses and water bodies affecting the sediment composition of the river bed;
- iv) Instrumentation of sediment modelling and analysis in situ and in the laboratory of the contaminants;
- v) Analysis and processing of water quality data;
- vi) Definition of water uses; classification of water courses; and, development of Target Levels for the Bermejo River Basin;
- vii) Preparation of Water Quality Indices based on physical, chemical, and bacteriological parameters;
- vii) Building of a group of experts (composed of laboratory staff, and staff from the COREBE and the OTNPB) for planning, implementing, and evaluating the Water Quality Monitoring System for the Bermejo River Basin.
- ix) Instrumentation of inter-institutional agreements, including collaboration with the Pilcomayo Basin and the la Plata Basin commissions; and,

- x) Execution of activities for institutional strengthening of the laboratories in the Basin, including the performance of quality control tests, in which other laboratories external to the Basin may also participate.

III.2.2. Environmental Sanitation of water bodies

This Action is aimed at:

- i) defining a strategy for environmental sanitation at the Basin and Sub basin level, identifying the critical places with water quality problems through the analysis and processing of data from the Monitoring Network and other information sources;
- ii) designing and carrying out water resources conservation ; and,
- iii) designing and executing structural measures for sanitation in water bodies.

III.2.3. Systematization of information on water quality

This action is mainly based on the incorporation of data from the Water Quality Network into the Information System. Likewise, and as a support to the decision making process, elaboration and implementation of mathematical models to analyze the current status of the water quality in the system and forecast of contaminant dynamics, by segment of the river and by parameter.

Additionally, an alert mechanism and contingency plan in case of contamination events generated by accidental causes and/or natural phenomena that may happen in the Basin will be designed and

incorporated into the Information System.

III.2.4. Training, communications, and information dissemination program

The activity includes:

- i) training of professionals and laboratory technicians in pedagogical practices with the purpose of performing training within the laboratories.
- ii) training of professionals and laboratory technicians in specific subjects such as analytical techniques, sample taking, equipment use, etc.;
- iii) creating exchanges and traineeships to enhance inter-laboratory collaboration by professionals and technicians;
- iv) designing, elaborating, and disseminating a regular publication about the Water Quality Program and the conservation of the water resources;
- v) designing, preparation, and disseminating communication materials.

III.3. Risk management, prevention and reduction of natural disasters

The restrictions on the development and use of the water resources and natural resources of the Basin for productive and sustainable economic purposes are related to the natural fluctuations in water availability and related fluvial-morphological dynamics, associated with seasonality and extraordinary cycles such as the general shortages of water during dry periods are remarkable, among others, affecting both human consumption and agricultural and livestock use, resulting in low levels of

production and economic yields during droughts, and flooding of urban or rural areas during times of excess.

The countries have undertaken commitments in terms of the United Nations Framework Convention on Climate Change, and considered their vulnerabilities to the climate change, actions that show the regional progress in complying with international treaties on environmental matters.

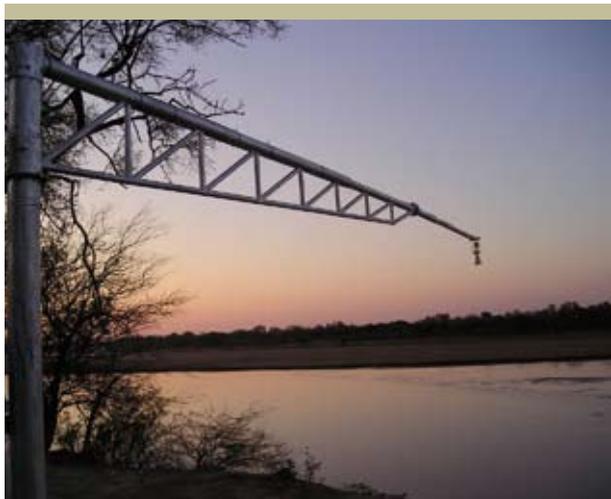
Extreme water events are related to climatic variability and climate change, especially longer term, recurrent, and intense flooding and long periods of drought that periodically affect areas of the Basin, with associated devastating social, economic, and environmental effects. Certain information gaps and knowledge of climate change were identified, including the pertinent lack of capacity to most ef-

ficiently minimize the effects of such variability and change. Improved capacity to model and forecast these phenomena to mitigate their impacts, and to identify hazards and vulnerabilities and implement measures for adaptation to the new climate and water scenarios. This problem is exacerbated by greenhouse gas emissions, like carbon dioxide and emission from forest fires and farming.

The purpose of this component, pursuant to the UN International Strategy for Disaster Reduction (2000), is to sensitize the population to the risks, to commit the authorities to implementing mitigation measures, to achieve the participation of the community in implementing mitigation practices, and to reduce the economic and social losses associated with natural hazards. In this sense, the integrated management of the risks that affect the



Gauging station in El Angosto, Tarija River, Bolivia



Remote station El Sauzalito of the hydrometeorological network, Republic of Argentina

whole Basin must consider the identification and analysis of both the threats and the vulnerabilities, in developing integrated and coordinated actions (prevention, mitigation, preparation, response, rehabilitation, and reconstruction), taking into account the differences among extreme phenomena in the Upper Basin and in the Lower Basin.

In this sense, during the formulation of the SAP Bermejo, irrigation and agricultural risk maps were developed for the Lower Basin, and maps of vulnerabilities to erosion in the Upper Basin were prepared. It should be noted that the works performed in the Town of Iruya, in the Province of Salta, Argentina, with regard to participatory risk assessment and contingency planning with the community form a useful precedent for such actions. On the other hand, the Basin has a system for the prediction of floods and droughts, administered by COREBE, which considers real time information from the existing binational hydro-meteorological network.

With this in mind, the PROBER includes the following Actions:

III.3.1. Strengthening existing forecasting systems and development of an extreme events alert system

With the purpose of creating more knowledge and technical and operative capacity to predict, with greater certainty and anticipation, the effects on water of global change and to consider, in particular, the mitigation of disasters such as floods and droughts and the adaptation to weather and water conditions in the Basin, it is necessary to strengthen the Decision Making Support System

with mathematical modeling tools and an irrigation management subsystem.

This includes, in a first stage, the implementation of mathematical modelling tools such as:

- i) a distributed water model;
- ii) a ground water model;
- iii) a model of surface-ground water connectivity;
- iv) hydro-sedimentological and sediment production models; and
- v) integration with models that generate future climate scenarios.

Aspects related to variability and the climate change, the mitigation of the causes of climate change, and adaptation to climate change scenarios must be taken into account, with special attention to the interrelationship with water resources, the degradation of the soil, and the biodiversity.

In addition, the modelling must integrate human water use into the Basin's water balance, including estimates of human water needs and water demands.

Based upon these models, it is envisioned that an integrated risk management module, that will include prevention, mitigation, preparation, response, rehabilitation and reconstruction measures, will be part of the Decision Making Support System of COBINABE. The design and development, as well as the implementation of its operation, will be coordinated with COBINABE's associated institutions, the COREBE in Argentina and the OTNPB in Bolivia, and take into account the mechanism of participative development.

The action framework together with the Hydro-climatic Prediction System should also be integrated with modeling initiatives at la Plata River Basin

level. These initiatives are being designed to estimate meteorological conditions, forecast weather, and include a water forecast. This system seeks to better estimate the floods, droughts, and extreme phenomena in the larger the Basin, through the coordinated and functional use of regional institutional resources such as the COBINABE.

The Decision Making Support System for the Bermejo River Basin will also provide hydro-climatic baseline information for the regional planning, with the purpose of guiding land use, protecting wetlands, and operating the reservoirs, among others, all within the context of adaptation to the hydrological effects created by climate change and variability. In addition, such an approach would form the basis for replication elsewhere in the la Plata River Basin.

III.3.2. Training, communications and information dissemination programs

An essential output of this component will be an integrated risk management program relating to the water resources of the Bermejo River Basin. This risk management program will be accompanied by a training, communication, and dissemination program, directly linked to the activities developed in Strategic Area IV.

III.4. Conservation of ecosystems and biodiversity

The purpose of this Component is to make the integrated management of water resources consistent with the different methods of conservation and management of natural resources that may be



Coverage area of the Ecological Corridor Calilegua-Baritú-Tariquía

implemented at the larger scale, and assure the maintenance of the water production systems and biodiversity of the Bermejo River Basin in the long term. The Basin is a regional integrating element in terms of the conservation of environmental services and environmental assets. To protect and preserve the integrity of this underlying system, and to provide for future expansion of demands to be placed on the system, strengthening of the protected area system within the Basin is viewed as a strategic priority.

The SAP Bermejo, in seeking to ensure the integrity of the ecosystems of the basin as continuing to support biodiversity, considered several initiatives such as the protection of headwaters and the strengthening of the ecological connectivity between nearby protected areas. It was of high priority for the Project to contribute to the consolidation of the protected areas recognized by the national and provincial systems. These include the Yungas Biosphere Reserve (recognized by UNESCO MAB) in Argentina and the promotion of a Binational Ecological Corridor that would allow the development of a connection between the Tariquía National Flora and Fauna Reserve in Bolivia with the Baritú and Calilegua National Parks in Argentina.

This action expands the area available to sustain biodiversity and protect natural resources (water and soil), while avoiding the fragmentation of habitats in the Yungas. Likewise, management plans were designed and prepared for several protected areas that, together with the implementation of ecotourism practices therein and in the surrounding areas, form concrete actions that contribute to the support and reduction of vulnerability of

these fragile ecosystems, as well as contributing to knowledge of their biodiversity, and retaining their carbon fixing potentials.

Considering that Strategic Area III comprises responses to the Basin's problems and vulnerabilities, insofar as the can be addressed through integrated management of water resources, the Actions included in this component are as follows:

III.4.1. Protection of ecosystems and management of protected areas

A broad-based concept of protected natural areas has been adopted. Thus, it is possible to incorporate into the protection system both typical concepts (for instance, national parks or reserves) and other more flexible concepts such as the Biosphere Reserves (Alto Bermejo, Yungas, Teuquito and Laguna Oca) and World Heritage Sites (UNESCO) like the Quebrada de Humahuaca.

The concepts of protected areas and conservation of wild spaces within the Bermejo River Basin must be developed as an environmental and societal integrating point. The recreational aspects related to this network must play an important role in promoting the implementation of such an integrated management point of view.

The Bermejo River Basin contains an number of important protected areas of an international, national, provincial, and private nature. A series of priority areas have been delineated for the conservation of the Gran Chaco Americano, from which a subgroup is located within the Bermejo Basin. A preliminary analysis shows that the Upper Basin is better protected, with international conservation areas such

as the Quebrada de Humahuaca World Heritage Site (comprised of an ecoregion characterized by jagged mountain ranges and desert valleys surrounded by mountains, with a lake at the center) and the Yungas Biosphere Reserve (comprised of an ecoregion characterized as Yungas). The main effort here consists in supporting the management of these areas, because they are tools that aim at making sustainable use of the natural resources consistent with its conservation, and because they are explicitly part of the human roles and responsibilities in the development of these landscapes. In the Lower Basin, the conservation areas occupy a minor portion of the territory. This contrasts with the high proportion of priority areas delineated within the ecoregion of the Chaco, especially as it relates to the Bermejo River. This situation shows the need to develop, as mentioned above, a strategy that takes the river, as a fluvial corridor, as the integrating point for the conservation of both the aquatic and terrestrial systems.

The identified actions are the following:

- e) Implementation of a riparian corridor along the Bermejo River, with the purpose of preserving the floodlands along the riverbed, consistent with the objectives of conservation and sustainable development. It is proposed to prioritize the protection of the riparian areas that are still in a wild state, together with a restoration program that promotes sustainable uses of the river and its floodlands;
- f) Protection of the basin's headwaters and recharge areas of aquifers within the framework of a binational management agreement. In terms of conservation and sustainable use of the resources of an ecosystem shared between the

countries, it is especially important to protect the headwaters and the associated ecosystems (pastureland, forest, and jungles), including the protection of the recharge areas of aquifers. In this case, the Yungas Biosphere Reserve in Argentina and the proposed Biosphere Reserve in the Upper Bermejo in Bolivia, provide examples of compliance with these purposes.

- g) Conservation and enhancement of the wetlands of the Upper and Lower Basins protect their functions as water reservoirs and regulators of the water systems of the Basin (surface and ground resources), encompassing great biodiversity and maintaining ecosystem goods and services of local communities and wild species;
- h) Promotion of the “environmental flow” concept in different areas of the Basin including the application of best available knowledge to the maintenance of ecological and environmental flows in the river, including the waters used for irrigation, industry, consumption, and other activities that use higher amounts of water from effluents or the Bermejo River itself. Productive and social uses must be articulated in a like manner with the environmental uses in order to create a regulatory framework that is acceptable to stakeholders and feasible to be implemented.

The following are among associated actions to be considered: making forest management consistent with the conservation of ecosystems, supporting the management of protected areas, attending to the national or international ecotourism market by promoting and supporting associations or other ways of local community management of protected areas.

III.4.2. Conservation of biodiversity related to water bodies and to the Basin

The Bermejo River Basin probably has the largest biological diversity of any subtropical South American river system, especially in Argentina. This environmental point is this river is undoubtedly a principal unit of conservation for the region, both for its intrinsic environmental value and for the environmental services it offers. There are several initiatives underway for the conservation of the biodiversity of the Bermejo River Basin, mainly based on the implementation of protected areas and land use zoning. These initiatives in the Bermejo River Basin are related to those in the other interconnected basins such as the Pilcomayo, Paraguay, and Parana rivers.

In order to assure that the biodiversity conservation strategies that are implemented at the regional level with respect to land partially or totally intended for productive activities are appropriate, it is fundamental that monitoring systems be developed to assess the success of the applied policies.

