



Binational Commission for the Development of the Upper  
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SAP  BERMEJO

strategic action program for the binational basin of the bermejo river

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PROGRAMA  
ESTRATEGICO  
DE ACCION  
≈ PARA LA CUENCA DEL ≈  
RIO BERMEJO





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STRATEGIC ACTION PROGRAM  
for the BINATIONAL BASIN of the BERMEJO RIVER

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## **PART I. FRAMEWORK, DIAGNOSIS AND JUSTIFICATION OF THE PROJECT**

### **1. INTRODUCTION**

#### **1.1 The project for preparation of the SAP**

The project for a «Strategic Action Program for Binational Basin of the Rio Bermejo»<sup>1</sup> is the result of technical and financial assistance provided in October 1996 by the Council of the Global Environmental Facility (GEF) to the governments of Argentina and Bolivia. This grant of US\$2,990,000 was supplemented with additional financing from the United Nations Environment Program (UNEP) of US\$150,000 and from the Organization of American States (OAS) of US\$75,000. The governments of Bolivia and Argentina together provided counterpart funding amounting to a total of US\$2,510,000. Preparation of the SAP was a joint effort by the governments of Argentina and Bolivia, working through the Binational Commission for Development of the Upper Basin of the Rio Bermejo and the Rio Grande de Tarija. The work was carried out in both countries, beginning in August 1997 and concluding in December 1999. The executing agency has been the OAS, which is responsible for administering the funds provided to the project by the GEF through UNEP.

The principal objective of the project was to prepare a Strategic Action Program (SAP) as an instrument for working with the responsible local institutions towards the sustainable development of the binational and inter-jurisdictional basin of the Rio Bermejo, by incorporating environmental concerns into development policies, plans and programs for This paper describes the priority actions identified by the two countries as necessary to deal with the principal environmental problems and their transboundary manifestations, and reflects the results of a participatory process of consultation. It also establishes the institutional framework and commitments for carrying out these actions, and assesses the financing needs for the projects and items selected for development. It therefore paves the way to proceeding with the next phase, the implementation of the program.

This Strategic Action Program for the Binational Basin of the Rio Bermejo will be systematically reviewed and updated during the course of its implementation, in light of new knowledge and the ongoing evaluation of its performance through monitoring of sustainable development indicators and the efforts of the inter-jurisdictional institutional mechanisms that are part of the program.

#### **1.2. Geographic location and political division**

The Rio Bermejo Basin is located in southern Bolivia, in

the department of Tarija, and in northern Argentina, where it embraces portions of the provinces of Chaco, Formosa, Jujuy and Salta. Figure 1 shows location of the basin within the South American continent, and figure 2 outlines its political and administrative divisions.

#### **1.3. Institutional framework for the preparatory stage of the SAP project**

The binational nature of the basin and the federal structure of government organization in Argentina give the Rio Bermejo basin an inter-jurisdictional character that makes for a highly complex institutional setting for the project. The following levels of government are involved:

- Binational:
  - Comisión Binacional para el Desarrollo Sustentable de la Alta Cuenca del Río Bermejo y Grande de Tarija (the "Binational Commission")
- Regional:
  - Argentina: Comisión Regional del Río Bermejo<sup>2</sup>
  - Bolivia: Comisión Nacional de los Ríos Pilcomayo y Bermejo
- Provincial level:
  - Argentina Governments of the Provinces of Chaco, Formosa, Jujuy and Salta
- Departmental and Municipal level:
  - Bolivia Prefecture and Municipalities of the Department of Tarija<sup>3</sup>.

Table 1.1 summarizes the main governmental areas with responsibility for managing water and other natural resources.

##### **1.3.1. The Binational Commission**

The Binational Commission for Development of the Upper Basin of the Rio Bermejo and the Rio Grande was created through a treaty, signed on June 9, 1995, for the purpose of cooperating in programming economic and social development and managing the natural environment of the region in a manner that would be sustainable overtime. The Commission has the legal status of an international entity, it enjoys autonomy in its technical, administrative and financial management, and it has the legal capacity to acquire rights and contract obligations, in the area of the upper basin of the Rio Bermejo and the Rio Grande de Tarija as far as their confluence at Juntas de San Antonio. The Binational Commission is financed by the governments of Argentina and Bolivia and acts in representation of the two governments, which have given it sufficient authority to perform all actions necessary in carrying out its duties.

<sup>1</sup> Formal name of the Project, according to the documentation establishing it.

<sup>2</sup> Regional body consisting of the Federal Government, the provinces of Chaco, Formosa, Jujuy and Salta, which border on the basin, and the provinces of Santa Fe and Santiago del Estero.

<sup>3</sup> Municipalities of Cercado, Mendez 1ª Sección, Avilés 1ª Sección, Arce 1ª and 2ª Sección, Gran Chaco 2ª Sección and O'Connor.



**Table Nº 1.1 Bermejo River Basin – Government Institutional Framework for the preparatory stage of the Project**

<b>AGENCY</b>	<b>FUNCTION/SCOPE</b>	<b>ACTION PLAN / JURISDICTION</b>
Binational Commission	Coordination and pursuit of cooperative projects between the two countries for developing water resources of the upper basin of the Rio Bermejo and the Rio Grande	Binational. Its responsibilities are limited to projects expressly agreed by the two countries
Comisión Regional del Rio Bermejo	Promote the integrated development and management of water resources of the Rio Bermejo, coordinating cooperation between the federal and provincial levels in the greater Rio Bermejo region	Argentina Provinces of Chaco, Formosa, Jujuy and Salta, Santiago del Estero and Santa Fé
Comisión Nacional de los Ríos Pilcomayo y Bermejo.	Formulate national policies and strategies for exploiting the waters of the Pilcomayo and Bermejo rivers. Coordinate and participate as the national representative in multilateral studies and projects	Bolivia. Basins of the Pilcomayo and Bermejo Rivers
Secretariat of Natural Resources and Sustainable Development <sup>4</sup>	Nationwide competence for natural resources, in areas designated by the national Constitution	National – Argentina
Ministry of Sustainable Development	Nationwide competence for natural resources policy	National - Bolivia
Ministries of Foreign Affairs	Competence(Bolivia)/Involvement (Argentina) in external policy issues relating to shared water and natural resources. Involvement in bilateral and multilateral environmental agreements	Bolivia Argentina
Provincial Agencies	Primary policy responsibility for managing water and other natural resources	Provinces of Chaco, Salta, Formosa, Jujuy
Prefecture of the Department of Tarija.	Competence in environmental issues under the Administrative Decentralization Law of Bolivia. Undertakes projects and studies related to natural resources and their sustainable exploitation	Department of Tarija Bolivia
Municipalities in the basin	Powers delegated by the municipal division of the national territory. Water supply, environmental sanitation and micro-irrigation	Department of Tarija, Bolivia
Municipalities	Limited roles in natural resource and environmental management	Region of the Basin. Argentina
National Technical Agencies	Specialized in the operation of hydrometeorological and water quality networks, and technical support for water resources, agricultural technology and other areas. (SENAMHI, INTA , INA)	Bolivia Argentina

<sup>4</sup> With the recent installation of a new constitutional government in Argentina, on 10/12/99, this agency has been modified and its powers and functions reassigned within the new ministerial structure.

### 1.3.2. Governmental agencies

Table 1.2, in Annex I, presents a summary of the governmental agencies involved in managing the waters and other natural resources of the basin. In Argentina, management of these resources falls under the jurisdiction and competence of the provincial governments, reflecting the fact that natural resources are the preserve of the provinces (art. 124 of the national Constitution), while in Bolivia the national government is responsible.

The large number of governmental organizations involved in managing the area's natural resources means that management of water resources is fragmented sectorally and dissociated from other natural resources. There is no proper horizontal or vertical articulation and the flow of information essential for proper coordination is inadequate. There is much overlapping and conflict and frequent gaps among functions, responsibility areas, programs and activities. This has been indicated as one of the basic causes of problems detected during the diagnosis, and institutional coordination constitutes one of the priority objectives of the SAP.

### 1.3.3. Nongovernmental organizations

In addition to the government agencies noted above, there are a large number of nongovernmental organizations (NGOs), for the most part nonprofit groups, with an interest in various aspects of water resource management in the Rio Bermejo basin. Table 1.3 in Annex I lists the principal NGOs that have specific areas of interest in the basin's development, like natural resources conservation, community development assistance or environmental protection. The presence of these organizations is a factor that augurs well for the activities proposed under the SAP: they represent potential execution and cooperation partners in their areas of interest, and they have qualified human resources with a vast range of specialties and geographic coverage within the basin.

## 1.4. Activities and work conducted during preparation of the SAP

Preparation of the SAP involved a set of 18 working elements, arranged under 6 broad thematic areas. The contents of the various studies and the results achieved are presented in Annex II. They may be summarized as follows:

(i) Transboundary regional diagnosis, with local and regional sectoral studies relating to the generation and transport of sediments, water quality, environmental zoning, integral management of water resources, the legal and institutional framework, and transboundary population migrations, water quality assessment; mathematical modeling of sediment

transport in the upper and lower basin in Argentina; diagnosis of the legal and institutional framework for environmental issues in the basin. The principal result of the Transboundary Diagnostic Analysis was to identify the environmental problems affecting the basin, their transboundary manifestations and the direct and basic causes underlying them.

(ii) Cartographic work. Availability of digital cartography at a scale of 1:250,000 for the entire basin, in a GIS environment, relating to geology, susceptibility to the production and transport of sediments in the upper basin through surface erosion and mass-movement processes.

(iii) The Public Participation Program. This was developed on several fronts: there was broad participation by institutions, specialists and organizations from the region in developing the project's activities; regional workshops were held on the project along its development; consultation and communication mechanisms were promoted and organized with civil society organizations and experts in the region, facilitating their articulation with the use of email; a Web page was set up with regularly updated information about the project. It is to be noted that in Argentina a Governmental Working Group for Formulation of the SAP (GTGPEA)<sup>5</sup> was established as the principal mechanism for participation and consultation with provincial governments.

(iv) Pilot demonstrations. An important phase of the preparatory process was a series of pilot demonstrations relating to erosion control and sediment transport in the Tarija valley, sustainable management practices in mountainous and piedmont areas of the Yungas, forage management and weed control in the Humid Chaco, removal of barriers to sustainable development in the Dry Chaco and Humid Chaco and environmental education in Formosa.

(v) Survey of projects and programs. An inventory of plans, programs, projects and initiatives for economic, social and natural resource development at the regional level was compiled showing the level of execution.

(vi) Formulation of the Strategic Action Program. The studies and work referred to above were taken as the basis for identifying the strategic areas and elements of action that form the framework and content of this Strategic Action Program.

## 2. TRANSBOUNDARY DIAGNOSIS, IDENTIFICATION OF PRIORITY AREAS FOR STRATEGIC ACTION

This section summarizes the results of the transboundary diagnostic analysis and the various

<sup>5</sup> Made up of representatives of government agencies for water and natural resources and the environment in the provinces of Chaco, Formosa, Jujuy and Salta, the Argentine Delegation to the Binational Commission for the Upper Rio Bermejo Basin and the Regional Commission for the Rio Bermejo.

items of work performed during the preparatory stage, indicated in the preceding section.

## 2.1. Social-geographic vision of the basin

The basin of the Rio Bermejo, shared by Argentina and Bolivia, is an important area of the Rio de la Plata region. It embraces some 123,200 km<sup>2</sup>, of which about 11,900 km<sup>2</sup>, or 10 percent, belongs to the Bolivian portion and the rest to the upper and lower basin in Argentina. Figure 3 shows the principal drainage system. The River itself has a length of about 1300 kilometers and passes through the entire extent of the huge Chaco plain, serving as a link between two important geographic features of southern South America: the Andes Ranges and the Paraguay-Parana river system. In this way, it provides a corridor connecting the biotic elements of the Andean mountains and the Chaco Plain. There is an exceptional diversity of habitats all along the course of the river, as well as great potential for human development and the sustainable exploitation of its resources. Erosion and sedimentation are serious problems, and studies have shown that the Rio Bermejo produces about 90 percent of the sediment that flows into the Rio de la Plata through the Paraguay-Parana river system.

This extensive basin contains urban centers and areas of widely differing degrees of social, agricultural, commercial and industrial development, many of which produce goods of national significance. The department of Tarija, for example, produces wine and beverages, fruits and vegetables, and sugarcane; areas of the Chaco and Formosa produce cotton; fruits and vegetables are grown around the city of Oran in Salta, and sugarcane in the vicinity of Salta and Jujuy. Extensive livestock operations, including cattle, sheep and goats, are widespread in a great part of the basin. Crops such as soybean are gaining growing importance in the piedmont zone of the upper basin in Argentina, and their spread has a major impact on soil and forest management; rice growing, for which there is good potential in the area of the lower basin, places a high seasonal demand on the water supply and requires sound water and soil management that will have to be closely monitored.

Natural resource degradation (severe soil erosion and desertification) can be found to varying degrees in much of the basin, and in large parts of many areas soil productivity is low. This is one of the significant factors leading to low levels of income, temporary migration by workers and small producers, which in turn results in the general neglect of rural establishments and in unsustainable farming practices.

The population suffers from low levels of income, and indicators of education, health and sanitary conditions

are among the lowest anywhere in the two countries. A large proportion of the population, estimated at 1.2 million, is below the poverty line. Among this group, the indigenous population is most disadvantaged, followed by rural workers and small-scale agricultural producers who migrate each season in search of employment.

Despite its potential and its strategic location within the southern regional market, the basin overall is much less developed than other areas of the two countries. This reflects in part a long history of extractive exploitation of forests and natural pasture lands: the unsustainable use of these resources has diminished biological diversity and has severely limited the natural regeneration of native species.

In short, the Rio Bermejo basin has, on one hand, an enormous supply of natural resources and an advantageous geographic position, as well as urban centers with a relatively high level of development. On the other hand, it suffers from a high degree of social and environmental vulnerability, typified by the loss of natural resources, the soil and the native forest, severely limited supplies of surface and underground water, and deteriorating living conditions for its population, due to the weakness of markets and the isolation of wide areas and groups. These problems have a transboundary impact.

## 2.2. The principal transboundary problems

In the course of preparing and compiling<sup>6</sup> the Transboundary Diagnostic Analysis for the basin, six major environmental problems were identified, covering the major environmental concerns in the basin, particularly those of transboundary significance, as summarized in table 2.1.

## 2.3. Principal basic causes

On the basis of information gathered directly during preparation of the diagnosis, it was concluded that the principal problems identified Table 2.1 at basin level, are related to a set of political, institutional and economic factors that contribute to their aggravation and that constitute a growing threat to the stability, conservation and sound management of natural resources, protection of the environment and the generation of sustainable development projects in the basin. A number of human-induced<sup>7</sup> Basic Causes (Specific to the problem or Common to all problems) as lying at the origin of the chain of causal relationships that determine these problems were identified. This list reflects a view that emerged during preparation of the transboundary diagnostic analysis and consultation procedures that were carried out.

Table 2.2 presents in simplified form the causal relationship inherent to the bio-geophysical and social situation of the basin and shows how this relationship

<sup>6</sup> This relates to the integration of the ideas and visions collected in the various regions of the basin at the basin level.

<sup>7</sup> This does not imply disregarding the conditioning role of the natural environment on the manner in which anthropogenic causes ultimately make themselves felt in the major problems identified. But it is unsustainable forms of human intervention in nature that are their determining causes.

results in the problems identified and gives them a transboundary impact. In the Transboundary Environmental Diagnosis these specific and common basic causes are described in greater detail.

#### 2.4. Forecasting scenarios with and without the SAP

The existence of demands, conflicts and requests for action and the information compiled into the documentation produced during formulation of the SAP point out to a high degree the social and environmental vulnerability of the Rio Bermejo basin, demonstrated by the weakness of its markets, its isolation and marginality, in the context of plentiful natural resources and of a society that is in general characterized by poverty and by economic and social behavioral factors that are degrading the human and natural habitat.

To cope with this situation, a series of major projects are being planned in response both to regional demands, particularly in the MERCOSUR area in which the basin is located, and to global demands, as part of the process of economic restructuring that has been underway during the last decade. The most dynamic and well-functioning sectors are transport and energy, and to a lesser extent agro-industry. Inter-ocean

transport corridors, transboundary gas, oil and multi-purpose pipeline networks, works for regulating water flows and generating hydroelectricity, large-scale agricultural development, the resurgence of mining using state-of-the-art technology, are all examples of major works resulting from this process.

It may be expected that these investment projects will have major impacts on natural resources and their conservation and management, as well as on the functional structure of population. Two possible scenarios may be forecasted under these conditions:

- a) The State maintains the current situation without change, or intervenes only modestly through the regulatory framework governing natural resource use. In this case, the consequences and impacts listed in Table 2.2 would be aggravated, with consequently growing damage to the environment and the population.
- b) The second, more favorable, scenario would result from successful implementation of the measures called for in this SAP, the general and specific objectives of which are to promote sustainable development by addressing the basic causes of environmental problems and establishing a management framework that will ensure the sustainability of development initiatives.