The following are identified activities:

- i) To create an information base on the ecology and dynamics of the principle water courses of the Basin. This knowledge will be fundamental to decide the conservation strategies needed to implement the water resources management system in the Basin. It will allow informed decision making for the management and uses made of the natural resources of the Basin, including fisheries and other resources;
- j) To promote the systematic study of key compo-

nents of the biodiversity to inform actions for conservation and management that make those interests as compatible as possible with other demands on the River system and its resources, taking into account the vision for integrated water resources management. This involves supporting the generation of an environmental information system that includes inventory and monitoring information on biodiversity in the Basin in such a way as to strengthen and socialize the information;

- k) To monitor land use over the whole of the Basin. It is necessary to develop an environmental observatory for the Basin that allows stakeholders to understand the extent of land uses throughout the Basin. This would represent a fundamental decision support tool for the conservation and management of the natural resources and ecosystems of the Basin.

Other associated activities are: actions that complement the creation of an information base on the ecology and dynamics of the forest ecosystem, among others.

III.4.3. Rehabilitation and restoration of degraded environments

Ecological restoration or rehabilitation is a working approach that attempts to provide alternatives to the historic uses of lands in areas that have suffered from ecological degradation as result of human impacts. It is increasingly recognized that the success of the restoration initiatives must enhance the socio-economic benefits at the landscape level. It is consistent with an ecosystemic ap-

proach, based on the recognition that planning and action related to conservation must occur at landscape level and must involve the different groups of interest that ecosystem restoration of degraded landscapes must promote both the restoration of wild environments as well as the reduction of rural poverty. It must increase the productive capacity and the commercial feasibility of existing land uses, minimize the economic and environmental risks to these lands in the long term, improve functioning of ecosystem services, assure a greater connectivity between environments, mitigate the threats to wild environments, and enhance the conservation of biodiversity.

The degradation of these environments may result in the loss of biodiversity and biomass, and the modification of the structure of wild ecosystems contributing to a reduction of their productivity that, at the same time, impacts the provision of the necessary resources to ensure the maintenance of wild environments. In some cases, the main purpose will be to restore the original ecosystem and recover the initial biodiversity. In other cases, the priority will be to recover the sites for other productive purposes such as agriculture.

Identified actions include:

- a) Careful management of those areas susceptible to erosion, due to both natural and anthropogenic causes. The important erosion processes, for instance, are those resulting from inadequate agricultural practices or over grazing, which have significant impacts due to their geographical extent and duration of impact. To continue the development of land use and land management practices that prevent, restore, and/or mitigate

such processes is a priority.

- b) Development and evaluation of appropriate restoration and environmental rehabilitation techniques. There are a few successful experiences that can be adopted at a landscape scale in the Bermejo Basin. This is a turning point, because the restoration and rehabilitation works are usually demanding in terms of capital investments

and works, so their relevance and advantages must be well established.

Among other related activities are the following: identification of restoration methods and approaches for wild lands that are feasible to be implemented by local communities, as well as techniques for the restoration of forested ecosystems in the Basin.



National Park Potrero de Yala in the province of Jujuy, Republic of Argentina

Strategic Area IV

2.3.4. Social participation for the planning and integrated management of the Basin

This Strategic Area seeks to strengthen the participatory process in the Basin by means of convergent advances empowering the different jurisdictional stakeholders involved. It also aims to extend the development and scope of the mechanisms and instances of environmental education, communications, and information dissemination, and support societal participation, as well as to empower stakeholders and institutions in implementation of the PROBER.

This Strategic Area is transversal nature, giving support to the other Strategic Areas that are part of the PROBER. The purpose of this Component is to provide continuity and extension of the successful experiences and achievements of Bermejo SAP, consolidating and expanding mechanisms for participation, environmental education, information dissemination, and awareness creation that allows a fuller commitment and greater participation by societal and institutional stakeholders in the integrated management and development of the Binational Basin.

Given its contribution to the sustainability of the integrated management of the transboundary water resources, and the economic and social development of the environment, this proposal has been developed with a binational point of view, pinpointing the need for and importance of interacting with the key players and involved jurisdictions. For this reason, the main purpose of this Component is to broaden and extend knowledge of the problems of the Basin and their solutions, in order to build, in a participatory way, awareness among the inhabitants of the Basin, encouraging them to be progressively involved in the process through employing

the tools and using the opportunities that allow societal participation in water matters.

The development of these actions seeks, on the whole, to address the following purposes:

- To encourage the active participation of different stakeholder in the planning and implementation of the PROBER in relation to the management and sustainable use of the water resources and other natural resources of the Bermejo Basin;
- To promote the active and supportive behavior of stakeholders through training and education related to the environment and processes for societal participation as essential components in all the Components and Actions of the PROBER, promoting communication among governmental institutions and the communities, making information flow and access to information easier during the decision making processes, and addressing the different interests of the stakeholders in a manner consistent with their adaptation to the changing realities facing local communities of Argentina and Bolivia;
- To promote and strengthen the knowledge and awareness of the different societal, political, and economic stakeholders in the Basin in relation to

the environmental consequences of unsustainable management of water resources and other natural resources and the consequences of human actions in the different areas of the Basin.

- To promote and strengthen environmental education (including training of stakeholders, and formal and informal education) and the participatory processes in the Basin to facilitate and promote sustainable development through the sustainable use of water resources, modifying production processes, and recognizing cultural and gender diversity and the need for societal and generational equity in the Basin;
- To replicate and complement the processes initiated within the framework of the Bermejo SAP in relation to environmental education at all levels (educators, teachers, and students), strengthening the consideration of problems and solutions experienced in the Bermejo River Basin and disseminating these experiences and education materials inside and outside the Basin.



Content development workshop on Environmental Education

This Strategic Area is structured in three Components, each one corresponding to specific Actions as shown in Table 2.7.

Table 2.7

Strategic Area IV: Social participation for the planning and integrated management of the Basin

Components	Actions
IV.1. Consolidation of participatory processes	IV.1.1. Promotion of societal participation. IV.1.2. Generation of capacities for societal participation.
IV.2. Environmental education	IV.2.1. Formal environmental education. IV.2.2. Informal environmental education. IV.2.3. Building awareness on environmental matters.
IV.3. Systematization of information, dissemination, and communication	IV.3.1. Dissemination of information and communication. IV.3.2. Development of new communications channels.

Components and Actions

Strategic Area IV

IV.1. Consolidation of participatory processes

Through this Component, the societal participation will be facilitated and mechanisms that facilitate stakeholder participation will be actioned through the joint participation of civil society, its representative institutions, municipalities, and local governments, and through concrete actions supporting sustainable socio-economic development in the Bermejo River Basin, promoting the involvement and commitment of the institutions and organizations of civil society in the design and execution of the strategic actions and projects of the PROBER.

The actions included in this component are

framed by the definition and achievement of a common societal purpose and the convergence of the Strategic Action Program for the Binational Basin of the Bermejo River with existing policies and national regulations in each country that encourage and promote the active participation of civil society in development and environmental management, according to the internal conditions and participating jurisdictions within existing legal frameworks.

IV.1.1. Promotion of societal participation

This Activity seeks to promote and facilitate the participation of civil society to support the sustainable development of the Bermejo River Basin as well as the involvement and commitment of the institutions and organizations of civil society in the design and execution of strategic actions



Participatory workshop with the community of Calilegua in the province of Jujuy, Argentina, for the design of training modules and intercultural content building modules

and projects set forth in the PROBER. These actions will be undertaken through projects duly validated and adapted to the needs of the communities involved. They comprise the following specific actions:

- a) Creation of public awareness to support stakeholder participation, including awareness and social participation activities, through communication actions intended for to promote the knowledge and awareness among the different societal, political, and economic stakeholders, creating a sensitivity to and change of attitude toward environmental problems, and promoting actions at the different levels of the government and among civil society consistent with the objectives of the COBINABE as regards the inclusion of societal participation in the planning, execution, and assessment of results of the different projects of the PROBER; and,
- b) Enhanced access to environmental information to facilitate community access to substantive information on the Basin through the expansion of the Integrated Environmental Information System for the Basin , updated from time to time and made available to users through different means according specific cultural scenarios (i.e., via the Internet, radio or printed bulletins, meetings, training courses, community meetings, etc.). Expected actions include the following: promotion of better access to technical documents, educational materials, and mass communication mechanisms to increase knowledge of the information available for the sustainable management of Basin.

IV.1.2. Generation of capacities for societal participation

Through this action, opportunities and capacity for societal participation in the management of the Basin will be strengthened working with different governmental and societal stakeholders, trying to consolidate the processes of participation and empowerment initiated during the formulation of the projects included in the PROBER, adapted to each country, and in compliance with the particularities and requirements of each project. It includes the following activities:

- a) Creation of participation opportunities with the purpose of promoting and/or strengthening the stakeholder commitment in the different stages of planning, managing, and assessing the activities and projects proposed for the execution of the PROBER; and to institutionalize the shared responsibility and roles of governmental organizations, academic institutions, civil society, and the private sector in the performance of the PROBER.
- b) Institutional strengthening to support such participation, in order to strengthen the COBINABE and other institutions of the Basin, especially the ones responsible for the management of water and environmental resources, provide for public participation, including that of national and jurisdictional governments within the scope of the Basin, civil society, resource users, and the private sector. This action also focuses on strengthening the socio-environmental management capacity and the decision making of the organizations, municipalities, and local insti-

tutions responsible for the management of water resources, conservation of natural resources, and improvement of quality of life of the Basin's inhabitants.

- c) Representation of civil society through social participation mechanism, aimed at assuring the representation of all groups affected and/or interested in the Basin, using appropriate participatory processes, inclusive of native communities and vulnerable populations, in the identification, design and execution of projects.

IV.2. Environmental education

The experiences in environmental education achieved during the formulation of the Bermejo SAP were positively valued, by the government, the teachers, and students themselves, particularly those elements that are supported in the PROBER. Among those elements is the contribution of the public education system. For instance, the teaching network of the Department of Educational Services in Bolivia, and the inclusion of relevant topics in the environmental education curricula of the provinces of Salta, Jujuy, Chaco, and Formosa in Argentina; the strengthening of capacities of trainers, teachers, and students in the sustainable management of natural resources, the conservation of the environment, and the resolution of the problems of the Bermejo River Basin; the elaboration and provision of educational materials that improve the knowledge of environmental problems in the Basin; and, the promotion of knowledge and awareness of the societal, political, and economic stakeholders about the environmental consequences of in-



Workshop on training of trainers in Environmental Education

adequate management of the natural resources in the Basin.

The PROBER proposes to continue and expand the activities developed through three Actions aimed at strengthening formal and informal environmental education in the Basin, integrating syllabi among schools, civil society, and decision makers so that the learning, will, and needs of communities form an integral part of the tasks of resource managers and political decision-makers. The specific purposes of this component include the following:

- Promoting and strengthening environmental education (including teacher training, and formal and informal education) to facilitate and promote sustainable development.
- Replicating and complementing the processes initiated within the framework of the SAP Bermejo in relation to the subject of environmental education at its different levels (trainers, teachers, and students), strengthening the consideration of the problems and experiences of the Bermejo River Basin and disseminating experiences and educational materials inside and outside the Basin.

The Actions set forth in this Component include:

IV.2.1. Formal environmental education

Created as a permanent educational process, its goal is to achieve, within the framework of the educational system, a curriculum for students, both in terms of knowledge and the instilling of attitudes (individual and collective) about the value and the sustainable management (individual and collective) of natural resources and the use of environmental

services, that contribute to equity in the quality of life of all the people in the Basin. These actions seek to create a new educational process that leads to a permanent improvement in the quality of life of the participating students in this program and of the communities in which they live; to establish synergies among the institutions at different levels, civil society stakeholders, and the provincial political decision-makers, with the purpose of achieving agreement on needed environmental and social transformations; and, to a sense of belonging to the Basin that allows problem solving and identification of possible solutions.

The actions considered include:

- a) Definition of a strategy for formal environmental education in the Basin. A strategy for environmental education, based on the joint and integrated work of multiple stakeholders (school, community, state, civil society, etc.) that share collective purposes and joint efforts in trying to achieve a permanent change in the vision and management of the natural resources and environmental services of the Basin will be designed. It also includes activities to try to reach an agreement, an integrated vision of the potentialities and problems, and a nexus between the diverse social, cultural, economic, ecological, political, and institutional interests in the Basin, for the definition of the guidelines supporting an environmental education strategy.
- b) Inclusion of environmental education throughout the educational process. It seeks to widen the coverage of implementation of the environmental education activities within Basin at the primary and secondary school levels in the

Department of Tarija in Bolivia, and in the Educational Units of the core and networks of the educational or school districts, at the EGB 1, EGB 2, EGB 3 and high school [Polimodal] levels in the Argentine provinces in the Basin, providing continuity to the transversal treatment of environmental matters in the curricular guidelines and public education institutions. It aims at strengthening the idea of integrated educational processes in articulating appropriate, pertinent, and possible actions within the formal environmental education curriculum and informal environmental education arena, including other actions within the community

- c) Environmental education at a higher teaching level in order to:
- i) implement an environmental education project at the higher level of teaching within the the Basin in Bolivia and Argentina;
 - ii) promote the incorporation, in the curricula and the organization of post graduate and extra curricular courses, of topics associated with the integrated management of the basin, the sustainable management of natural resources, the conservation of the environment, and the resolution of the problems of the Bermejo Basin;
 - iii) promote the articulation of knowledge gen-



Education unit in the Department of Tarija, Bolivia

- erated at a higher level in the other educational venues and in the community;
- iv) promote the participatory processes in the practices of teaching and learning with the purpose of introducing changes in the curricula in order to promote future professionals as agents of change in environmental matters;
 - v) formulate, implement, and validate, in a participatory way, the mechanisms of “environmentalization” applied to selected career paths and/or academic units. At the same time, an implementation strategy for these mechanisms will be developed, supported by indicators of efficiency and applicability;
 - vi) promote, through a pilot project, the transfer of results to teaching institutions, including one of EGB level and one of high school level.
- d) Teacher training in environmental matters in order to:
- i) strengthen the curriculum of teaching training to include environment as a transverse subject; and
 - ii) train new teaching professionals in environmental education, improving teaching skills and use of pedagogical tools.