**Table 2.1 PRINCIPAL PROBLEMS. TRANSBOUNDARY MANIFESTATIONS AND QUANTIFICATION OF THE PROBLEM**

ENVIRON. PROBLEMS	EFFECTS AND SYMPTOMS	TRANSBOUNDARY MANIFESTATIONS	QUANTIFICATION OF THE PROBLEM
I. Soil degradation. Intense erosion and desertification processes	<ul style="list-style-type: none"> <li>- High sediment content in surface waters.</li> <li>- Silting up of reservoirs.</li> <li>- Increased rate of salinization.</li> <li>- Reduced natural productive capacity of soils.</li> <li>- Loss of organic matter.</li> <li>- Reduced farming and livestock productivity.</li> <li>- Loss of productive areas.</li> <li>- Increase in areas affected by desertification.</li> <li>- Lower water retention capacity.</li> <li>- Increased erosion</li> </ul>	<p>Increased sediment transport, impacting on fluviomorphological dynamics and on the utilization of the basin's water resources, the formation process of the Parana Delta and navigation channels in the Rio de la Plata.</p> <p>Increased transboundary migration within and beyond the basin, because of reduced productivity of the land and advancing desertification which affects incomes, particularly among small-scale producers</p>	<p>About 22 percent of the basin's total surface area is critically affected by erosion.</p> <p>Erosion processes (surface erosion and mass movement) that contribute sediments to the Rio Bermejo arise mainly in active areas of the upper basin where human influence is currently slight. Measurements show that the upper Rio Bermejo and Rio Grande account for 24 percent, the Iruya-Pescado system 49 percent, and the San Francisco 20 percent of the total sediment carried by the Rio Bermejo to the lower basin. In the lower basin, surface erosion is mainly related to human activity. Its contribution to sedimentation in the Rio Bermejo is insignificant. Areas showing signs of desertification represent approximately 18 percent of the total basin.</p>

**Table 2.1 Continued**

ENVIRON. PROBLEMS	EFFECTS AND SYMPTOMS	TRANSBOUNDARY MANIFESTATIONS	QUANTIFICATION OF THE PROBLEM
<p>II. Water scarcity and availability restrictions</p>	<ul style="list-style-type: none"> <li>- General shortage of water during dry periods, both for human consumption and for farming and livestock use.</li> <li>- Reduced area under irrigation.</li> <li>- Low levels of production and productivity.</li> <li>- Seasonal employment for farm labor.</li> <li>- High percentage of population without access to drinking water.</li> <li>- Health problems.</li> <li>- Conflicts over uncontrolled water use in the dry season.</li> <li>- Limitations on water use in the rainy season.</li> </ul>	<p>Temporary or permanent transboundary migration within and beyond the basin, reflecting limitations on the pursuit of domestic and productive activities, affecting incomes and living conditions and fostering transience.</p> <p>Potential conflicts over water use, because of variations and limitations in the usable flow</p>	<p>The high variability of the hydrological regime (85 percent of the flow occurs in a few months), sediment concentrations exceeding 10 kg/m<sup>3</sup> and fluviomorphological dynamics severely constrain intakes design and development of water resources in water-deficient regions.</p> <p>Seasonal hydrological variability: Oct. Dec. 14-15% of annual flow, January March April 63-75% . Low flows April-September</p> <p>Water deficit during the dry season is severe or very severe for approximately 31 percent of the basin's total area.</p> <p>In the ecoregions of the semi-arid Chaco and Bolivian portion of the Yungas a high percentage of the rural and urban population has no access to drinking water.</p> <p>Sediments carried by the rivers of the upper basin: approximately 1200 tons/km<sup>2</sup> year in the Rio Grande, 1700 tons/km<sup>2</sup> year in the upper Rio Bermejo, 12,500 tons/km<sup>2</sup> year in the Iruya River and 700 tons/km<sup>2</sup> year in the San Francisco.</p>
<p>III. Degradation of water quality</p>	<ul style="list-style-type: none"> <li>- High levels of organic, bacterial, chemical and probably agro-chemical pollution in certain reaches of the basin's rivers.</li> <li>- High sediment content in watercourses of the basin.</li> <li>- Increased salinity.</li> <li>- Destruction of habitat for aquatic flora and fauna.</li> <li>- Fish mortality.</li> <li>- Presence of infectious diseases from consumption of contaminated water and foods.</li> <li>- Limitations on water use</li> </ul>	<p>Growing transport of organic, microbiological and other polluting agents of health concern, from urban, industrial or even agricultural origin, with growing impact on water use, human health and aquatic ecosystems.</p> <p>Massive transportation of sediments affecting water use in the basin and beyond, in the Parana-Rio de la Plata systems</p>	<p>Soil salinization: because of poor management, approximately 7 percent of the basin's surface suffers from critical salinity levels, primarily in the floodplain of the Dorado, del Valle rivers, the Quirquincho marshes, areas around Rivadavia and headwaters of the Guaycuru.</p> <p>Water quality: at 41 sites sampled in the department of Tarija, 28 showed some degree of pollution. In Argentina, of 14 sites sampled, 2 sites in the province of Salta on the Bermejo and San Francisco and 4 sites in Jujuy were unfit for human consumption because of total and fecal coliform counts.</p>

**Table 2.1 Continued**

ENVIRON. PROBLEMS	EFFECTS AND SYMPTOMS	TRANSBOUNDARY MANIFESTATIONS	QUANTIFICATION OF THE PROBLEM
II Destruction of habitats, loss of biodiversity and deterioration of biotic resources	<ul style="list-style-type: none"> <li>- Changed dynamics of wildlife populations and their area of distribution and development.</li> <li>- Reduced populations of wildlife (flora and fauna).</li> <li>- Reduced biological properties of soils, restricting their use for farming and livestock.</li> <li>- Loss of natural scenic beauty.</li> <li>Increase in invasive woody vegetation.</li> <li>- Increase in domestic clearings.</li> <li>- Impoverished structure and composition of species and functions of forests and pasture lands.</li> <li>- Fish mortality.</li> <li>- Loss of wetlands.</li> </ul>	<p>Impact on distribution and transboundary dynamics of wildlife populations, with significant changes to the natural heritage and balance of the basin's ecosystems, particularly land and water biological corridors.</p>	<ul style="list-style-type: none"> <li>a) Endangered Species. More than 11 species of flora, more than 18 species of fauna. Together, 14 percent of the basin shows signs of biodiversity loss.</li> <li>b) Deforestation: apparent in lands suitable for agriculture, in nearly all the ecoregions. The large ecological units showing critical signs of deforestation account for roughly 14 percent of the total basin. The forested surface converted to agriculture represents 7 percent of the basin.</li> <li>c) Overgrazing occurs on more than 60 percent of pasture lands in the Eastern Cordillera of Bolivia. Large units showing significant to very serious overuse of vegetation cover, including overgrazing, cover approximately 61 percent of the basin.</li> <li>d) Woody invasive shrubs, (primarily vinal), especially in the center of Formosa.</li> <li>e) Degradation through overuse, situation is critical in all ecoregions, but to a lesser extent in the Humid Chaco.</li> <li>f) Protected natural areas: acceptable protection levels found in only 2 of 21 protected sites.</li> <li>g) Domestic bare-lands are frequent. Large units with severe bare-lands occurrence cumulatively amount 9 percent of the total basin. The areas most affected are the Rio Bermejo divagation region, la Almona and the vicinity of Sauzalito.</li> </ul>
V. Conflicts arising from flooding and other natural hazard events	<ul style="list-style-type: none"> <li>- Loss of human life and population displaced by flooding, in both urban and rural areas.</li> <li>- Losses in productive activities from flooding, drought, frost and hail.</li> <li>- Losses from deterioration of infrastructure and rural and urban facilities.</li> <li>- Chronic indebtedness of producers</li> </ul>	<p>Loss of urban and rural habitability, infrastructure and equipment leads to migration and loss of production and productivity in the region, affecting living conditions.</p> <p>Possible inter-provincial conflicts</p>	<p>Lower basin: Two large units affected by Rio Bermejo overflows, in the vicinity of the junction with the Bermejito; in the floodplain of the Paraguay River and of the Dorado and Del Valle rivers, and in the low land region of the Eastern Chaco and Formosa. These critical conditions, at the large unit level, occur in approximately 8 percent of the total basin.</p> <p>Critical urban points: city of Tarija, city of Bermejo in the piedmont region and parts of the Quebrada de Humahuaca on the San Francisco River, and in the lower basin, where they become isolated. Extremely high flows in 1984 in the province of Chaco resulted in the flooding of about 390,000 hectares.</p>

**Table 2.1 Continued**

ENVIRON. PROBLEMS	EFFECTS AND SYMPTOMS	TRANSBOUNDARY MANIFESTATIONS	QUANTIFICATION OF THE PROBLEM
<p>VI. Diminished quality of life and endangered cultural resources.</p>	<ul style="list-style-type: none"> <li>- Low indices of human development.</li> <li>- High percentages with Unmet Basic Needs (UBN).</li> <li>- Presence of endemic diseases and increased numbers of people at health risk.</li> <li>- Presence of poverty and extreme poverty among broad sectors of the population.</li> <li>- Low capacity for self-management.</li> <li>- Decline in traditional cultural values and education</li> </ul>	<p>The valley exports population as a result of low living standards.</p> <p>Domestic and international migration in search of better living conditions, from the Bolivian sector of the basin into northern Argentina, Buenos Aires and other places, and from the Argentine sector towards major population centers.</p> <p>Changes in practices and customs of the expelling and receiving populations, with frequent under-utilization of human potential in the latter case.</p>	<p>Health conditions. A 48 percent of the basin's population in Argentina and 37 percent in Bolivia has no medical coverage. The infant mortality rate is 24-34/000 and 44-74/000 respectively.</p> <p>Migratory movements. 42 percent of the rural population in the Bolivian basin has moved at least once, and of these half went to Argentina. While Argentine provinces in the basin receive migrants from neighboring countries, they are as a whole exporters of population to the major cities.</p> <p>The Argentine sector of the basin has 37% of the population with UBN, being 31.8 % in rural areas. In the Bolivian sector, the population with UBN is 64.1 %, and in rural areas this proportion rises to 90.2 %</p> <p>Population with UBN in the Basin amount to 41,7%.</p> <p>UBN percentages in the Argentine basin, by province, are: Chaco 53 %, Formosa 37 percent, Jujuy 34 percent and Salta 35 %.</p> <p>The provincial illiteracy rate in the Argentine basin exceeds 6 percent in all cases.</p> <p>The percentage of substandard dwellings in Argentina exceeds 48 percent.</p>