IV.2.2. Informal environmental education

Informal education includes every organized educational conducted outside of the official educational system, including training of specific groups within the community in particular matters. Within this framework, the actions considered in this component include:



Classroom project in Bolivia

- a) Environmental education for civil society and governmental staff, the purposes of which are:
- i) to promote training in technologies and sustainable productive processes and other environmental matters associated with the priority projects and actions of the PROBER;
 - ii) to train, in environmental matters, technicians in public organizations within the different jurisdictions of the Basin (the provinces of Chaco, Formosa, Jujuy and Salta, and Prefecture of Tarija) and other institutions;
 - iii) to replicate the experience developed within the framework of the SAP Bermejo (see the experience developed within the framework of the SAP Bermejo: results, lessons learnt, and good practices) in the programs of environmental education at an institutional level, especially in the areas of environmental and water resources management and within other public organizations having jurisdiction in the subject area; and
 - iv) to promote the incorporation of the solutions to problems, positive experiences, and good practices arising from the SAP Bermejo into the purposes and initiatives of environmental, social, and production-orient NGOs in the Basin.

IV.2.3. Building awareness on environmental matters

Environmental awareness and sensitivity requires the development of communications actions that strengthen and support sustainable development and care for nature as beneficial for the



Diagnosis workshop for the management plan of the Reserve Pintascallo, Republic of Argentina

development and quality of life of the inhabitants of the Basin. It is expected that this will result in a modification of attitudes and customs that are bad for the environment, create environmental problems, or aggravate degradation caused by human actions and forming of alliances with other institutions for the purpose of complementing their actions and extending their beneficial impacts.

IV.3. Systematization of information, dissemination, and communication

This Component seeks to secure the commitment and participation of key stakeholders involved in spreading and communicating information associated with the Basin and the different Projects being conducted for environmental protection therein, allowing a better and wider understanding of the purposes, Strategies, activities,

and anticipated results. The planned actions anticipate the design and implementation of a series of alternatives for communicating and spreading this message using different media, taking into account those that best fit the objectives of the PROBER and the corresponding scenarios for the sustainable development of the Bermejo Basin in Argentina and Bolivia, including information and dissemination alternatives connected to the mass media (radio, TV, written press) and other media.

It comprises the following actions:

IV.3.1. Dissemination of information and communication

It considers the design and implementation of a communications strategy for the Basin, which promotes the knowledge and understanding of actions, activities, results, and projects yet to be de-



Meeting of project's beneficiaries in Bolivia

veloped, creating a new culture in relation to water and natural resources. In particular, it will take into account certain aspects, such as the importance of the water resources to development and quality of life of the population and key concepts relating to water resources, associated with or stemming from the water problem.

It comprises the following actions:

- a) institutionalization of a communications function within the COBINABE: it is proposed that a communications function be included within the scope of the “COBINABE”, whose goals are:
 - i) to organize, implement, and manage communications, and
 - ii) to manage the database and the institutional information and technical documentation center of the COBINABE as well as the documentation and information contributed by the COREBE and the OTNPB.
- b) design and implementation of a communications and editorial strategy for information and development of communication processes, identifying priorities, addressees, instruments, programs, etc. It is also proposed to disseminate information on the activities for the PROBER through the preparation and publication of reports and other documents.

IV.3.2. Development of new communications channels

This Activity is based on the premise that good information translates to good practices and, as a consequence, to better management of natural resources. In this sense, the proposed activities are

aimed at promoting the training of journalists (communicators) in reporting on the management of the Basin and sensitizing specialists to understand the daily needs for information of the population, as well as the need for interaction among water resources professionals’ and journalists’ networks (communicators).

It is comprised of the following activities:

- a) Design of an environmental information dissemination network, with the purpose of:
 - i) creating and operating in “virtual space” through a network of electronic mail and internet websites, and
 - ii) promoting the exchange of information, consultation, dissemination and sharing of experiences, related to environmental subjects or natural resources management, among people, institutions, and organizations that implement activities in the Bermejo River Basin;
- b) promoting new channels of communication with the purpose of:
 - i) boosting relationships with different communications media to achieve the multiplying effect of the information dissemination; and
 - ii) encouraging the creation and integration of networks and forums, complementary to Strategic Area I, promoting societal participation in the management of the Bermejo River Basin.

3. Execution Proposal

3.1. Institutional and organization arrangements for execution

The comprehensive nature of the program and the interjurisdictional political-institutional framework of the Basin requires for the implementation of the PROBER the execution of formal agreements between the COBINABE and the responsible institutions in both countries, and the provincial/departmental agencies in the sector and thematic areas in which it seeks action.

The strongly participatory nature of the PROBER and its purpose of developing the empowerment of communities requires the COBINABE and its associated national bodies to formalize opportunities for participation, information and education, and realization of instruments that execute and complete the implementation of planned activities within the Binational Basin.

The organization structure for the execution

of the PROBER will be based on institutional arrangements developed during the implementation phase of the SAP Bermejo, strengthening and deepening the consultation and participation mechanisms of the provincial and departmental agencies and authorities, both public and private, as well as organizations of the civil society, community groups and the community on the whole. To that effect, the actual participation of the Binational Council for the Bermejo River Basin will be consolidated. The council was created as a result of the successful experience of the Regional Coordination and Regional Advising Councils during the implementation of the SAP Bermejo, as a mechanism for programming, follow-up, consultation and participation.

The PROBER actions will be coordinated by the COBINABE, which will have a technical operating unit for the execution and follow-up of the relevant activities, with the participation of the COREBE in Ar-

gentina and the OTNPB in Bolivia, both institutions acting as the Secretariat of the COBINABE, especially in the execution of local and national actions.

3.2. Extent and estimated costs

The PROBER, as a long-term program, and based on the progress, achievements and results of the SAP Bermejo, establishes the Strategic Areas, Components and priority Action Lines to solve the main transboundary environmental problems and promote the sustainable development of the Binational Bermejo Basin.

The Action Lines, in their turn, are composed of a group of specific actions and projects, selected within the framework of a continuous and systematic process for the identification, prioritization and validation of proposals.

For the short-term phase, a set of projects has been identified for each problem issue dealt with by the PROBER, representing and funneling the priorities of the different national, provincial/prefecture and city authorities as well as of the communities.

The initial survey and identification of projects are part of –within an updated programmatic framework- a set of existing projects of the SAP Bermejo, along with new initiatives and proposals. The projects include structural and non-structural measures for the management of the Basin as well as projects aimed at the implementation of productive and sustainable use models of natural resources to be executed at binational, regional, provincial and local level.

As regards indicative figures of the selected projects, the estimated cost of the Program for this phase amounts to an approximate aggregate amount of US\$168 million, distributed by Strategic Area as shown in Table 3.1.

Table 3.1. Costs of the Project during the short term phase (by Strategic Action area)

Strategic Area	Estimated Amount
I. Institutional consolidation for integrated water resources planning and management of the Binational Basin of the Bermejo River	2,720,000
II. Sustainable use of natural resources	130,651,870
III. Reduction in vulnerabilities through integrated water resources management, considering climate variability and change	31,582,590
IV. Social participation for the planning and integrated management of the Basin	2,910,000
Total US\$	167,864,460

Amounts are stated in United States dollars.

3.3. Financing

The necessary financing to implement the short-term PROBER actions includes obtaining funds from various international, regional, and national sources. Depending on the activity to be financed, the funds may be non-refundable grants or loans. Counterpart public funds are also planned to be incorporated in the financial strategies underlying these actions (from national, provincial and/or prefectural and municipal

or private sources).

The proposed financing strategy will seek financial support from multilateral agencies such as the GEF, World Bank, Inter-American Development Bank (IDB), Andean Development Corporation (CAF), or others or bilateral cooperation from third countries (Donors) to implement both structural and nonstructural actions, as well as complementary actions necessary to strengthen the binational institutional framework of the short term PROBER.

Acronyms and abbreviations

CBC: Binational Coordinating Committee

CEDEVA: Center for Validation of Agricultural Technologies, province of Formosa, Republic Argentina

CIC: Intergovernmental Coordinating Committee for the La Plata Basin Countries

COBINABE: Binational Commission for the Development of the Upper Bermejo River and Grande de Tarija River Basins

COHIFE: Federal Water Council, Republic of Argentina

COREBE: Regional Commission of the Bermejo River, Republic of Argentina

GEF: Global Environment Facility

MDL: Clean Development Mechanism

OAS: Organization of American States

OTNPB: National Technical Office of the Pilcomayo and Bermejo Rivers, Bolivia

PEA BERMEJO: Strategic Action Program for the Binational Basin of the Bermejo River

PET: Territorial Strategic Planning, Republic of Argentina

PNFRH: National Water Resources Plan, Republic of Argentina

PROBER: Integrated Management Program of the Binational Basin of the Bermejo River Basin

REDD: Mechanism for reduction of emissions from deforestation and forest degradation

SAYTT: Aquifer system Yrendá-Toba-Tarijeño

SIG BERMEJO: Information System for the Management of the Bermejo River Basin

SINDOT: National System of Development and Territorial Ordering, Republic of Argentina

SSRH: Subsecretariat of Hydraulic Resources, Republic of Argentina

UNEP: United Nations Environment Programme

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SAP  BERMEJO
STRATEGIC ACTION PROGRAM
FOR THE BINATIONAL BASIN
OF THE BERMEJO RIVER



ARGENTINA



BOLIVIA

BINATIONAL COMMISSION FOR
THE DEVELOPMENT OF THE UPPER BERMEJO
AND GRANDE DE TARIJA RIVER BASINS
COBINABE



GEF - FMAM
GLOBAL
ENVIRONMENT
FACILITY



UNEP - PNUMA
UNITED NATIONS
ENVIRONMENT
PROGRAMME



OAS - OEA
ORGANIZATION
OF AMERICAN
STATES



Integrated Management Program for the Binational Basin of the Bermejo River (PROBER) ANNEX

Working document: preliminary list of project proposals



SAP BERMEJO

STRATEGIC ACTION PROGRAM
FOR THE BINATIONAL BASIN
OF THE BERMEJO RIVER

Integrated Management Program for the Binational Basin of the Bermejo River (PROBER)

ANNEX

Preliminary list of project proposals



ARGENTINA



BOLIVIA

BINATIONAL COMMISSION FOR
THE DEVELOPMENT OF THE UPPER BERMEJO
AND GRANDE DE TARIJA RIVER BASINS

COBINABE



GEF - FMAM
GLOBAL
ENVIRONMENT
FACILITY



UNEP - PNUMA
UNITED NATIONS
ENVIRONMENT
PROGRAMME



OAS - OEA
ORGANIZATION
OF AMERICAN
STATES

Preliminary list of project proposals

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
I. INSTITUTIONAL CONSOLIDATION FOR INTEGRATED WATER RESOURCES PLANNING AND MANAGEMENT OF THE BINATIONAL BASIN OF THE BERMEJO RIVER					
Component: I.1. Development of the institutional framework					
I.1.1. Institutional consolidation of COBINABE as the Basin organization	I.1.1.1. Institutional consolidation of the COBINABE as institution of the Basin	To consolidate and strengthen the coordination, planning and management capability of the COBINABE and the technical and institutional capabilities of the involved organizations (OTNPB and COREBE) by: <ul style="list-style-type: none"> i) institutionalizing the Binational Coordinating Committee (CBC); ii) improving communication and spreading of information, experiences and knowledge; iii) promoting the development of institutional capabilities of public and private entities and social organizations and users; and iv) facilitating and supporting the formulation and execution of investment projects about development initiatives of national and binational interest. 	600	Bin	3 years
	I.1.1.2. Strengthening of the National Coordinating Committee and the COBINABE	To encourage active participation of local players and organizations in planning processes and execution of actions to improve the quality of life in the Bermejo River Basin and contribute to the consolidation of the institutional structure of the COBINABE through the organized participation of social players.	200	Bin	2 years
I.1.2. Strengthening of COREBE and OTNPB and coordination of water and natural resources management entities of Argentina and Bolivia	I.1.2.1. Strengthening of the COREBE and delegation to the water and natural resources management institutions of Argentina	To give organizational, operational, technical and human resources capacities to the national organizations of the basin for the execution of the PROBER in their jurisdictions in order to comply with the legal duties and the social responsibilities arising from the management of the water resources. For the COREBE in Argentina, the actions will be aimed at improving operational capacities to achieve decentralization in order to contribute with the development of an integrated information system for the decision-making process. Likewise, the actions will aim at having an organizational configuration and more organizational tools to make the operation of the entity more efficient and the implementation of the PROBER better.	300	Arg	3 years
	I.1.2.2. Strengthening of the OTNPB and delegation to the water and natural resources management institutions of Bolivia	To give organizational, operational, technical and human resources capacities to the national organizations of the basin, for the execution of the PROBER in their jurisdictions in order to comply with the legal duties and the social responsibilities arising from the management of the water resources.	300	Bol	3 years

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
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Component: I.2. Adaptation of the legal framework for planning and management

I.2.1. Harmonization of the legal frameworks of jurisdictions of the Basin for integrated water resources management (IWRM)	I.2.1.1. Development and harmonization of regional and jurisdictional legal frameworks for the integrated management of the water resources	To allow for a strengthened regulatory framework that includes the basic aspects of the management of shared water resources and facilitates the integrated management of the Binational Basin by: <ul style="list-style-type: none"> i) identifying common standards and strengthening the core of binational basic coincidences for the integrated management; and ii) harmonizing the national and jurisdictional regulations in relation to the use and management of the water resources, particularly the key levels of water quality. 	100	Arg	3 years
	I.2.1.2. Harmonization of the legal frameworks of Argentina and Bolivia in relation to the project of integrated use of the Bermejo River Basin	To set the bases to harmonize the legal frameworks of Argentina and Bolivia in relation to all necessary aspects for implementing binational ventures or projects and for an integrated management of the Basin.	50	Bin	8 months
	I.2.1.3. Integration and implementation of actions in the Biosphere Reserves of the Yungas (Argentina) and the Upper Bermejo (under assessment, Bolivia)	To support the institutional consolidation of the Biosphere Reserves of the Upper Bermejo River Basin (Yungas and Upper Bermejo) through the implementation of priority management actions. In particular: <ul style="list-style-type: none"> i) to institutionally consolidate the government bodies of the Biosphere Reserve of the Yungas (Argentina) and the Upper Bermejo (under assessment, Bolivia) and develop the transnational link between both reserves; ii) to staff the Biosphere Reserves with executive technical teams for the management of their respective biosphere reserves; iii) to implement the priority lines of the strategic plans (management plan, action plan or similar) of the Biosphere Reserves in the jurisdictions where they have been developed; and iv) to complete the development of the action plans in those jurisdictions where they have been established. 	720	Bin	3 years
I.2.2. Implementation of zoning and land use regulation	I.2.2.1. Zoning and land use regulation	To promote and encourage the application of environmental zoning and land use processes as a basic instrument of regional planning by doing the following: <ul style="list-style-type: none"> i) in Bolivia, actions are aimed at completing the land use plans in the cities of Bermejo, the second section of the province of Arce and Entre Ríos in the province of O'Connor (including the cities of San Lorenzo in the province of Méndez and Valle de Concepción in the province of Avilés and Padcaya in the province of Arce), which are partially participating in this type of plans; ii) in Argentina, work will be done on the Strategic Territorial Plans (PET) prepared by the national government. The PET plans to develop a strategy for the consolidation of the national territorial identity and the land development projects and for handling new projects according to the experience of the provinces and the National System for Development and Land Zoning (SiNDOT), strengthening the planning networks; and 	150	Arg	3 years

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
		iii) to develop consistent criteria for an agroecological zoning of the Basin, which include the possibilities and limitations of the environment for the implementation of different sustainable productive models, updating the existing information of the Basin.			
	See I.2.1.3 Integration and implementation of actions in the Biosphere Reserves of the Yungas (Argentina) and the Upper Bermejo (under assessment, Bolivia)				

Component: I.3. Design and implementation of the decision-making support system

I.3.1. Optimization of an information system for the management of the Binational Basin of the Bermejo River, incorporating the monitoring network of environmental parameters and the early warning and extreme events alert system	I.3.1.1. - 1.3.1.2. Support System for the Decision-making process, including the information system for the management of the Binational Bermejo River Basin	To provide a Support System as a tool to facilitate the generation of knowledge, the decision making process and the education and social participation to support the management processes of the water resources and the sustainable development of the Binational Bermejo River Basin. It includes an optimized Information System, as from the SIG Bermejo, with components to complete and extend it with reliable information about different environmental parameters.	200	Bin	3 years
I.3.2. Implementation of the decision-making support system	I.3.2.1. Design and commissioning of the Support System for the Decision-making process in the Bermejo River Basin	To provide a Support System as a tool to facilitate the generation of knowledge, the decision making process and the education and social participation to support the management processes of the water resources and the sustainable development of the Binational Bermejo River Basin. It includes an optimized Information System, as from the SIG Bermejo, with components to complete and extend it with reliable information about different environmental parameters.	100	Bin	3 years

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
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II. SUSTAINABLE USE OF NATURAL RESOURCES

Component: II.1. Development of sustainable production in critical areas

II.1.1. Sustainable cattle management	II.1.1.1. Implementation at farm level of experiences related to mount livestock or forest grazing systems in the Chaco region	To generate in each jurisdiction a Livestock Management Pilot Plan under forestry coverage. To agree upon general criteria for the assessment of the sustainability of the system through specific indicators for each component resulting from the pilot experience. Such criteria will be added as technical rules to the applicable laws and the official plans supporting the livestock activity in the region.	500	Arg	30 months
	II.1.1.2. Implementation at farm level of provincial/ departmental land regulations	To generate in each jurisdiction a Land Regulation Pilot Plan related to one of the main change activities in the use of soil (agriculture or livestock). To agree upon general criteria to apply at farm level, resulting from the pilot experience. Such criteria will be added as technical rules to the applicable laws.	100	Bin	18 months
	II.1.1.3. Sustainable development program of the caprine sector in the area of the Quebrada de Humahuaca in the province of Jujuy	<ul style="list-style-type: none"> i) To make a diagnosis of the sector and market researches for the placement of products; ii) to improve the management of rodeos by applying the appropriate technology and the efficient use of forestry and water resources; iii) to improve farm infrastructures to obtain quality products and generate the appropriate scope for the tourism activity; iv) to contribute to obtaining value added products (for example, caramelized milk, flavored cheese, leather crafts, sausage, etc.); v) to create a Tourism Circuit related to the activity and the life of the rural producer, generating activities for the satisfaction of tourists; vi) to train players for the achievement of the proposed objectives; and vii) to support execution plans and programs (IPAF-MP - Project of Creole Goat Breeding). 	900	Arg	3 years
	II.1.1.4. Sustainable development program of the goat sector in the sub-basin of the Guadalquivir River and in the sub-basin of the Santa Ana River in the Central Valley of Tarija	<ul style="list-style-type: none"> i) To make a diagnosis of the sector and market researches for the placement of products; ii) to improve the management of rodeos by applying the appropriate technology and the efficient use of forestry and water resources; iii) to improve farm infrastructures to obtain quality products and generate the appropriate scope for the tourism activity; iv) to contribute to obtaining value added products (for example, caramelized milk, flavored cheese, leather crafts, sausage, etc.); v) to create a Tourism Circuit related to the activity and the life of the rural producer, generating activities for the satisfaction of tourists; vi) to train players for the achievement of the proposed objectives; and vii) to support execution plans and programs. 	900	Bol	3 years

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	II.1.1.5. Short-term rural, group and solidary micro-loan program in the Quebrada de Humahuaca in the province of Jujuy	To improve the productive base of the domestic unit to generate property-owning processes in the farm. To redirect the outcome of the trading of the agricultural production to the extended reproduction of the family capabilities. To sustain the operation through popular organization, but not the "credit market". To seek to create and strengthen farm organizations with the participation of farmers. To improve the management of the agricultural ecosystem, applying an appropriate technology for the efficient use of soil and water.	1.800	Arg	3 years
	See I.2.1.3. Integration and implementation of actions in the Biosphere Reserves of the Yungas (Argentina) and the Upper Bermejo (under assessment, Bolivia)				12 months
	II.1.1.6. Development of capabilities for improving livestock production in the High and Medium Bermejo River Basin	To support small livestock producers by improving infrastructure, production and fodder transformation.	400	Bol	4 years
	II.1.1.7. Strengthening of the CEDEVA Centers in the province of Formosa	To build the facilities of the Provincial Caprine Livestock Cottage for the management of pure breeders, CEDEVA, Laguna Yema. Development of Periurban Vegetable Gardens in towns of the interior of the province.	1.430	Arg	
	II.1.1.8. Strengthening of the milk basins in the province of Formosa	To assure the production and supply of fluid milk in the province of Formosa by: i) adding Girolando breeders to the provincial rodeo; ii) strengthening fodder supply, both the amount and quality; iii) providing appropriate milking facilities for the required management; and iv) transferring technology to current and potential producers.	554	Arg	4 years
	II.1.1.9. Experimental field for raising and re-raising buffalo breeders and developing demonstrative storage bins	To create a reference place in the government of the province of Formosa for producers, professionals, students, and field staff. Such place should be demonstrative and experimental and for training purposes to add value to obtain products by: i) developing a demonstrative field, subordinated to the Ministry of Production and Environment in the province of Formosa; ii) generating installed capacity in the province in relation to production and reproduction of buffalo milk; iii) providing improved bulls and improvers; and iv) genetically improving the provincial buffalo rodeos.	574	Arg	2 years

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	II.1.1.10. Beekeeping development	<ul style="list-style-type: none"> i) To increase income of agricultural producers; ii) to increase honey production in the province; and iii) to strengthen the organization. 	1.500	Arg	
II.1.2. Management of intensive agricultural systems	II.1.2.1. Integral plan for the management of properties in the province of Arce	To improve the quality of life of the inhabitants of the districts La Merced and La Mamora in the city of Padcaya in the province of Arce, promoting planning and innovating through the application of appropriate technologies to agriculture as from the rational and sustainable use of the farmers' productive bases.	325	Bol	4 years
	II.1.2.2. Sustainable agricultural development in the province of O'Connor with small producers	<ul style="list-style-type: none"> i) To improve income and food security of rural families, promoting a local economic development based on the management and sustainable use of natural and productive resources in the province of O'Connor of the Department of Tarija; ii) to improve and strengthen the agricultural production of the families of small rural producers in the province of O'Connor as from the sustainable management of their productive bases; and iii) to develop the capabilities and competencies in proposition, management and social participation of small rural producers for an effective social participation in the development of cities in the province of Entre Ríos. 	520	Bol	3 years
	II.1.2.3. Implementation of integrated management of properties in the province of Avilés	To improve the integrated management of properties through sustainable agriculture to contribute food security and sovereignty to the most vulnerable sectors.	325	Bol	4 years
	II.1.2.4. Conservation and transformation of diversified agricultural products in the Upper Bermejo River Basin	To develop skills in the implementation of infrastructure and equipment for the agricultural production transformation, assuring food security and sovereignty with small producers in the Upper Bermejo River Basin, Bolivia.	267	Bol	3 years
	II.1.2.5. Conservation and transformation of diversified agricultural products in the Medium Bermejo River Basin	To develop skills in the implementation of infrastructure and equipment for the agricultural production transformation, assuring food security and sovereignty with small producers in the Medium Bermejo River Basin, Bolivia.	267	Bol	3 years
	II.1.2.6. Conservation and transformation of diversified agricultural products in the Low Bermejo River Basin	To develop skills in the implementation of infrastructure and equipment for the agricultural production transformation, assuring food security and sovereignty with small producers in the Low Bermejo River Basin, Bolivia.	267	Bol	3 years

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	See II.1.1.2. Implementation at farm level of provincial/departamental land regulations.				
	II.1.2.7. Sustainable production alternatives of multi-purpose oil-seeds in the Bermejo River Basin	To conduct field tests and assess sustainable production alternatives of oil-seeds (<i>Jatropha curcas</i> , <i>moringa oleifera</i> , ricino) for multiple purposes (fodder, oil, dietary supplement, natural flocculants, etc.) in the Bermejo River Basin.	80	Arg	
II.1.3. Sustainable forestry management	II.1.3.1. Productive development of the forestry/industrial sector in the departments of San Martín and Orán in the province of Salta	<ul style="list-style-type: none"> i) To achieve an efficient use of the native forests by applying appropriate technical knowledge and promoting technology researches to improve the availability of information for production; ii) to develop forestry plantations with energy and industrial purposes and to improve the value of the native forest through handling and enrichment activities; iii) to support the creation and institutional strengthening of a forestry/industrial productive agglomerate; iv) to develop products of higher value, boosting the development of industries in the region with higher level of specialization; and v) to develop a training program aimed at the entire productive chain. 	500	Arg	3 years
	II.1.3.2. Forestry-industrial strategic plan in the province of Jujuy	<ul style="list-style-type: none"> i) To achieve an efficient use of the native forests by applying appropriate technical knowledge and promoting technology researches to improve the availability of information for production; ii) to develop forestry plantations with energy and industrial purposes and to improve the value of the native forest through handling and enrichment activities; iii) to support the creation and institutional strengthening of an Execution Unit and a Forestry/Industrial Productive Agglomerate; iv) to develop products of higher value, boosting the development of industries in the region with higher level of specialization; and v) to develop a training program aimed at the entire productive chain. 	1.000	Arg	3 years
	II.1.3.3. Implementation plan for the conservation of forestry resources in Serranía El Cóndor	To contribute to the sustainable development of the Central Valley of Tarija through environmental conservation and recovery processes with an approach towards forestry integral protection and production systems to improve the quality of life of rural communities settled in Serranía el Cóndor.	645	Bol	3 years

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	II.1.3.4. Sustainable forestry management of the community of Sidras in the province of Arce	<ul style="list-style-type: none"> i) To contribute to the implementation of an Action Plan for the Ecological Corridor Tariquia-Baritu-Calilegua; and ii) to share demonstrative experiences with sustainable agroforestry production systems. 	312	Bol	5 years
	See II.1.1.2. Implementation at farm level of provincial/departmental land regulations				
	See I.2.1.3. Integration and implementation of actions in the Biosphere Reserves of the Yungas (Argentina) and the Upper Bermejo (under assessment, Bolivia)				
	II.1.3.5. Promotion and sustainable forestry management in the Bermejo River Basin in the Department of Güemes, Salta	<ul style="list-style-type: none"> i) To add good forestry management practices to the indigenous and Creole communities of the influence area of the Bermejo River Basin to be suitable for obtaining the forestry management certification of their forests; ii) to strengthen the capabilities for the promotion of a sustainable forestry management in the influence area of the Bermejo River among the technical and para-technical staff of private and public entities and organizations of the civil society; and iii) to contribute to improving the income of native and Creole communities through the diversification of non-wood forestry products. 	500	Arg	30 months
II.1.4. Development of agro-forestry systems for small producers	II.1.4.1. The frontier as an opportunity for the organizational strengthening and training of small producers of the Bermejo River Basin	<ul style="list-style-type: none"> i) To strengthen the following processes: social revaluation, association practice and revaluation of cultural bases by: <ul style="list-style-type: none"> a) improving additional income of small producers as well as their self-esteem, thus reducing migration to urban centers; b) familiarizing producers with the definition and application of production protocols and the relevance of producing with the quality assured by the different existing brands of source quality; c) encouraging and training people in the use of Internet media, specially the young people of said locations; and d) positioning the existing regional brands with strong relationship with the environmental and social conditions of the territory of the Bermejo River Basin; ii) to boost organizational strengthening, promotion of sustainable practices and sharing of experiences between the different existing organizations of producers in the region; and iii) to reach institutional bases for the formulation and search of financing to implement a micro-loan program to support the productive initiatives of small producers. 	500	Arg	3 years