**Table N° 2.2: Priority Environmental Problems, Effects and Symptoms, Causes<sup>8</sup> and Strategic Actions**

ENVIRON. PROBLEMS	EFFECTS AND SYMPTOMS	DIRECT CAUSES	BASIC CAUSES	STRATEGIC ACTIONS (+)
I. Soil degradation. Intense erosion and desertification processes	<ul style="list-style-type: none"> <li>- High sediment content in surface waters.</li> <li>- Silting up of reservoirs.</li> <li>- Increased rate of salinization.</li> <li>- Reduced natural productive capacity of soils.</li> <li>- Loss of organic matter.</li> <li>- Reduced farming and livestock productivity.</li> <li>- Loss of productive areas.</li> <li>- Increase in areas affected by desertification.</li> <li>- Lower water retention capacity.</li> <li>- Increased erosion</li> </ul>	<p>Adverse natural characteristics: susceptibility of soils to erosion, torrential rains concentrated in a few months, topography with sharp slopes and geomorphological instability.</p> <p>Destruction of vegetation cover by overgrazing and deforestation.</p> <p>Destruction of natural vegetation through occupation of land for agricultural purposes (clear-cutting and slash and burn).</p>	<p>Specific Basic Causes. Improper use of soil without considering its suitability.</p> <p>Unsustainable forestry and sylvopastoral practices.</p> <p>Common Basic Causes (*see list at end of Table)</p>	<p>DSA: b5, c1, c2, b1, c3,d3,</p> <p>CSA: a1, a2, a3, a4, a5, a6,a7, a8,d1, d2, d4</p> <p>ISA: b2, c4, c5</p>
II. Water scarcity and availability restrictions	<ul style="list-style-type: none"> <li>- General shortage of water during dry periods, both for human consumption and for farming and livestock use.</li> <li>- Reduced area under irrigation.</li> <li>- Low levels of production and productivity.</li> <li>- Seasonal employment for farm labor.</li> <li>-High percentage of population without access to drinking water.</li> <li>- Health problems.</li> <li>-Conflicts over uncontrolled water use in the dry season.</li> <li>- Limitations on water use in the rainy season.</li> </ul>	<p>Pronounced seasonality of rainfall from east to west, concentrated in a few months of the year.</p> <p>Reduced flows during the dry season.</p> <p>High sediment content in the Rio Bermejo.</p> <p>High fluviomorphological dynamics.</p> <p>Exhaustion of aquifers.</p> <p>High salinity content in the underground waters in certain portions of the basin.</p> <p>Relief limitations.</p> <p>Inadequate hydrological infrastructure.</p>	<p>Specific Basic Causes. Inefficient exploitation of water resources.</p> <p>Low use of existing potential. Inadequate infrastructure for regulation, irrigation and drinking water.</p> <p>Limited knowledge of surface and underground water sources and development potential.</p> <p>Inadequate financial resources for implementing existing water supply projects for irrigation and other uses.</p> <p>Inadequate legal and institutional framework for managing water resources</p> <p>Common Basic Causes (*)</p>	<p>DSA: c4, c1, c2, b5</p> <p>CSA: a1, a2, a3, a4, a5, a6,a7, a8,d1, d2, d4</p> <p>ISA: b4, c5</p>

<sup>8</sup> **Common Basic Causes:** resulting from the political, institutional, social and economic structure as the common root causes or origin of the problems identified.

**Specific Basic Causes:** identifies specific or particular manifestations of Basic Causes applied to the problem, those that are most significant or representative of the complex network of causal relations

**Direct Causes:** directly or finally responsible, emerging from a complex system of underlying factors.



Table Nº 2.2: Continued

ENVIRON. PROBLEMS	EFFECTS AND SYMPTOMS	DIRECT CAUSES	BASIC CAUSES	STRATEGIC ACTIONS (+)
III. Degradation of water quality	<ul style="list-style-type: none"> <li>- High levels of organic, bacterial, chemical and probably agro-chemical pollution in certain reaches of the basin's rivers.</li> <li>- High sediment content in watercourses of the basin.</li> <li>- Increased salinity.</li> <li>- Destruction of habitat for aquatic flora and fauna.</li> <li>- Fish mortality.</li> <li>- Presence of infectious diseases from consumption of contaminated water and foods.</li> <li>- Limitations on water use</li> </ul>	<ul style="list-style-type: none"> <li>Soil degradation and erosion.</li> <li>Dumping of raw or semi-treated sewage from urban centers directly into watercourses.</li> <li>Industrial pollution in certain stretches of rivers.</li> <li>Pollution caused by improper livestock and farming management</li> </ul>	<ul style="list-style-type: none"> <li>Specific Basic Causes. Inadequate or unenforced pollution control standards.</li> <li>Inadequate sanitation infrastructure.</li> <li>Financial weakness of institutions responsible for administering sanitary sewer systems.</li> <li>Inadequate health education and awareness among the community.</li> <li>Inadequate information on water quality</li> </ul>	<ul style="list-style-type: none"> <li>DSA: b4, b5</li> <li>CSA: a1, a2, a3, a4, a5, a6, a7, a8, d1, d2, d4</li> <li>ISA: b1, b2, c1, c2, c3, d3</li> </ul>
			Common Basic Causes (*)	
IV. Destruction of habitats, loss of biodiversity and deterioration of biotic resources	<ul style="list-style-type: none"> <li>- Changed dynamics of wildlife populations and their area of distribution and development.</li> <li>- Reduced populations of wildlife (flora and fauna).</li> <li>- Reduced biological properties of soils, restricting their use for farming and livestock.</li> <li>- Loss of natural scenic beauty.</li> <li>- Increase in invasive woody vegetation.</li> <li>- Increase in domestic clearings.</li> <li>- Impoverished structure and composition of species and functions of forests and pasture lands.</li> <li>- Fish mortality.</li> </ul>	<ul style="list-style-type: none"> <li>Deforestation of native woodlands.</li> <li>Uncontrolled and indiscriminate hunting and fishing.</li> <li>Uncontrolled increase in forested areas cleared for agriculture.</li> <li>Farming and forestry practices such as clear-cutting, slash and burn, planting on slopes, etc.</li> <li>Overgrazing.</li> <li>Increase in water pollution<sup>9</sup></li> </ul>	<ul style="list-style-type: none"> <li>Specific Basic Causes. Lack of land-use planning.</li> <li>Rules governing protection and use of soils, water, flora and fauna are inadequately applied and harmonized.</li> <li>Lack of biodiversity management plans.</li> <li>Weakness in the management and administration of protected areas.</li> <li>Unsustainable farming, forestry and sylvo pastoral practices.</li> <li>Inadequate understanding of native flora and fauna.</li> </ul>	<ul style="list-style-type: none"> <li>DSA: b1, b2, c5, c3, b4, d3</li> <li>CSA: a1, a2, a3, a4, a5, a6, a7, a8, d1, d2, d4</li> <li>ISA: c1, c2</li> </ul>
			Common Basic Causes (*)	