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	II.1.4.2. Development of integral agroforestry in La Huerta	To maintain and improve productive bases (soil, water, genetic resources) by applying appropriate techniques for the use and management of soils, water and crops by means of the application of family agroforestry systems in the community of La Huerta in the city of Padcaya.	1.492	Bol	No informed
	II.1.4.3. Strengthening and promotion of agroforestry production systems in Formosa	Livestock-forest grazing subproject: Construction of a multi-purpose room for training technicians and producers. CEDEVA Las Lomitas. Fruit & Vegetables subproject: Development of irrigation for family vegetable gardens in areas where energy is not available. Increase in the number of banana and pineapple vitro plants to support small producers. Tacaagle Mission (CEDEVA). Northern Fruit Basin, development of fruit basin for small producers in the departments of Pilcomayo and Pilagas. Citrus, guavas, pitahayas. Southern Fruit Basin, development of fruit basin for small producers in the departments of South Formosa and Pirané. Citrus, figs and grenades. Drip irrigation systems. Chamber for bananas. Tacaagle Mission (CEDEVA). Room for researchers. Tacaagle Mission (CEDEVA). Integrated management of water and soils subproject: Construction and equipment of the Laboratory of Soils, Water and Fodder. Location of Ibarreta.	3.520	Arg	
	See I.2.1.3. Integration and implementation of actions in the Biosphere Reserves of the Yungas (Argentina) and the Upper Bermejo (under assessment, Bolivia)				
	See II.1.1.2. Implementation at farm level of provincial/departmental land regulations				
	II.1.4.4. Forestry-livestock development in Teuco Bermejito	i) To increase income of agricultural producers; ii) to reduce drift from the land, improving the conditions for small producers; and iii) to increase the livestock/forestry production in the province.	15.000	Arg	3 years
II.1.5. Development of tourism	II.1.5.1. Ecotourism corridor Capricornio: integrating conservation of biodiversity and productive development	i) To define and strengthen potential areas of tourism development to the interior of the Bermejo River (Valley of Tarija, Biosphere Reserve of the Yungas, Biosphere Reserve of Teuquito) which are characterized by their natural and productive attractions; ii) to identify the strengths and weaknesses of each of these identified places; iii) to generate training opportunities in the supply of goods and services associated with the tourism activity, promoting transboundary actions; and iv) to make an assessment of the methods and scopes of the transboundary promotion of the area, generating opportunities to promote visits to the identified places.	350	Arg	3 years

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	See I.2.1.3. Integration and implementation of actions in the Biosphere Reserves of the Yungas (Argentina) and the Upper Bermejo (under assessment, Bolivia)				
	II.1.5.2. Sustainable development of the Valle Grande River Basin, Department of Valle Grande, province of Jujuy: restoration of tourism and small works to protect riverbanks and water and sanitation	<ul style="list-style-type: none"> i) To restore the tourism value of the Valle Grande river basin; ii) to execute small works to protect riverbanks; and iii) to perform water and sanitation works. 	1.250	Arg	3 years
	II.1.5.3. Sport Fishing Center in El Cajón – National Flora and Fauna Reserve in Tarija, Department of Tarija, First Section of the province of Arce	<ul style="list-style-type: none"> i) To implement infrastructure for lodging, food and rental of fishing equipment; ii) to train local inhabitants as providers of tourism services in the different required and necessary areas for a good provision of services; and iii) to take promotion and marketing actions to assure the permanent flow of groups of visitors. 	485	Bol	7 months
	II.1.5.4. Sport fishing and recreation module in Santa Clara, Department of Tarija, First Section of the province of Arce	<ul style="list-style-type: none"> i) To implement infrastructure for lodging, food and rental of fishing and recreation equipment; ii) to train local inhabitants as providers of tourism services in the different required and necessary areas for a good provision of services; and iii) to take promotion and marketing actions to assure the permanent flow of groups of visitors. 	215	Bol	7 months
	II.1.5.5. Activation of the Tourism Product Las Juntas de San Antonio, Department of Tarija, First Section of the province of Arce	<ul style="list-style-type: none"> i) To involve the population of the Bermejo River in the tourism activity, particularly in the provision of the service of boat rides from the city of Bermejo to Las Juntas de San Antonio and vice versa; ii) to create a small tourism company for rides in Las Juntas de San Antonio; iii) to implement the necessary infrastructure and equipment for tourism activation in Las Juntas de San Antonio; and iv) to develop business skills in tourism services. 	45	Bol	7 months
	II.1.5.6. Tourism signaling in the Department of Tarija, First Section of the province of Arce (Bermejo and its surroundings)	<ul style="list-style-type: none"> i) To promote and consolidate Tarija as an important referent of the national and international tourism in the South American scope; and ii) to take actions to turn the Bermejo–Tarija road into a tourism road, through the construction of infrastructure related to the signaling of the tourism spaces in the region and the use of spreading and information media. 	260	Bol	4 months

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	II.1.5.7. Exhibition center Chaguaya, Department of Tarija, First Section of the province of Arce	<ul style="list-style-type: none"> i) To develop the necessary infrastructure and equipment to visit the church; ii) to improve the tourism image of Chaguaya as a mystic religious center in the South of Bolivia and the region; iii) to support and motivate the introduction of regional and agricultural products through the provision of appropriate spaces; iv) to encourage and strengthen the presence of local populations and community undertakings in the main visit center; v) to encourage higher tourism expenditure from visitors by facilitating appropriate spaces and conditions for the introduction of local products; vi) to promote the visit center of Chaguaya, adding infrastructures according to the mystic religious spirit that strengthen the local tourism image, that favor local undertakings, and that improve the living conditions of the local population; and vii) to enable a sustainable economic dynamics, specially on weekends when the highest flow of visitors to the sanctuary occurs. 	45	Bol	4 months
	II.1.5.8. Tourism lookout La Angostura, Department of Tarija, First Section of the province of Aviles	<ul style="list-style-type: none"> i) To develop the necessary infrastructure and equipment for the international and departmental tourism transit; ii) to improve the tourism image of Tarija and Valle de Concepción as the most important tourism region; iii) to increase the number of tourism stops in La Angostura, facilitating appropriate conditions and infrastructure to serve groups of travelers and tourists; iv) to encourage and strengthen the presence of local populations and undertakings in the surroundings of the stops used by tourists and travelers; v) to encourage higher tourism expenditure from visitors by facilitating appropriate spaces and conditions for the introduction of local products; and vi) to enable a consistent and stable tourism supply in the marketing of tourism products in Tarija, supported by an infrastructure according to international requirements. 	36	Bol	4 months
	II.1.5.9. Tourism lookout Padcaya, Department of Tarija, First Section of the province of Arce	<ul style="list-style-type: none"> i) To develop the tourism potential of the area of influence through projects that may be articulated or interrelated with other communities that are part of the mystic religious tourism destination of Tarija; ii) to implement tourism infrastructures, equipment and services in the main roads of the region; iii) to support and encourage the improvement of the current services and to strengthen the current tourism supply in the area of Chaguaya and its influence area; iv) to encourage and strengthen the presence of local populations and community undertakings in the development of the tourism activity in the region; v) to promote the development of the tourism activity in the Department of Tarija, through the implementation of tourism infrastructures and equipment to improve conditions for tourism and strengthen the community tourism operation aimed at generating actual alternatives for the development of economic, social and cultural scopes; vi) to promote the community management in the operation stage of the project; vii) to enable a sustainable economic dynamics, resulting from the generation of employment and income for the beneficiaries of the project; and 	85	Bol	4 months

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
		viii) To generate the necessary local technical skills for an appropriate management and operation of tourism and the project.			
	II.1.5.10. Signaling of tourism road to the Sanctuary of Chaguaya	<ul style="list-style-type: none"> i) To develop the necessary traffic police orientation infrastructure for the road to Chaguaya from the Argentinean border; ii) to improve the tourism image of Chaguaya as a mystic religious center in the South of Bolivia with access facilities in accordance with international parameters; iii) to install signaling of the site in Chaguaya to access to important services and attractions in the surroundings for visitors; iv) to promote visits from people not only local but also from the interior of the country and of the entire Argentinean North region, providing appropriate traffic police signaling conditions; v) to support the tourism activities organized to the entire region included in the roads under discussion; vi) to promote the development of tourism activities in the Department of Tarija, through the implementation of tourism signaling to improve conditions for access and circulation and to strengthen the community's tourism operation aimed at generating actual alternatives for the development of economic, social and cultural scopes. 	4	Bol	2 months
	II.1.5.11. Tourism infrastructure of seaside-like resorts, Department of Tarija, City of San Lorenzo	<ul style="list-style-type: none"> i) To have the necessary facilities to optimize the management and marketing of recreational products required by visitors; ii) to favor the participation of the local population in the tourism benefits through employment; iii) to expand the benefits of the local tourism activity throughout the region of Cabecera de Valles; iv) to improve the quality of the local tourism service through the provision of the equipment and facilities required by the visitors interested in recreation at the local resorts; and v) to promote the organization and improvement of the quality of local recreation services. 	52	Bol	5 months
	II.1.5.12. Tourism centers of craft-like products, Department of Tarija, City of San Lorenzo	<ul style="list-style-type: none"> i) To have the necessary facilities to optimize the administration, management, participation and marketing of craft and confectionery products required by visitors; ii) to favor the participation of the local population in the tourism benefits through employment and their participation in management; iii) to expand the benefits of the local tourism activity throughout the region of Cabecera de Valles; iv) to improve and consolidate the food and craft tourism product through the provision of the appropriate facilities to that end; and v) to promote the organization and improvement of the quality of the local production and sale services. 	65	Bol	5 months
	II.1.5.13. Lookout paths and equipment for tour-	<ul style="list-style-type: none"> i) To have the necessary facilities to optimize the administration, management, participation and marketing of products required by visitors; ii) to favor the participation of the local population in the tourism benefits 	45	Bol	6 months

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	ism interpretation, City of Tarija, Comunidad los Pinos	<ul style="list-style-type: none"> through employment and their participation in management; iii) to expand the benefits of the local tourism activity throughout the region of Cabecera de Valles; iv) to improve the local tourism service through the provision of facilities and the determination of routes, equipment and facilities required by visitors interested in performing activities related to the interpretation of nature and/or local culture; and v) to promote the organization and improvement of the quality of the local environmental interpretation service. 			
	II.1.5.14. Training of local nature, cultural and adventure guides in the provinces of Cercado and Méndez in the Department of Tarija	<ul style="list-style-type: none"> i) To develop occupational training courses in accordance with the particular activities of the tourism industry in the region; ii) to favor the participation of the local population in the tourism benefits through employment; iii) to expand the benefits of the local tourism activity throughout the region of Cabecera de Valles; iv) to improve the local tourism service through continuous and appropriate education to the technology development of the sector. 	30	Bol	3 months
	See II.1.1.3. Sustainable development program of the caprine sector in the area of the Quebrada de Humahuaca, province of Jujuy				
	See II.1.1.5. Short-term rural, group and solidary micro-loan program in the Quebrada de Humahuaca in the province of Jujuy				
	II.1.1.15. Craft strengthening	<ul style="list-style-type: none"> i) To promote tourism activities related to the production of indigenous crafts; ii) to develop the craft activity as a commercial alternative based on the cultural knowledge, thus improving the quality of life of families; iii) to create and strengthen a flexible commercial structure to articulate and relate the crafts to the market. 	1.350	Arg	3 years
II.1.6. Management of fishing and aquaculture resources	II.1.6.1. Joint and integrated action plan for the conservation and repopulation of the fishing fauna of the Bermejo River Basin	<ul style="list-style-type: none"> i) To design and support the implementation of a proposal for a joint and integrated action plan for the conservation and repopulation of the fishing fauna; ii) to update the assessment of the fishing resources of the Basin; and iii) to promote marketing. 	200	Bin	30 months

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	II.1.6.2. Fishing research and development center in the Bermejo River Basin	<ul style="list-style-type: none"> i) To implement a fishing research and development center in the Bermejo River Basin; ii) to make studies and researches on fishing training and monitoring (shad); iii) institutional and financing strengthening; and iv) to make a study on the existing biological diversity particularly for the "Protection and sustainable use of fish species of social interest and commercial value in the Bermejo River Basin", artificially reproducing and creating fish to repopulate the Bermejo River. 	850	Bol	No informed
	II.1.6.3. Development of sustainable aquaculture in the Flora and Fauna Reserve of Tariquia at small producer level	To implement demonstrative fish farms with families of small producers, improving the productive conditions for food security and developing the skills of the inhabitants of the influence area of the project.	215	Bol	3 years
	II.1.6.4. Aquatic farming	<ul style="list-style-type: none"> i) To promote aquaculture as a tool for productive diversification; ii) to develop productive poles in wet areas; iii) to favor the development of applied technology; and iv) to provide integral technical assistance to producers. 	780	Arg	66 months

Component: II.2. Integral use of water resources (surface and underground waters)

II.2.1. Drinking water supply	II.2.1.1. Maintenance and adaptation of water taking in Laguna Yema	<ul style="list-style-type: none"> i) To assess the operation of the system of works in Laguna Yema; and ii) to optimize the aspects related to the operation of the hydraulic system in Laguna Yema, through the performance of: <ul style="list-style-type: none"> a) Water demand studies (present and future) of the area served by Laguna Yema; b) Diagnosis of the operation of the current system in water scenarios of average, minimum and maximum years; c) Assessment of the current capacity of the water taking work and comparison with the requirements imposed by the water demand; and d) Reconditioning project of the water taking work to meet the estimated demands based on the short and medium term future scenarios. 	60	Arg	12 months
	II.2.1.2. Extension of the drinking water system in Colonia Linares	Improvement and extension of the drinking water system.	224	Bol	300 days
	II.2.1.3. Extension of the drinking water system in Colonia Barredero	Improvement and extension of the drinking water system.	150	Bol	200 days