<sup>9</sup> See causal relation corresponding to Problem III

Table Nº 2.2: Continued

ENVIRON. PROBLEMS	EFFECTS AND SYMPTOMS	DIRECT CAUSES	BASIC CAUSES	STRATEGIC ACTIONS (+)
V. Conflicts arising from flooding and other natural hazard events	<ul style="list-style-type: none"> <li>- Loss of human life and population displaced by flooding, in both urban and rural areas.</li> <li>- Losses in productive activities from flooding, drought, frost and hail.</li> <li>- Losses from deterioration of infrastructure and rural and urban facilities.</li> <li>- Chronic indebtedness of producers</li> </ul>	<ul style="list-style-type: none"> <li>Exceptional climatic phenomena.</li> <li>Extraordinary flood peaks on rivers.</li> <li>Use of flood-prone areas for urban expansion.</li> <li>Extension of farming to unsuitable areas.</li> <li>Destruction of vegetation cover along shorelines and at the headwaters of rivers and creeks</li> </ul>	<p>Specific Basic Causes.</p> <ul style="list-style-type: none"> <li>Unplanned and uncontrolled urban and rural development.</li> <li>Limited control and protection infrastructure, both in rural and urban areas.</li> <li>Lack of integral watershed management plans.</li> <li>Lack or inadequate application of emergency plans for natural disasters.</li> </ul> <p>Common Basic Causes (*)</p>	<p>DSA: b3, c1</p> <p>CSA: a1, a2, a3, a4, a5, a6, a7, a8, d1, d2, d4</p> <p>ISA: c2, c4, c3, c5</p>
VI. Diminished quality of life and endangered cultural resources.	<ul style="list-style-type: none"> <li>- Low indices of human development.</li> <li>- High percentages with Unmet Basic Needs (UBN).</li> <li>- Presence of endemic diseases and increased numbers of people at health risk.</li> <li>- Presence of poverty and extreme poverty among broad sectors of the population.</li> <li>- Low capacity for self-management.</li> <li>- Decline in traditional cultural values and education</li> </ul>	<ul style="list-style-type: none"> <li>Seasonal unemployment and under-employment.</li> <li>Inadequate income levels.</li> <li>Inadequate access to health, sanitation and education services</li> </ul>	<p>Specific Basic Causes.</p> <ul style="list-style-type: none"> <li>Inadequate support infrastructure to production (irrigation, roads, electricity etc.).</li> <li>Inadequate infrastructure for sanitation and water supply.</li> <li>Limited and deteriorated natural resources: soils, water and vegetation.</li> <li>Inadequate development of the region's natural potential.</li> </ul> <p>Common Basic Causes. (*)</p>	<p>DSA: c4, b4, c3</p> <p>CSA: a1, a2, a3, a4, a5, a6, a7, a8, d1, d2, d4</p> <p>ISA: b1, c1, c2, d3, b3</p>

(\*) Common Basic Causes:

1. Inadequate political, legal and institutional framework
2. Inadequate planning and coordination within and between jurisdictions.
3. Inadequate awareness, commitment and participation by the community and failure to promote such participation.
4. Inadequate financing and support mechanisms.
5. Inadequate access to and use of sustainable technologies

(+)

DSA: Direct Strategic Actions (directly related to the problem and its basic causes)

CSA: Common Strategic Action (common to all problems and basic causes)

ISA: Indirect Strategic Action (related indirectly to the problem and its basic causes).

By ensuring that development projects are based on sound decision-making, technically, economically, and environmentally sound solutions can be designed to take account of the basic pillars of sustainable development, in terms of economic efficiency, social equity and ecological integrity, within the context of participation and consultation involving all stakeholders in government and in civil society. In this way, unwanted economic, social and environmental effects can be foreseen and mitigated within a framework of reasonable consensus. This scenario also calls for attempts to reverse the obvious social, economic and environmental trends identified, and thereby gradually to overcome the region's current fragility.

## **PART II. THE STRATEGIC ACTION PROGRAM**

### **3. OBJECTIVES OF THE SAP**

#### **3.1. General objective of the SAP**

The general objective of the Strategic Action Plan is to promote sustainable development in the binational and inter-jurisdictional basin of the Rio Bermejo, by (i) incorporating environmental concerns into the development policies, plans and programs of the various jurisdictions, (ii) instilling an integrated approach to the basin and the management of its natural resources, (iii) promoting the establishment of mechanisms for regional articulation and coordination and for public participation and consultation, through (iv) programs, projects and actions that will (v) prevent and resolve environmental degradation and the unsustainable use of natural resources, and (vi) foster the adoption of sustainable practices in natural resource management.

#### **3.2. Specific objectives**

- a) To constitute a frame of reference for regional harmonization and coordination of transboundary efforts undertaken by the various jurisdictions in the basin, while facilitating the work within each jurisdiction, thereby contributing to the harmonious and sustainable management of the basin's natural resources.
- b) To deepen and keep up-to-date the environmental diagnosis of the basin in order to identify, dimension and georeference priority transboundary environmental problems and their related sector issues.
- c) To strengthen the management of water resources and other natural resources and protection of the environment in the various jurisdictions of the basin.
- d) To promote establishment of a proper planning system

and mechanisms for consultation and coordination among the various jurisdictions within each country, and for the basin as a whole.

- e) To promote the incorporation of transboundary environmental concerns into development policies, plans and programs for the basin.
- f) To conduct a systematic series of pilot demonstration activities to obtain the information needed to implement the SAP and keep it up-to-date.
- g) To assist in introducing, strengthening and making use of public consultation and participation instruments in planning and developing projects of general interest in the basin, to ensure that they are environmentally sustainable and socially appropriate.
- h) To implement prevention and remediation activities and projects to deal with priority transboundary environmental problems: soil erosion and degradation, declining water quality, habitat destruction and loss of biodiversity, flooding and other natural disasters, and deteriorating living standards.
- i) To undertake activities and projects for the sustainable exploitation of water resources within the context of an integrated approach to natural resources management within the basin.
- j) To promote public awareness activities

### **4. POLICY FRAMEWORK**

As a result of preparing the transboundary diagnosis, identifying the principal transboundary problems and their direct and basic causes, all within the framework of a public participation and consultation process that was maintained throughout the project, a set of principles and policies has been defined that give expression to the vision and demands of the regions and that provide a context for proposing priority activities. Along with the strategic areas of action identified, these will determine the overall frame of reference for decision-making and, in particular, for defining the objectives and contents of the activities and projects to be undertaken through this program.

The principles adopted are those that reflect and expand on a basic consensus about the need for integrated management of water resources through a basin-wide approach. These principles were worked out in a series of international meetings<sup>10</sup> at the global and Latin American level, and are based on recognition of water as an integral part of the ecosystem, a finite and vulnerable natural resource, and an economic and social good.

The policies that the various stakeholders in this Strategic Action Program agree to undertake in pursuit of its objectives, and in full respect for those principles, are those described in Annex II.

<sup>10</sup> Among others:

Action Plan for the Sustainable Development of the Americas, Santa Cruz de la Sierra, Bolivia, December 8, 1996.  
 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Inter-American Dialogue on Water Resource Management, Miami, 1994; Buenos Aires, 1996; Panama 1999.  
 Conference on Evaluation and Management of Water Resources in Latin American and the Caribbean, San José, Costa Rica, May, 1996  
 International Conference on Water and the Environment: Development Issues for the 21<sup>st</sup> Century, Dublin, January 1992.  
 Agenda 21 - United Nations Conference on Environment and Development, Rio de Janeiro, Brazil, July 1992.

## 5. THE STRATEGIC ACTION FRAMEWORK AND PRIORITY ACTIONS OF THE PROGRAM

### 5.1. The strategic action framework

The ideas and views that were collected throughout the basin have been used to organize into four strategic areas the priority actions that must be undertaken to meet the general and specific objectives of the SAP. These strategic actions have been defined with a view to mitigating the environmental problems identified and attacking the basic anthropogenic causes through efforts at institutional development and strengthening, environmental prevention, protection and rehabilitation, and public awareness and participation. To these are added actions in support of the sustainable development of natural resources, intended to foster the conditions needed for improving living standards in the basin.

Table 5.1 presents the strategic actions that make up each of the four areas of action identify. The relationship between these strategic actions, as responses to the Principal Environmental Problems, and their direct and basic causes is shown in Table 2.2.

Following are details of the strategic action areas defined for implementing the SAP.

#### 5.1.1 Institutional development and strengthening for integrated planning and management of the basin.

This strategy is intended to overcome weaknesses in the political, legal and institutional framework and in the capacity of organizations to guide the development process in the region under conditions of sustainability, by developing an appropriate framework for the integrated management of the basin's water resources.

To this end, special attention is devoted to upgrading and strengthening existing binational and regional entities and thereby establishing forms of organization and inter-jurisdictional capacities suited to carrying out the functions of a basin-wide agency, both at the regional level and in each of the countries, depending on the form of political organization in each.

At the same time, it is intended to develop and strengthen the various aspects involved in integrated planning and management of natural resources in the basin, such as those relating to a regional legislative framework, jurisdictional and sectoral coordination, environmental information, economic instruments and planning in terms of integrated

management, environmental zoning and land-use planning.

#### 5.1.2. Environmental prevention, protection and rehabilitation

The strategy calls for strengthening mechanisms of prevention and control of the principal phenomena causing environmental degradation in the basin, as they affect the availability of habitats and biodiversity, the aptitude of natural resources and the quality of water, as well as conflicts resulting from flooding and other disasters.

Conservation of nature, prevention and control of erosion and water pollution therefore constitute the strategic focus of this area of action. In this context, it also includes specific actions related to consolidating the system of protected areas in the basin, mitigating the effects of flooding and other natural disasters, and cleaning up watercourses.

#### 5.1.3. Sustainable development of natural resources

The pressing need to improve living standards for the local population calls for efforts to develop and make sustainable use of natural resources that will give meaning to the institutional development, preventive and remediation measures that are required to ensure those conditions of sustainability, and which are addressed by the other strategic areas. The implementation of projects for the use and exploitation of water resources, which is central to the strategy, is based on three other fundamental aspects that will provide a suitable context for structural development efforts: integrated management of the basin's natural resources, access to and use of sustainable technologies, and research into the management and exploitation of natural resources.