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	II.2.1.4. Water infrastructure in the segment between the rivers Bermejo and Bermejito	Supply of drinking water to gathered and scattered urban and rural communities, which develop in a wide segment of the North-West of the province of Chaco, between the rivers Bermejo to the north and Bermejito to the south, the bordering area with the province of Salta to the west and the convergence of both water courses to the east.	160	Bol	10 months
II.2.2. Livestock watering, irrigation supply, agricultural drainage, and other uses	II.2.2.1. Water projects in the province of Salta: dam of Angosto del Mojotoro	Technical review of the existing project of the dam Angosto del Mojotoro to identify areas requiring update and management of financing sources to make the project ready for a bidding process.	200	Arg	18 months
	II.2.2.2. Hydroelectric power generation project through the dam Arrazayal	Researches to identify and update the potential Multiple Purpose Projects in the binational segments of the river, including environmental impact studies and construction alternatives that envisage the application of modern technology.	200	Bin	6 months
	II.2.2.3. Sustainable development of the Perico-Manantiales basin: design and support to the implementation of a regulation and management plan of the basin, evaluation of priority works, determination of the value of the water resource, and improvement of new productive areas	<ul style="list-style-type: none"> a) To prepare a proposal of a regulation and management plan of the water resources of the Perico-Manantiales basin and support its initial implementation; b) to identify priority works; c) to draft the terms of reference for the work profile and environmental and social impact studies; e) to identify the economic-social and financial assessment indicators; and f) to prepare the bidding conditions for works and impact studies and call for bids. 	350	Arg	2 years
	II.2.2.4. Irrigation system in Nogalitos	<ul style="list-style-type: none"> i) To increase the irrigated surfaces in the influence area of the project, fully satisfying the water demand of the proposed crops; ii) to improve, increase and diversify the levels of productivity and agricultural production; and iii) to develop sustained self-management skills between the users for an efficient management of the irrigation system. 	229	Bol	130 days
	II.2.2.5. Irrigation system in Flor de Oro	<ul style="list-style-type: none"> i) To increase the irrigated surfaces in the influence area of the project, fully satisfying the water demand of the proposed crops; ii) to improve, increase and diversify the levels of productivity and agricultural production; and iii) to develop sustained self-management skills between the users for an efficient management of the irrigation system. 	267	Bol	315 days

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	II.2.2.6. Irrigation project in Quebrada Grande	<ul style="list-style-type: none"> i) To add unused agricultural areas to a production system under surface irrigation; 890 ha of crops in two agricultural campaigns/crops per years; ii) to benefit 118 families under poverty situation; iii) to optimize the use of available water and soil resources, improving production conditions and agricultural productivity; iii) to train the beneficiaries of the project in the organization and maintenance of the irrigation system, the management of water at plot level and other productive processes; iv) to diversify the agricultural production and offer the best alternatives of prices and markets; v) to reduce migration indices to other populated centers; vi) to increase the income of farm families with low resources in the project area; and vii) to provide an economically-depressed irrigation area with the outcome of the agricultural and fishing production of the artificial lake. 	11.227	Bol	2 years
	II.2.2.7. Santa Ana river basin	<ul style="list-style-type: none"> i) To implement a management system of natural resources in the Santa Ana River basin, with environmental sustainability purposes; ii) to use the natural resources of the Santa Ana River basin in order to achieve a sustainable economic growth; iii) to look for equality in the effect of actions with the participation of the inhabitants and players of the Santa Ana River basin; and iv) to improve the human development index in the inhabitants of the Santa Ana River basin. 	5.720	Bol	5 years
	II.2.2.8. Use of small water sources and collectors for families' vegetable gardens in the different micro basins of the Bermejo river	<ul style="list-style-type: none"> i) Use of small sources; ii) storage of water through rain water collectors; and iii) implementation of small vegetable gardens for families in critical areas of the micro basins. 	1.218	Bol	3 years
	II.2.2.9. Construction of an irrigation system in the community of San Agustín South in the province of Cercado, Bolivia	<ul style="list-style-type: none"> i) To increase the irrigated surfaces in the influence area of the project, fully satisfying the water demand of the proposed crops; ii) to improve, increase and diversify the levels of productivity and agricultural production; and iii) to develop sustained self-management skills between the users for an efficient management of the irrigation system. 	72	Bol	300 days
	II.2.2.10. Secure water program for a good living in the Upper Bermejo River Basin	<ul style="list-style-type: none"> i) To be aware of the potential of water resources in the whole of the Upper Bermejo River Basin; ii) to rationally use water resources to assure water consumption in the rural communities of the Upper Bermejo River Basin; and iii) to coordinate with local and national players the integrated management of water resources and of the basins in the Planning Unit of the Upper Bermejo River Basin. 	530	Bol	5 years

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	II.2.2.11. Reactivation of the Bellaco System, including a readjustment of the embankment of San Pedro and regulation works in the southwest channel system in Formosa	To construct reactivation works in the Estero Bellaco System.	15.000	Arg	2 years
	II.2.2.12. Management of water surplus between the rivers Bermejo and Bermejito	To construct regulation works and channels for the management of overflows of the Bermejo River.	15.000	Arg	2 years
	II.2.2.13. Main drainage network of springs	To construct drainage works and conduction channels and to use land for crops.	15.000	Arg	2 years
	II.2.2.14. Intaking works and La Quena-Morillo channel	To construct intaking works and the Channel La Quena Morillo.	10.000	Arg	2 years
	II.2.2.15. Supply of the Oro river from the Bermejo River for the use of livestock, agricultural and forestry sectors	To optimize the use, control and preservation of water within the framework of the development of the provincial water and production policy through executed hydraulic works that allow the regulation and sustainable use of water resources in the Oro river basin. To increase productivity by rationally and efficiently using natural resources and the water infrastructure, and improving the organization to solve common problems through technical assistance services that support production.	100	Arg	8 months
	II.2.2.16. Water conduction system for the use of livestock and forestry sectors in the departments of Güemes and Alte. Brown	To supply, optimize the use of, control and preserve water within the framework of the development of the provincial water and production policy through executed hydraulic works that allow the regulation and sustainable use of water resources. To increase productivity by rationally and efficiently using natural resources and the water infrastructure, and improving the organization to solve common problems through technical assistance services that support production.	200	Arg	12 months
II.2.3. Ground water uses	II.2.3.1. Management plan of groundwaters of the Bermejo River Basin	To assess groundwater resources in the Basin for different uses. To make a zoning of the recharge and discharge areas. Management plan of groundwaters.	800	Bin	3 years
II.2.4. Atmospheric waters	II.2.4.1. Water harvesting in Chagwaya and Rosillas	To implement rainwater storage infrastructure for animal consumption and optimized irrigation systems in agricultural production.	388	Bol	1 year

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	II.2.4.2. Water harvesting in critical areas of the Upper Bermejo River Basin	<ul style="list-style-type: none"> i) To implement the necessary infrastructure for harvesting and storing of rainwater and small waterfalls for human consumption and agricultural production to assure food security and sovereignty in the Upper Bermejo River Basin; ii) to optimize water use and management for human consumption and agricultural production; and iii) to train people in water use and management. 	1.590	Bol	1 year
	II.2.4.3. Rural development of Chaco Salteño in relation to the assured water supply (water harvesting)	To establish water sources and certain uses for the productive development of the region. To obtain and conduct water: Surface water harvesting and integral use of groundwater. To identify alternatives of surface water conduction. To achieve productions under irrigation: Agricultural-livestock productions under irrigation of different levels. To achieve fruit-vegetable productions under irrigation.	20	Arg	12 months
	II.2.4.4. Rural storm drains for the area of Peña Colorada	To construct storm drains for the area of Peña Colorada.	5.000	Arg	2 years
II.2.5. Others	II.2.5.1. Navigability of the Bermejo River	To make an update and complete technical study to assess the navigability of the Bermejo River.	200	Arg	2 years

Component: II.3. Application of instruments and development of capacities for environmental management

II.3.1. Payment for environmental services	See III.4.2.1. Determination of the ecological flow in the rivers of the piedmont of the Upper Bermejo River				
II.3.2. Clean development mechanisms	See III.4.3.1. Restoration of forest environments in transformed or degraded critical areas				
	II.3.2.1. Strengthening of capabilities within the framework of the Bermejo River Basin for the implementation of Clean Development Mechanisms (CDM)	<ul style="list-style-type: none"> i) To assess existing capabilities and barriers (for example, rules, technical standards, etc.) to identify and execute potential projects of Clean Development Mechanism (CDM) in the Bermejo River Basin; ii) to strengthen local capabilities, both of the public sector and the civil society (for example, NGOs, peasantry, aboriginal communities, etc.) and the private sector (for example, forestry, energy, etc.), to identify, prepare and implement CDM projects; iii) to identify potential niches of CDM projects, focusing on forestry projects; iv) to support the preparation and submission before the competent national and international authorities of two or four pilot CDM projects (at least 	1.400	Bin	

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
		one by country); v) to support the binational cooperation in CDM projects; and vi) identification of priority sectors and support to the preparation and execution of pilot projects.			
II.3.3. Reduction of carbon emissions	II.3.3.1. Binational initiative for the sustainable management and preservation of dry forests in Gran Chaco Americano	To preserve the dry forests in Gran Chaco Americano, particularly those corresponding to the Bermejo River Basin, from the degradation and transformation processes based on a pilot experience: i) to generate tools and specific technical skills for the conservation and sustainable management of dry forests; ii) to strengthen the legal framework for the conservation and sustainable management of dry forests; and iii) to generate financial instruments to promote the conservation and sustainable management of dry forests.	300	Arg	3 years
	II.3.3.2. Strengthening of capabilities for the implementation of the United Nations strategy for the Reduction of the Emissions Resulting from Deforestation and Degradation of Forests	i) To assess existing capabilities and barriers (for example, rules, technical standards, etc.) to implement, within the framework of the Basin, potential pilot projects for reducing emissions resulting from the deforestation and degradation of Forests under the REDD strategies of both countries; ii) to strengthen capabilities for the preparation and implementation of REDD projects in the Basin; iii) to support the preparation and submission before the competent national and international authorities of two pilot projects (one by country) for the implementation of REDD strategies in the Basin; and iv) to support the binational cooperation and coordination in the implementation of REDD strategies in the Basin.	4.500	Bin	3 years

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
III. REDUCTION IN VULNERABILITIES THROUGH INTEGRATED WATER RESOURCES MANAGEMENT, CONSIDERING CLIMATE VARIABILITY AND CHANGE					
Component: III.1. Prevention and mitigation of erosion, sedimentation and desertification processes					
III.1.1. Creation of a sedimentological monitoring and information system	III.1.1.1. Readjustment and extension of the sediment transportation monitoring network in the flows of the Bermejo River Basin	To extend and optimize the existing network of monitoring nodal points, proposing new measuring stations in strategically located areas. To conduct monitoring campaigns (at least 4 per year) to assess the seasonal variability of the transportation processes of solid materials. To assure the sustainability of the sedimentological network in the short, medium and long term for a continuous enrichment based on information about the Basin's sediments.	1.000	Bin	3 years
III.1.2. Implementation of control measures	III.1.2.1. Design of a protection system against flows in the downstream segment of Lavalle Bridge in the Bermejo River	<ul style="list-style-type: none"> i) To mitigate the effect of flows in the segment of the Bermejo River under study; ii) to take structural actions to contribute to the control of regular and special floods in this segment; and iii) to improve the productivity standards of the influence area of the project by means of the addition to production of areas currently affected by recurrent floods. 	600	Arg	1 year
	III.1.2.2. Cleaning and reactivation of flows in the river system of the Stream Guaycurú	<ul style="list-style-type: none"> i) To improve the conduction capacity of the river system (active flows and paleobeds) of the stream Guaycurú; ii) to assure the availability of good surface water for multiple purposes, specially for livestock use in the influence area; and iii) to contribute to the improvement of productivity standards in the influence area of the project by means of the addition to production of low-lying areas prone to salinization. 	100	Arg	1 year
	III.1.2.3. Sediment control in Tolomosa River Basin	To review and assess the works of solid material retention and erosion control previously executed in the Bermejo SAP. To design new works and/or readjustments to existing ones based on lessons learnt and the guidelines of the Document "Sediments of the Bermejo River Basin."	200	Bol	2 years
	III.1.2.4. Flood control in the city of Tarija	To mitigate the effect of flows in different segments of the city of Tarija located in the neighboring area of the Guadalquivir river valley. To take structural actions to contribute to the control of regular and special floods in this segment.	300	Bol	2 years
	III.1.2.5. Protection of margins against erosion in the Bermejo and Grande Tarija Rivers	To mitigate the effect of erosion of margins in Bermejo and Grande de Tarija rivers. To take structural actions to contribute to the control of erosion and side movement of the watercourse affecting vast urban, peri-urban and rural territories. To improve environmental conditions, urban services and potential production in the influence areas of the rivers to protect.	120	Bol	1 year
	III.1.2.7. Stabilization of the flow of the Bermejo River in the area of Lavalle Bridge	To mitigate impacts on infrastructure works for side migration processes in the segment to study of the Bermejo River. To take structural actions to contribute to stabilize the watercourse to keep it under a reasonably stable fluvial-morphological pattern during different hydrological situations. To improve productivity standards in the influence area of the project through the	150	Arg	1 year