In particular, an Integrated Water Management Program for the basin is to be established as a basic planning instrument to guide future activities in the basin, all within a context of strengthening institutions at all levels.

#### 5.1.4. Public awareness and participation

This strategic action area addresses one of the basic causes identified, by promoting informed and participatory decision making processes, by i) strengthening public access to information, ii) promoting awareness at all levels of the community, through environmental education and training, and iii) ensuring active community participation in planning and implementing development activities and managing natural resources.

**Table 5.1 STRATEGIC ACTIONS**

<p>A Institutional development and strengthening for integrated planning and management of the basin</p>	<p>A1 Upgrading and strengthening of the Binational Commission as a basin-wide agency for the integrated and sustainable management of water resources in the Rio Bermejo basin, with the effective participation of the provinces in Argentina, the prefecture of Tarija and the municipalities with jurisdiction in the Bolivian portion of the basin.</p> <p>A2 Development, harmonization and enforcement of a legislative framework for sustainable use and conservation of natural resources</p> <p>A3 Introduction of effective mechanisms for sectoral and jurisdictional coordination and articulation.</p> <p>A4. Implementation and strengthening of an environmental information system for the basin</p> <p>A5 Formulation and implementation of integral watershed management plans, environmental zoning and land-use planning as basic instruments of the planning system.</p> <p>A6 Institutional strengthening at all levels for integrated management of natural resources and the environment.</p> <p>A7 Strengthening and/or development of economic instruments and financing mechanisms</p>
<p>B Environmental prevention, protection and rehabilitation</p>	<p>B1 Protection of biodiversity and the natural heritage.</p> <p>B2 Strengthening and consolidation of the system of protected areas in the basin.</p> <p>B3 Implementation of mitigation plans for flooding and other natural hazard events of climate origin.</p> <p>B4 Pollution prevention, control and environmental cleanup of watercourses.</p> <p>B5 Prevention and control of erosion and sedimentation</p>
<p>C Sustainable development of natural resources</p>	<p>C1 Development and implementation of integral watershed management plans. Formulation of the Integrated Management Program for Water Resources of the Basin.</p> <p>C2 Implementation of sustainable management programs for natural resources of watersheds</p> <p>C3 Development, validation and application of appropriate technologies, management practices and sustainable productive models.</p> <p>C4 Implementation of projects for sustainable development and use of water resources.</p> <p>C5 Research for the management and exploitation of natural resources</p>
<p>D Public awareness and participation</p>	<p>D1 Strengthening public participation in the planning and implementation of development activities and the management of natural resources.</p> <p>D2 Environmental education and training programs for civil society.</p> <p>D3 Dissemination of sustainable production technologies.</p> <p>D4 Public dissemination of information in support of decision-making processes</p>

## 5.2. Strategic actions

Within this Strategic Action Framework, this section discusses the elements that make up the Action Program in the form of priority actions that are considered necessary in the various jurisdictions, levels and sectors within the basin. This set of actions will provide technical, social, institutional, legal and financial responses to the priority problems of the basin, and it gives expression to the views that were gathered and assembled from different parts of the basin.

They have been produced as the result of an analytical process that has involved the preparation of studies, the execution of demonstration projects, surveys and assessments undertaken as part of a Working Program that was carried out by both countries in a coordinated fashion. During that process, proposals, demands and viewpoints were surveyed and consulted<sup>11</sup> in the various regions, and these were compiled for each country, and subsequently for the basin as a whole. The survey of development and environmental plans, programs, projects and initiatives undertaken in the basin recorded more than 300 items in the two countries.

The program therefore consists essentially of non-structural actions aimed at institutional development, environmental protection and prevention, sustainable management of natural resources, and public awareness and participation. It also includes infrastructure projects on a medium and small scale, associated with immediate regional needs for protection and exploitation of water resources. Finally, it contains a set of research activities and studies identified as necessary for the sustainable management of the resources.

The Strategic Action Program is designed as a long-term instrument intended to foster far-reaching policies and measures within the region. Achieving the program's objectives and developing the proposed strategies is a process that will be continuously adjusted and enriched during the course of implementation, in light of new or better information and the successes and difficulties experienced. This highlights the dynamic character of the proposed programming, which will be constantly refined and improved through a permanent process of feedback.

Given its scope, the proposed program includes both regional activities that embrace the basin in its

entirety, including territories under the jurisdiction of the Argentine provinces in the basin and the prefecture of Tarija in Bolivia, and others that are limited to localized areas of the basin. The activities of a non-structural nature relating to institutional development and planning are essentially of a regional character, and they will involve coordinated participation by governmental and civil society organizations in the various jurisdictions.

The incorporation of infrastructure projects was the subject of special consideration. With a few exceptions, the water infrastructure projects surveyed during the SAP project that have progressed satisfactorily<sup>12</sup> have been based on decision-making procedures and environmental legislation prevailing within each jurisdiction. These pre-date the SAP and their development, harmonization and adaptation is the principal objective of the program now proposed. It is indeed the central purpose of the SAP to help establish conditions within the basin that will ensure the sustainability of development initiatives, in regional terms, and it is in this context that suitable project selection criteria consistent with this condition can be established in the future.

Recognizing that there are asymmetries in current environmental legislation and decision-making procedures among the various jurisdictions<sup>13</sup>, and in light of the region's needs with respect to water resource development, the Strategic Action Program will include a series of small and medium-scale structural activities showing suitable progress level, that were accorded priority by the various jurisdictions. It is understood that their development and execution will be undertaken in the context of the objectives and policies established by the SAP, i.e. consistent with sustainability criteria that call for projects to be subjected to decision-making processes based on participation and consultation with all stakeholders, in addition to satisfying technical, economic and environmental conditions that will ensure their feasibility and guarantee their sustainability. Insistence on this condition will be stronger the greater are the regional effects of the works, as in the case of the larger projects identified, and in particular in the Las Pavas, Arrazayal and Cambari Multiple-Use Projects programmed by the two countries.

Table 5.2 presents a summary of the basic contents of the strategic action areas and the fundamental concepts underlying the priority activities selected.

<sup>11</sup> Surveys, workshops and regional meetings, elaborations resulting from various items of the Work Program. Annex III details the inventory of development and environmental national plans, programs and projects surveyed in various parts of the basin

<sup>12</sup> Only projects that had moved beyond the feasibility stage were considered for possible inclusion in the program.

<sup>13</sup> This refers essentially to the existence of informed decision-making processes for projects of general interest, environmental impact assessment procedures, and public consultation participation and an environmental legal framework regulating the use and protection of natural resources.

**TABLE Nº 5.2 Summary of the Strategic Framework and Priority Actions of the SAP**

CONCEPT OF THE STRATEGY	CONCEPTS OF PRIORITY ACTIONS
<b>A) Institutional Development and Strengthening for Integrated Planning and Management of the Basin</b>	
<p>Resolve weaknesses in the policy, legal, institutional framework and the capacity of organizations to guide development in the basin under conditions of sustainability, by developing an appropriate framework for integrated management of water resources in the basin as a whole, through:</p>	<p>Includes efforts to develop institutions with responsibility for managing water and other natural resources at the different levels and jurisdictions, introduction of regional coordination and programming mechanisms and functions within the scope of the existing binational and regional institutions that will insure active participation by the provincial governments in Argentina and by the prefecture in Bolivia, and promote progress towards establishment of a «basin agency», with broad participation. This also includes strengthening the capacities of the organizations involved.</p>
<p>a) Upgrading and strengthening of existing binational and regional entities.</p>	<p>a) Development of a regional legal framework and harmonization of the different jurisdictions. Regionally, to establish common criteria for managing shared water resources, in terms of quality and quantity, and at each jurisdictional level, for harmonizing aspects of common interest contained in the respective legal frameworks governing the use and protection of natural resources and the environment. Among the priority aspects are general environmental legislation, water standards, environmental impact assessment procedures, public participation and access to information.</p>
<p>b) Appropriate implementation of the functions of a basin-wide agency, both at the binational level and in each of the two countries, depending on the form of political organization, in order to harmonize and apply a legal framework compatible with SAP objectives, in Argentina with the effective participation of provincial governments, and in Bolivia with the prefecture of Tarija and the municipalities.</p>	<p>b) Sectoral and jurisdictional articulation of the various organizations with interests in the basin.</p>
<p>c) Develop and strengthen the various aspects involved in planning and integrated management of natural resources of the basin, such as the regional legislative framework, jurisdictional and sectoral coordination and articulation, environmental information, economic instruments, integrated management plans, environmental zoning and land-use planning.</p>	<p>c) Strengthening the planning system, with a view to formulating integrated management plans for water resources, prevention and control of erosion and pollution, land-use plans for each jurisdiction, etc.</p>
<p>d) Formulation of an Integrated Management Program for the Basin's Water Resources, as a basic planning tool to provide a framework for future activities in the basin, all within the context of institutional strengthening at all levels.</p>	<p>d) Implementation of an integral environmental information system that will provide a regional context for information generated in the various jurisdictions, and will make this available to different users.</p>
<p>d) Formulation of an Integrated Management Program for the Basin's Water Resources, as a basic planning tool to provide a framework for future activities in the basin, all within the context of institutional strengthening at all levels.</p>	<p>e) Development and promotion of economic and financial instruments, and the incorporation of environmental and social issues into project evaluation, so as to take account of the economic, social and environmental value of water and natural resources, moving in this way towards objective evaluation mechanisms that will ensure sustainability and social equity in development efforts.</p>
<b>B) Environmental Prevention, Protection and Rehabilitation</b>	
<p>Strengthening mechanisms of prevention and control of the principal phenomena causing environmental degradation in the basin, as they affect the availability of habitats and biodiversity, the aptitude of natural resources and the quality of water, as well as conflicts resulting from flooding and other natural disasters</p>	<p>Includes a series of activities in specific areas in need of nature conservation, protection or remediation of environments, biodiversity, water quality and soil quality (erosion and desertification) and measures to prevent and protect against floods and other natural disasters.</p>
<p>The principal focus is on conservation of nature, prevention and control of erosion and water pollution. To this end it calls for strengthening and consolidating the system of protected areas, the management of buffer zones and efforts to mitigate the effects of flooding and other natural disasters, as well as to clean up watercourses.</p>	<p>The priority actions here are:</p>
<p>As one of the various focus of the transboundary strategy, measures to control and reduce the impact of sediment transfer will be proposed</p>	<p>a) Consolidation of the protected areas of Sama and Tariquia in Bolivia and of Baritu, Calilegua, El Rey and Teuco in Argentina, as part of the regional system, which includes biological networks and corridors for protecting water resources. A trust fund in support of the administration of protected areas is proposed.</p> <p>b) Definition, consolidation and development of buffers zones around protected areas.</p> <p>c) Prevention of soil erosion in critical areas, to help reduce the production and control the transport of sediments. Concrete actions will include integrated management of micro-basins and sub-basins in critical areas.</p> <p>d) Flood protection projects in Bolivia and areas of the Eastern Chaco in Argentina. It should be noted that the planning components for these issues will be incorporated under the Integrated Water Management Program for the basin, which is part of strategic action C.</p>

TABLE N° 5.2 Continued

CONCEPT OF THE STRATEGY	CONCEPTS OF PRIORITY ACTIONS
<b>C) Sustainable Development of Natural Resources</b>	
<p>The pressing need to improve living standards for the local population calls for efforts to develop and make sustainable use of natural resources that will give meaning to the institutional development, preventive and remediation measures that are required to ensure those conditions of sustainability. The implementation of projects for the use and exploitation of water resources, in particular, is based on three other fundamental aspects that will provide a suitable context for structural development efforts: (i) integrated management of the basin's natural resources, (ii) access to and use of sustainable technologies, and (iii) research into the management and exploitation of natural resources. Communication and participation with stakeholders in these projects is an essential part of the strategy.</p>	<p>Promoting concrete activities for integrated planning and management of basins, development and application of sustainable technologies, and exploitation of natural resources and of water in particular, as a contribution to overcoming constraints that limit the use of water resources, and to address the low levels of human development that now characterize the region and that have been identified as major problems.</p> <p>A focus will be provided for this activity by the Integrated Water Management Program, which includes sector programs to prevent and control erosion and pollution and to promote nature conservation.</p> <p>It also includes activity in localized areas of the upper basins in Argentina and in Bolivia. Many proposals were submitted by various jurisdiction, calling for development, validation and application of sustainable management practices, including:</p> <ul style="list-style-type: none"> <li>a) Revival and validation of traditional cultural practices with respect to natural resources management.</li> <li>b) A series of small and medium-scale infrastructure works intended to permit or improve exploitation of water resources in each ecosystem. These include rehabilitating and optimizing existing irrigation systems and developing new systems of limited scope.</li> <li>c) Other proposals intended to improve access to water for productive use and human consumption needs.</li> <li>d) The SAP will take account of the Multiple-Use Program for the Upper Rio Bermejo Basin, as a strategic plan agreed by both governments, covering three important developments, Cambari, Las Pavas and Arrazayal and requiring a total investment of some US\$450 million. Its principal objective is to regulate water flows so as to increase them during the dry season, and provide for irrigation of major areas suitable for agriculture in Bolivia and Argentina, hydroelectric power generation, partial flood control and water supply.</li> <li>e) Research and studies to provide technical and scientific support for structural and non-structural activities that are identified or may be proposed in the future.</li> </ul>
<b>D) Public Awareness and Participation</b>	
<p>The focus of the strategic action is on broad participation by all stakeholders in the basin, on the basis of a suitable legal framework to support broad access to information of general interest and public consultation mechanisms for decisions on development projects.</p> <p>This activity will encourage i) public access to information, ii) social awareness at all levels, through environmental education and training, and iii) active community participation in planning and implementing development activities and in managing natural resources.</p>	<p>Community awareness and environmental education are complementary policies of equal priority. Key actions will include:</p> <ul style="list-style-type: none"> <li>a) A public participation and environmental education program.</li> <li>b) Proposals for improving access to information</li> <li>c) The role of civil society organizations together with governmental agencies in overseeing environmental management.</li> <li>d) As well, some localized projects in determined areas of the basin representing local initiatives that have been declared priorities by various jurisdictions.</li> </ul>



### 5.3 Criteria adopted for prioritizing projects

The projects identified were pre-selected using the following criteria

- a) Contribution to resolving priority environmental problems. The key consideration here was the project's relationship to the Strategic Lines of Action.
- b) Technical feasibility according to available information, and expected economic and environmental benefits.
- c) Project status. In the case of investment projects, priority was generally given to those for which the studies (final design, feasibility or pre-feasibility) had been concluded, but no financing was assured.
- d) Institutional feasibility, execution capacity and social participation in the project.
- e) Geographic location. The elements studied in the TDA and the GIS georeferencing data were taken into account. Depending on the values given by indicators of natural resource status and sustainability, in relation to the problems identified, environmental Subregions and Large Units were classified by their degree of criticality. The Subregions that had the highest frequency of environmental impact indicators with very high or extreme values, taking into account the number of large units and their surface area, are:

I.1 Montane, I.2 Valle Central de Tarija and I.3 Quebrada de Humahuaca in the Eastern Andean eco-region

II.3 Piedmont in the Subandina region

III.2 Current flood plain of the Bermejo-Teuco and

III.3 Current overflow and paleo water channels of the Bermejo in the Semi-arid Chaco region

IV.2 Fluvial deposits. Dobagán - de Oro System in the Eastern Sub-Humid Chaco region

V.2 Large riparian ridges and interfluvial narrow ridges in the Humid Chaco region

The SAP investment program was formulated by participatory consultation mechanisms in both countries. In this way, opinions were sought from: (i) public institutions responsible for natural resources administration, (ii) NGOs with interests and activities in the area, particularly those related to environmental protection and natural resources, (iii) producers and business associations in the area of the basin.

### 5.4 Priority actions included in the SAP

The SAP is designed as a long-term strategy and consists of all the projects that were identified and selected on the basis of the criteria described above. These projects are at different stages of development: some are still merely concepts, while others are underway or about to begin execution<sup>14</sup>. The current status of these projects, and the prospects for financing their further development, suggests that many activities can be initiated within a short period of time.

#### 5.4.1 Projects contained in the SAP

On the basis of the above concepts and the selection criteria described, a program has been put together consisting of 136 pre-selected projects, which are described in terms of their location, responsible institutions, state of progress, objective/scope and estimated total cost in Annex IV. Figure 4 in that Annex shows the location or scope of the pre-selected projects that make up SAP.

The total budget estimate for the projects and strategic activities identified amounts to approximately US\$470 million, for disbursement over a period of 20 years. This figure in itself bespeaks the enormous impact that an investment of this magnitude will have on the basin, and highlights the importance of the inter-institutional and inter-jurisdictional coordination mechanisms that must be created for the sustainable development of the basin's natural resources, through the activities described in Table 5.3, in both countries. This table summarizes the makeup of the SAP. It will be seen that projects in the strategic area of Sustainable Development of Water Resources (which are primarily of an infrastructure nature) account for more than 71 percent of the total estimated long-term investment, reflecting both the urgent need to make use of water resources and the high cost of those undertakings.

Although its cost is not included in Table 5.5, this program also covers the Multi-Use Project (PAM) in the upper Rio Bermejo basin, sponsored by the governments of both countries, which calls for three major activities as shown in the following table. Their principal objective is to regulate water flows so as to increase minimum flows during the dry season, thereby opening the possibility of irrigation for large areas suitable for agriculture in Bolivia and Argentina. Other objectives include the generation of hydroelectric power, partial flood control and the supply of water for human and industrial consumption. Annex VI provides greater detail on this project.