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
		addition to production of areas currently affected by the watercourse ramblings. To minimize maintenance costs of affected structures by erosion and sedimentation phenomena associated with recurring morphological processes developed by the river in this area.			
	See II.1.5.2. Sustainable development of the Valle Grande River Basin, Department of Valle Grande, province of Jujuy: restoration of tourism and small works to protect riverbanks and water and sanitation				
III.1.3. Expansion of knowledge and development of management instruments	III.1.3.1. Tertiary channels for the integral use of the Perico and Grande rivers	To make basic studies of climate, soils, hydrology and water demand in the influence area of the project. To develop water projects of the tertiary channels system integrated to the multiple-use plan of the Perico and Grande rivers. To optimize the production development (mainly agricultural) of the area and to improve the income of the benefitted population.	200	Arg	1 year
	III.1.3.2. Sustainable management of the Blanco or Zenta River Basin	i) To optimize the use, management and control of water resources and sediments in the Blanco or Zenta river basin; and ii) to contribute to the social-economic development of the influence area of the basin, specially in relation to the development of production activities (in particular, agriculture) in the region.	150	Arg	1 year
	III.1.3.3. Readjustment and refunctionalization of the sediment control works in the Iruya and Pescado river basins	To review and assess the behavior of the works of solid material retention and erosion control previously executed in the Bermejo SAP. To design new works and/or adjustments to existing ones based on lessons learnt and the guidelines of the Document "Sediments of the Bermejo River Basin."	150	Arg	3 years
	III.1.3.4. Seminar on sediment control	To give training in sediments and dams to public officers, professionals and people involved in the Project Integral Use of the Bermejo River.	150	Bin	3 months
III.1.4. Dissemination of existing information	See Strategic Area IV				

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
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Component: III.2. Pollution prevention and control and environmental sanitation in water bodies

III.2.1. Monitoring of water quality	III.2.1.1. Readjustment and extension of the Water Quality Monitoring Network in the Bermejo River Basin	To extend and optimize the existing network of monitoring nodal points, proposing new measuring stations to consolidate the network. To conduct monitoring campaigns (at least 4 per year) to assess the seasonal variability of water quality parameters. To assure the sustainability of the network in the short, medium and long term for a continuous enrichment based on information about the water quality of the basin.	400	Bin	3 years
	III.2.1.2. Water Quality Monitoring Network of the Bermejo River Basin and entry of the results into the database of the Environmental Information System	To consolidate the Water Quality Monitoring Network designed and agreed within the framework of the Strategic Action Program (Bermejo SAP) and its addition as one of the components of the Environmental Information System and database of the Bermejo River Basin.	300	Bin	3 years
	III.2.1.3. Strengthening of the APA laboratory	To physically adjust the microbiology sector of the Water Laboratory. To install a biological safety cabin. To purchase instruments and molecular biology reagents. To fine tune analytical techniques. To train the staff. To physically adjust the inorganic sector of the Water Laboratory. To install a gas extraction bell and evacuation of drains liquid from nebulizer. To fine tune analytical techniques. To train the staff. To install a gas chromatograph with specific detectors (NPD and PFPD) and automated sample processing techniques (CombiPal).	280	Arg	1 year
III.2.2. Environmental Sanitation of water bodies	III.2.2.1. Artificial wetlands built as a tool to reduce and prevent water pollution: development of pilot experiences in the Bermejo River Basin	<ul style="list-style-type: none"> i) To find opportunities to execute in the Bermejo River Basin two pilot projects at farm level (one by country): "Artificial wetlands built as a tool to reduce and prevent water pollution;" ii) to provide technical assistance and financial support to the design and execution of two pilot projects to improve water quality; and iii) to establish a mechanism to follow up and assess replication opportunities of the pilot projects under discussion. 	700	Bin	4 years
	III.2.2.2. Integrated management of municipal solid waste: replication of experiences within the framework of a regional strategy and its relationship with the CDM	To replicate MSW management in the cities developed in the SAP (Iruya, Salta) and to evaluate the opportunity to include the topic in the clean development mechanism.	400	Arg	3 years

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	III.2.2.3. Environmental sanitation at the IAB S.A. plant (Bermejo)	i) To implement a system for the treatment of industrial residual waters at the IAB S.A. plant, composed of the following units: a) degreaser; b) anaerobic reactor of ascending flow and sludge blanket RAFA; c) sludge drying beds; and d) overflow and bypass system; ii) internal sewerage project and treatment of domestic residual waters at the IAB S.A. plant, composed of the following units: a) spillway; b) sand trap; c) dump (flow meters); d) baffle reactor; e) outlet chamber; and f) infiltration field.	473	Bol	7 months
III.2.3. Systematization of information on water quality	Included in III.2.1.2. Water Quality Monitoring Network of the Bermejo River Basin and entry of the results into the database of the Environmental Information System				
III.2.4. Training, communications, and information dissemination programs	See Strategic Area IV				

Component: III.3. Risk management, prevention and reduction of natural disasters

III.3.1. Strengthening existing forecasting systems and development of an extreme events alert system	III.3.1.1. Alert prediction system of external natural events as a tool for irrigation management	To consolidate a support system of the decision-making process for the integrated management of water resources based on: a) the timely collection, processing and spreading of information; b) the results of modeling mathematical tools; and c) the irrigation management system.	1.000	Bin	3 years
	III.3.1.2. Adaptation measures to climate variability and change	To strengthen capabilities in the Basin to answer to environmental impacts related to climate variability and change with adaptation actions.	200	Bin	3 years
	III.3.1.3. Creation and consolidation of a Climate Change Network within the framework of the Bermejo River Basin: a pilot experience	To create a climate change network within the framework of University extension network: "Universities towards the integration of borders" (REUNIF) as a pilot experience to protect and add value to the human capital, research and application of appropriate scientific and technological applications aimed at adapting and mitigating the effects of the Climate Change in the bordering subregion.	250	Bin	2 years

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	III.3.1.4. Network of automatic hydrometeorological stations and preparation of a regional proposal for the climate change adaptation project	To generate and provide climate information for the Bermejo River Basin as a technological tool at the service of production and social development of each region, specially focusing on the strengthening of the agricultural and agroindustrial sectors and the mitigation of climate agents that may be present in the climate change.	2.800	Bin	3 years
	III.3.1.5. Integrated management of the project of Tariquia basins, city of Padcaya, Department of Tarija	<ul style="list-style-type: none"> i) To preserve and conserve resources, reverting erosion processes: water, soil and vegetation; ii) to strengthen production bases of local inhabitants for a sustainable agriculture and food sovereignty; iii) to identify natural risks, vulnerability and threats and loss of soils in slopes and banks within the framework of an integrated management of the basin; and iv) to institutionally and organizationally strengthen the management of basins in the National Reserve of Flora and Fauna of Tariquia (Tarija). 	486	Bol	2 years
	III.3.1.6. Integrated management of the San Telmo River Basin, city of Padcaya, Department of Tarija	<ul style="list-style-type: none"> i) To preserve and conserve resources, reverting erosion processes: water, soil and vegetation; ii) to strengthen production bases of local inhabitants for a sustainable agriculture and food sovereignty; iii) to identify natural risks, vulnerability and threats and loss of soils in slopes and banks within the framework of an integrated management of the basin; and iv) to institutionally and organizationally strengthen the management of basins in the National Reserve of Flora and Fauna of Tariquia (Tarija). 	462	Bol	2 years
	III.3.1.7. Management plan of the Salinas river basin	<ul style="list-style-type: none"> i) To strengthen institutional mechanisms for an appropriate control of the participation of people within the framework of an agreement for the sustainable development of the territory; ii) to boost the permanent land regulation and planning with environmental criteria. To jointly formulate an integrated land regulation plan for all the communities of the basin through the use of a community planning technical instrument to govern the sustainable use of natural resources; iii) to become a link between the different executive levels involved in the public and private environmental management, acting as a facilitator of coordination and driver of synergy effects in the area; and iv) to boost formal and informal environmental education processes for different ethnic and social groups of the area. 	487	Bol	2 years
	III.3.1.8. Integrated management plan of the micro basin Rosillas	To promote and strengthen the Integrated Management of Water Resources (GIRH) and the Integrated Management of the Basin (MIC), with the implementation of a set of actions aimed at the sustainable use of natural resources in the basin.	322	Bol	4 months
	III.3.1.9. Integrated management of the Colón river basin	To promote and strengthen the Integrated Management of Water Resources (GIRH) and the Integrated Management of the Basin (MIC), with the implementation of a set of actions aimed at the sustainable use of natural resources in the basin.	373	Bol	4 months

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	III.3.1.10. Integrated management plan of the Tambo river basin	To promote and strengthen the Integrated Management of Water Resources (GIRH) and the Integrated Management of the Basin (MIC), with the implementation of a set of actions aimed at the sustainable use of natural resources in the basin.	477	Bol	4 months
	III.3.1.11. Integrated management plan of the Antigal river basin	To promote and strengthen the Integrated Management of Water Resources (GIRH) and the Integrated Management of the Basin (MIC), with the implementation of a set of actions aimed at the sustainable use of natural resources in the basin.	304	Bol	4 months
	III.3.1.12. Implementation of an integrated management plan of the Rejara river basin	To promote and strengthen the Integrated Management of Water Resources (GIRH) and the Integrated Management of the Basin (MIC), with the implementation of a set of actions aimed at the sustainable use of natural resources in the basin.	324	Bol	4 months
	III.3.1.13. Integrated management plan of the Camacho river medium basin	To promote and strengthen the Integrated Management of Water Resources (GIRH) and the Integrated Management of the Basin (MIC), with the implementation of a set of actions aimed at the sustainable use of natural resources in the basin.	473	Bol	4 months
	III.3.1.14. Integrated management plan of the Yesera river basin	To promote and strengthen the Integrated Management of Water Resources (GIRH) and the Integrated Management of the Basin (MIC), with the implementation of a set of actions aimed at the sustainable use of natural resources in the basin.	545	Bol	4 months
	III.3.1.15. Integrated management plan of the San Agustín river basin	To promote and strengthen the Integrated Management of Water Resources (GIRH) and the Integrated Management of the Basin (MIC), with the implementation of a set of actions aimed at the sustainable use of natural resources in the basin.	442	Bol	4 months
	III.3.1.16. Integrated management plan of the Santa Ana river medium basin	To promote and strengthen the Integrated Management of Water Resources (GIRH) and the Integrated Management of the Basin (MIC), with the implementation of a set of actions aimed at the sustainable use of natural resources in the basin.	457	Bol	4 months
	III.3.1.17. Integrated management plan of the Corana river basin	To promote and strengthen the Integrated Management of Water Resources (GIRH) and the Integrated Management of the Basin (MIC), with the implementation of a set of actions aimed at the sustainable use of natural resources in the basin.	433	Bol	4 months
	III.3.1.18. Agricultural water irrigation zoning	i) Mapping of the agricultural/livestock water irrigation zoning for the impenetrable areas and the south-east of the province of similar characteristics to the zoning works already performed in other regions of the province of Chaco (south-west, Bermejo East); and ii) implementation of a SIG with the products obtained.	100	Arg	1 year
III.3.2. Training, communications and information dissemination programs	See Strategic Area IV				

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
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Component: III.4. Conservation of ecosystems and biodiversity

III.4.1. Protection of ecosystems and management of protected areas	III.4.1.1. Development of an inventory and monitoring program of the biodiversity of the Bermejo River Basin	<ul style="list-style-type: none"> i) To establish a Regional Inventory and Monitoring Program (I&M) of the biodiversity of the Bermejo River Basin (objectives, methodologies, schedule); ii) to generate an institutional agreement and distribution of responsibilities between universities, research centers and organizations of the civil society for the I&M of the different components of biodiversity and land and water ecological systems; iii) to establish a digital periodical publication to update information on I&M of the Bermejo River Basin; and iv) to standardize an itinerant post-graduation course to contribute to the generation of information and the training of human resources in the region of the countries of the basin and of South America. 	200	Bin	3 years
	III.4.1.2. To identify priority areas for the protection of the Gran Chaco Americano and to manage its creation in the Bermejo River Basin	<ul style="list-style-type: none"> i) To identify areas in the ecoregion of Chaco Seco that, given their ecological characteristics, proximity to other forests of neighboring provinces, and financial position, may become areas of strict conservation (natural parks) or of productive uses compatible with conservation of biodiversity (multiple-use reserve); ii) to make a diagnosis document of the identified situation in each area (about five), including a socio-economic characterization and a preliminary zoning proposal; iii) to generate a "roadmap" to reach previous goals, also including management for the acquisition or transfer of the ownership of involved property, the identification of potential financial sources to carry out the management and subsequent implementation of the selected areas; and iv) to integrate the identified conservation areas in the provinces of Salta, Chaco and Formosa in a "network of reserves of the Dry Chaco" having the Bermejo River as conducting or integrating point, thus strengthening its ecological value and its ecotourism promotion. 	100	Arg	3 years
	III.4.1.3. Implementation of the Corridor Tariquia Baritu Calilegua	<ul style="list-style-type: none"> i) To outline a long-term vision and identify the programs and projects that will enable the sustainable development of the populations living in the area of the corridor Tariquia – Baritú – Calilegua; ii) to have a sustainable environmental, economic and socially feasible project portfolio and an implementation strategy to perform activities to contribute with the consolidation process of the corridor "Tariquia – Baritú – Calilegua" in the short term and the maintenance of biological connectivity in the long term; iii) to set the bases to take the necessary steps to turn the "Biosphere Reserve of the Yungas" (RBYUN) into a binational reserve integrated to the World Network of Biosphere Reserves of the UNESCO; and iv) to facilitate the organization and strengthening of management committees of the Corridor. 	5.252	Bin	5 years
	III.4.1.4. Implementation of a management plan of the	<ul style="list-style-type: none"> i) To preserve water sources, natural values (ecosystems, flora and fauna) and the cultural patrimony of the protected area; ii) to contribute to the improvement of the economic and social conditions 	5.253	Bol	5 years

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	Biological Reserve of Sama	<p>of the inhabitants of the protected area through the sustainable use of natural resources;</p> <p>iii) to achieve a coordinated management of the protected area, with the actual participation of the local communities bearing in mind the environment.</p>			
	III.4.1.5. Productive, commercial and institutional strengthening of the association of beekeepers of the Reserve of Tariquía	<p>i) To improve income and food security of rural families, promoting a local economic development based on the management and sustainable production of beekeeping in the Reserve of Tariquia, province of Arce in the department of Tarija; and</p> <p>ii) to strengthen rural social, economic and productive organizations for trading.</p>	139	Bol	2 years
	III.4.1.6. Action plan for the implementation of an interactive network on management and mitigation of risks for the climate change	<p>i) To produce and spread knowledge and information about patterns, causes and risk management of disasters to facilitate the application of forecasts and early alerts;</p> <p>ii) to increase the relevance, effectiveness and efficiency of risk management plans and programs related to disasters and to maximize the use of existing research, networking, spreading and training capabilities in the region; and</p> <p>iii) to strengthen cities and institutions in management and mitigation of global climate change risks.</p>	251	Bol	5 years
	III.4.1.7. Implementation of a management plan of the Flora and Fauna Reserve of Tariquía	<p>i) To preserve water sources, natural values (ecosystems, flora and fauna) and the cultural patrimony of the protected area;</p> <p>ii) to contribute to the improvement of the economic and social conditions of the inhabitants of the protected area through the sustainable use of natural resources;</p> <p>iii) to achieve a coordinated management of the protected area, with the actual participation of the local communities bearing in mind the environment.</p>	4.070	Bol	5 years
	See I.2.1.3. Integration and implementation of actions in the Biosphere Reserves of the Yungas (Argentina) and the Upper Bermejo (under assessment, Bolivia)				
	III.4.1.8. Multiple Reserve in the interfluvio Teuco-Bermejito	To implement a protected area with conservation and sustainable development objectives, focusing on participation. To promote good practices for the management of natural resources and the practice of eco-tourism.	300	Arg	3 years

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
III.4.2. Conservation of biodiversity related to water bodies and to the Basin	III.4.2.1. Determination of the ecological flow in the rivers of the piedmont of the Upper Bermejo River	<ul style="list-style-type: none"> i) To add to the formulation of specific irrigation projects the concept of ecological flow to improve the conservation of the rivers of the Basin, and to add such concept to the applicable specific regulations; ii) to determine the theoretical operation of the rivers based on the distribution of rains and the surface, lithology and geomorphology of the selected basins; and iii) to analyze restoration alternatives of the currently affected flows, bearing in mind their natural dynamics and social and environmental use backgrounds. 	150	Bin	2 years
	III.4.2.2. Creation of the biosphere reserve of the Yungas	To declare a biosphere reserve in the Bolivian sector of the ecological corridor Tariquia-Baritu-Calilegua, to achieve the biological connectivity and the maintenance of the operation of natural systems from this transboundary corridor.	49	Bol	1 year
II.4.3. Rehabilitation and restoration of degraded environments	III.4.3.1. Restoration of forest environments in transformed or degraded critical areas	<ul style="list-style-type: none"> i) To develop and assess appropriate restoration and environmental rehabilitation techniques, focused on forest areas; ii) to identify restoration methods and approaches for wild forest environments in the Basin that may be implemented by local communities and/or replicated at higher levels; and iii) to develop forest CDM pilot projects in the Bermejo River Basin aimed at forest restoration tasks. 	300	Arg	3 years
	See I.2.1.3. Integration and implementation of actions in the Biosphere Reserves of the Yungas (Argentina) and the Upper Bermejo (under assessment, Bolivia)				
	See III.2.2.1. Artificial wetlands built as a tool to reduce and prevent water pollution: development of pilot experiences in the Bermejo River Basin				

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
IV. SOCIAL PARTICIPATION FOR THE PLANNING AND INTEGRATED MANAGEMENT OF THE BASIN					
Component: IV.1. Consolidation of participatory processes					
IV.1.1. Promotion of societal participation	IV.1.1.1. Awareness for public participation	<ul style="list-style-type: none"> i) To promote awareness and public participation through knowledge experiences and change of attitudes in relation to environmental problems; ii) to facilitate the public participation in the different stages and modalities of the projects of the PROBER; and iii) to encourage a creative dialogue in the different levels of public organizations and organizations of the civil society about the objectives of the COBINABE to include the social participation in the different instances: planning, execution and assessment of results of the different projects of the PROBER. 	250	Bin	3 years
	IV.1.1.2. Access to environmental information	<ul style="list-style-type: none"> i) To facilitate access to substantive information of the Basin to the community by means of the implementation and operation of an Environmental Information Integrated System; ii) to promote the active commitment of the competent public institutions in the different jurisdictions to the private sector and to the civil society in the search of solutions of critical environmental issues and in the design and execution of concrete actions; and iii) to promote access of mass communication media to the information related to the sustainable management of the Basin. 	150	Bin	3 years
	IV.1.1.3. Consolidation of participatory processes in the implementation of the Biosphere Reserve and the Ecological Corridor	<ul style="list-style-type: none"> i) To promote awareness and social participation in the management of the RBYUN and the Corridor Tariquía-Baritú-Calilegua; ii) to promote the joint management, between the different players, of the construction sector of the RBYUN and the Ecological Corridor as a concrete entity for the players; iii) to strengthen a feeling of belonging of the players of the RBYUN and the Ecological Corridor; iv) to promote in the local communities a better knowledge, interest and support of the benefits of the RBYUN and the Ecological Corridor; and v) to promote the implementation of the Transboundary Biosphere Reserve. 	200	Bin	2 years
	IV.1.1.4. Spreading of the integral use project of the Bermejo River Basin	To inform the community and key players about the integral use project of the Bermejo River Basin to install it socially.	100	Bin	1 year
IV.1.2. Generation of capacities for societal participation	IV.1.2.1. Creation of participation spaces	<ul style="list-style-type: none"> i) To strengthen the management of the Basin and the participation opportunities and capabilities of the different government players and of the civil society; ii) to promote a higher and better involvement and active participation of the civil society in the sustainable development of the Basin as an essential component for the improvement of the quality of life; iii) to institutionalize the shared responsibility and the necessary contribution of the government and academic, civil organizations and of private 	150	Bin	1 year

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
		<p>players in the execution of the PROBER; and</p> <p>iv) to promote or strengthen the participatory spaces and procedures in the execution of the PROBER, in the different stages of planning, management and assessment of activities and projects.</p>			
	IV.1.2.2. Representativity of the civil society	To assure the representativity of all the affected and/or interested groups in the Basin in participatory processes, aiming at including aboriginal groups and the most vulnerable sectors in the design and execution of the projects.	150	Bin	No informado
	IV.1.2.3. Institutional strengthening for participation	<p>i) To strengthen the COBINABE and the main institutions of the Basin (specially, those responsible for the management of water and environmental resources) to include public participation processes;</p> <p>ii) to strengthen the institutional networks of national and jurisdictional governments within the framework of the Basin for their participation in the PROBER;</p> <p>iii) to strengthen the public participation of the organizations of the civil society, the users of resources and interested private sector; and</p> <p>iv) to strengthen the socio-environmental management and decision-making process of the base organizations, municipalities and local institutions in relation to the management of water resources, the conservation and sustainable management of natural resources and the contribution to the improvement of the quality of life of the inhabitants.</p>	150	Bin	2 years

Component: IV.2. Environmental education

IV.2.1. Formal environmental education	IV.2.1.1. Addition of the environmental problem issues to the development of the curricula of the teaching education institutes of the Upper Bermejo River Basin, Argentina	<p>i) To favor the addition of the own environmental concepts of the Bermejo River Basin and its influence areas to the curricula of the teaching education institutes of the Upper Bermejo River Basin, contextualizing school environmental education and promoting continuous training;</p> <p>ii) to develop in the inhabitants of the region of the Bermejo River Basin a feeling of belonging to a "common basin", using the river as the axis of a water culture, promoting a positive and responsible attitude in the appropriate management of natural resources and in the joint search of solutions to the current needs to prevent human participation that may endanger the environment; and</p> <p>iii) to operate within the formal education system, particularly higher institutions, to train teachers of teachers with the purpose of spreading and promoting the contents related to water management and the integrity of the basin to the students of higher education (future teachers), and in its turn, to generate the conditions in order that these institutions may train and keep teachers updated in the practice of primary and high school levels.</p>	100	Arg	1 year
	IV.2.1.2. Addition of the environmental problem issues to the development of the curricula to carry out –through	<p>i) To favor the addition of the own environmental concepts of the Bermejo River Basin and its influence areas to the curricula of the teaching education institutes of the Low Bermejo River Basin, contextualizing school environmental education and promoting continuous training;</p> <p>ii) to develop in the inhabitants of the region of the Low Bermejo River Basin a feeling of belonging to a "common basin", using the river as the axis</p>	100	Arg	1 year

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	them- training at the schools of the Low Bermejo River Basin, Republic of Argentina	<p>of a water culture, promoting a positive and responsible attitude in the appropriate management of natural resources and in the joint search of solutions to the current needs to prevent human participation that may endanger the environment;</p> <p>iii) to operate within the formal education system, particularly higher institutions, to train teachers of teachers with the purpose of spreading and promoting the contents related to water management and the integrity of the basin to the students of higher education (future teachers), and in its turn, to generate the conditions in order that these institutions may train and keep teachers updated in the practice of primary and high school levels; and</p> <p>iv) to complete pending actions of the Environmental Education Program for the Bermejo River Basin, developing the following guidelines: teacher training at 125 primary education schools, distribution of didactic materials to schools and development of institutional education experiences.</p>			
	IV.2.1.3. Environmental education program	<p>i) To make the necessary adjustments in other that the environmental problems of the Bermejo River Basin include the problem issues identified in the cross reference topic Environmental Education;</p> <p>ii) to train teachers of primary and high school levels for the implementation of the Environmental Education Program; and</p> <p>iii) to prepare informative materials for teachers and students for dealing with the environmental problems of the Basin to support the development of the curricula, strengthening the other courses.</p>	250	Bin	3 years
	IV.2.1.4. Training of trainers and teachers of private schools of the basin	To educate teachers and the education community on the whole in the integrated management of natural resources and the search of solutions to favor a better quality of life.	100	Arg	3 years
IV.2.2. Informal environmental education	IV.2.2.1. Institutional synergy	<p>i) To strengthen the experience gained and actions already taken within the framework of the SAP (results, lessons learnt and good practices);</p> <p>ii) to strengthen the technical skills of the organizations involved in sustainable productive processes and technologies and other environmental issues, associated with the rest of the projects and actions that are part of the PROBER;</p> <p>iii) to deal with the problems through the application of new, concrete and long-lasting solutions; and</p> <p>iv) to strengthen the existing synergy between the different involve organizations related to the environmental management of the Bermejo River Basin, and between them and the civil society, mainstreaming the treatment of the environmental problems of the Basin.</p>	200	Bin	3 years
	IV.2.2.2. Promotion of environmental education actions in the inhabitants of the Basin	To promote environmental education programs and activities between all the inhabitants of the Bermejo River Basin to strengthen their feeling of belonging to a “common basin” and an integrated region.	100	Bin	3 years

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
IV.2.3. Building awareness on environmental matters	IV.2.3.1. Commitment of the civil society	<ul style="list-style-type: none"> i) To promote environmental awareness and sensitivity in the inhabitants of the Basin, strengthening the knowledge on weaknesses of ecosystems and the effects of the reduction of environmental functions and services; ii) to strengthen communication actions to support and position the idea that the sustainable development and nature protection are beneficial for the development and quality of life of the inhabitants of the Basin; iii) to promote the modification of the inhabitants' attitudes and habits in relation to the actions generating a detriment to the environment; and iv) to create long-term alliances with institutions related to the environmental management and protection. 	100	Bin	2 years
	IV.2.3.2. Environmental awareness campaign	<p>To design and validate an environmental awareness project through the promotion of knowledge and the awareness of the different social, political and economic players on the environmental consequences of an inappropriate management of the natural resources of the Department of Tarija, in Bolivia, producing a favorable change of attitude towards sustainable development.</p> <p>To contribute to the creation of a friendly relationship between the population of the Department of Tarija and its natural environment, through the modification of perceptions, attitudes and habits related to the environment.</p>	150	Bin	1 year
	IV.2.3.3. Awareness and access to the environmental information – materials and spreading instruments	To develop informative materials (videos, tutorials, brochures, publications, etc.) as supporting instruments to the education programs and actions in EA, water culture, sustainable development and regional integration. To promote access to information related to environmental education to all sectors of the community to create awareness about the need of a Latin American integration from the environmental protection view.	160	Bin	3 years

Component: IV.3. Systematization of information, dissemination, and communication

IV.3.1. Dissemination of information and communication	IV.3.1.1. Communication and editorial strategy	<ul style="list-style-type: none"> i) To design and implement a strategy to spread information and develop communication processes, identifying priorities, addressees, instruments and programming; and ii) to spread main and relevant activities for the PROBER through the edition and publication of reports/documents. 	200	Bin	3 years
	IV.3.1.2. Institutionalization of a communication area in the COBINABE	<ul style="list-style-type: none"> i) To organize, implement and manage a communication area within the structure of the COBINABE; and ii) to manage the databases and institutional information and technical documentation of the COBINABE and the information provided by the COREBE and OTNPB and the information produced by the PROBER. 	150	Bin	18 months
IV.3.2. Development of new communications channels	IV.3.2.1. Information network and environmental spreading	<ul style="list-style-type: none"> i) To create and operate a virtual space through an email and website network; and ii) to promote the sharing of information, make inquiries, spread events and share experiences between people, institutions and organizations which develop activities in the Bermejo River Basin related to environmental issues or the management of natural resources. 	50	Bin	1 year

Action Line	Project Name	Objectives	Estimated amount (thousand US\$)	Scope (*)	Term
	IV.3.2.2. Promotion of new communication channels	i) To encourage relations with different communication media to achieve the multiplying effect of the spreading of information; and ii) to motivate the creation and integration of information networks and forums to promote the social participation in the management of the Bermejo River Basin.	100	Bin	2 years

(*) Arg: Argentina | Bol: Bolivia | Bin: Binational