#### 5.4.2 Core group of priority activities

From among the projects that make up the SAP, a small number of basic activities has been selected, relating to the areas of coordination, planning, consultation and participation mechanisms, and demonstration projects for environmental prevention and remediation, in the environmentally most critical subregions identified. There will also be cross-sector integration with other areas of interest to integrated water resource management, such as soil degradation and the protection of biodiversity and ecosystem conservation. These actions have been selected as catalysts for getting the broader SAP underway, since they address the most important issues that were identified in the Transboundary Diagnosis as basic causes of environmental problems.

<sup>14</sup> The PRA projects are complemented by others envisaged by the two PRA countries through programs financed by multilateral lending or cooperation agencies (IDB, IBRD, GEF, FONPLATA) and the national counterparts, which are detailed in Annex III, Plans and Programs in Execution: Investments in the Rio Bermejo Basin Region.

The actions included in this block are considered of immediate priority for short-term implementation. Assistance is expected from the GEF, signifying continuity of the SAP project. This will be the direct responsibility of the Binational Commission, through specific mechanisms for coordination and execution that will take account of the guidelines proposed in Section 6 for the program as a whole. It should be noted that these

activities are regarded as key for achieving a framework of cooperation, coordination and monitoring for the remaining pre-selected strategic activities now at various stages of progress (concept/profile, pre-feasibility, feasibility, in preparation, in execution) under the responsibility of various public institutions.

Table 5.5 summarizes the strategic areas, specific activities and projects that make up this block of immediate actions.

**Table 5.3 SAP: Principal Strategic Areas and Activities.Total Investment Budget in US\$000**

<b>STRATEGIC AREA AND ACTIVITY</b>	<b>COST</b>
<b>A. Institutional Development and Strengthening</b>	<b>7.027.0</b>
a.1 Upgrading and strengthening of the Binational Commission	720.0
a.2 Development, harmonization and application of a legislative framework for sustainable use and conservation of natural resources	714.0
a.3 Introduction of effective mechanisms for sectoral and jurisdictional coordination and articulation	195.0
a.4 Implementation and strengthening of an environmental information system for the basin	1840.0
a.5 Formulation and implementation of integral watershed management plans, environmental zoning and land-use planning	1.100.0
a.6 Institutional strengthening for Integrated Natural Resources Management	1.900.0
a.7 Strengthening and development of economic instruments and financing mechanisms	558.0
<b>B. Environmental Prevention, Protection And Rehabilitation</b>	<b>98.296.0</b>
b.1 Protection of biodiversity and the natural heritage	2.936.0
b.2 Strengthening and consolidation of the system of protected areas	28.258.0
b.3 Implementation of mitigation plans for flooding and other natural disasters of climatic origin	41.925.0
b.4 Pollution prevention, control and environmental cleanup of watercourses	18.387.0
b.5 Prevention and control of erosion and sedimentation	6.790.0
<b>C. Sustainable Development of Natural Resources</b>	<b>361.502.0</b>
c.1 Development and implementation of integral basin management plans	20.090.0
c.2 Implementation of sustainable natural resources management programs for watersheds	250.0
c.3 Development, validation and application of appropriate technologies and sustainable productive models	7.260.0
c.4 Implementation of projects for sustainable development and use of water resources	331.872.0
c.5 Research for the management and exploitation of natural resources	2030.0
<b>D. Public Awareness and Participation</b>	<b>3.470.0</b>
d.1 Strengthening public participation in the planning and implementation of development activities and the management of natural resources	1.190.0
d.2 Environmental education and training programs for civil society	1.160.0
d.3 Dissemination of sustainable production technologies	970.0
d.4 Public accessibility and dissemination of information in support of the decision-making process	150.0
<b>TOTAL</b>	<b>470.295.0</b>

**Table 5.4 Multiple-Use Project for the Upper Rio Bermejo Basin**

<b>Project</b>	<b>Objective</b>	<b>Executor</b>	<b>Amount</b>
APM Cambari	Multiple-purpose development, primarily to regulate the flows of the Rio Grande de Tarija and produce hydroelectric energy.	Binational Commission	142.000.000
APM Las Pavas and Arazayal and reconstruction of road Km 19 Desemboque	Multiple-purpose development, primarily to regulate the flows of the Rio Grande de Tarija and produce hydroelectric energy.	Binational Commission	352.500.000

**Table 5.5 Strategic areas, specific activities and projects that make up the block immediate actions**

	<b>ACTIVITIES</b>	<b>COSTS US\$)</b>	<b>COMPONENTS</b>
INSTITUTIONAL DEVELOPMENT	Development /strengthening of the institutional framework SAP projects N°: P1, P2, P8	1.824,5	Strengthening of the Binational Commission Strengthening of COREBE Strengthening of government and civil society orgs.
	Development of a holistic regional legislative, economic and environmental framework SAP projects N°: P3, P7, P9, P10	1.929,5	Harmonization of regional and jurisdictional legal frameworks Environmental zoning for land-use regulation in selected areas Economic instruments for sustainable water use Incorporation of environmental & social costs in project evaluation
ENVIRONMENTAL PROTECTION AND REHABILITATION	Soil management and erosion control in critical areas SAP projects N°: P51, P55, P58, P59	2.134,2	Sediment control in the Tolomosa River basin Integral mgnt. of natural resources in the Santa Ana River basin Integrated management of the Iruya River basin Soil loss prevention in the Huasamayo sub-basin
	Consolidating protected areas and protecting biodiversity SAP projects N°: P19, P17, P14, P16, P20, P22	1.786,0	Ecotourism activities in piedmont transition forests Carbon fixation in the Yungas Implementation of the Baritú-Tariquía biological corridor Management plan for Sama and Tariquía biological reserves Evaluation of sub-Andean rangelands Study and implementation of the Teuco National Park (Chaco region) Biodiversity study
	Protection and restoration of water quality SAP projects N°: P43, P44	326,5	Environmental clean-up of the Guadalquivir River (pilot-scale waste-water treatment plants in rural communities) Assessment and design of water-pollution control strategies in the Bermejo Triangle
SUSTAINABLE DEVELOPMENT OF NATURAL RESOURCES	Implementation of the Integrated Water Resource Management Plan. SAP projects N°: P53	2.675,9	Regional integrated program for water resource management, erosion and pollution control, and protection of natural areas
	Sustainable practices for rehabilitation of degraded areas in the Chaco and Yungas regions. SAP projects N°: P62, P70.	2.393,1	Training and promotion of sustainable resource management techniques in the humid and sub-humid Chaco Diversification of production alternatives to reduce human pressure on natural forest resources in the Yungas region
	Community extention programs for sustainable production and natural resource management SAP projects N°: P72, P133	340,2	Survey, assessment, validation and extention of traditional natural resource management practices in representative areas of the Bermejo River basin Promotion of sustainable production activities and natural resource management in indigenous and native communities
	Sustainable agriculture and soil conservation practices along the San Jacinto project area SAP projects N°: P115	243,0	Pilot project for testing and dissemination of soil and water management techniques in irrigated farming along the San Jacinto water reservoir area (Upper Bermejo)
PUBLIC AWARENESS & PARTICIPATION	Environmental education programs SAP projects N°: P129, (P128 , P130, P131)	1.166,0	Implementation of environmental awareness and training programs on sustainable resource use for different ecological regions of the Bermejo basin
	Public participation program SAP projects N°: P126	532,3	Information dissemination, consultation workshops, and establishment of suitable mechanisms for public participation in the Bermejo river basin
	Information system for the Bermejo River basin SAP projects N°: P136, P5, P6	2.081,6	Creation and implementation of an environmental information and monitoring system
	<b>TOTAL COSTS</b>	<b>17.432,8</b>	

## **PART III. IMPLEMENTATION PLAN**

### **6. INSTITUTIONAL AND ORGANIZATIONAL COMMITMENT**

#### **6.1 Preliminary considerations on institutional issues**

Many organizations have responsibilities or involvement in managing water and other natural resources in the Rio Bermejo basin.

In Argentina, because of its federal structure and the way powers have been delegated under the Constitution, ownership, jurisdiction and competence over natural resources, and particularly over water, lies with the provincial governments, except for navigable waterways which fall under national jurisdiction. The coexistence of provincial and national agencies with responsibility for water management and other natural resources, generates some overlapping of federal and provincial competence and interests in particular situations, such as the case of inter-jurisdictional watersheds.

In Bolivia, due to its unitary political organizations, water management falls under the authority of the national government. However, as a result of the administrative decentralization process now underway, powers over environmental issues and water management have been delegated to the departmental prefectures and municipalities, under a system of national ownership and legislation.

#### **6.2 The institutional stakeholders**

The implementation phase of the SAP will have to involve the broadest possible number of institutions active in the Rio Bermejo basin, including:

- Government agencies at the binational, national, regional, provincial and departmental, and municipal levels.
- Public enterprises.
- Nongovernmental organizations (NGOs).
- Producers' and users' organizations.
- Community organizations.
- Academic and scientific institutions.
- Private businesses, industrial, farming and other interest.

Tables 6.1, 6.2 and 6.3 in Annex V list the public institutions, agencies and nongovernmental associations, producers' organizations and water users' groups that could have a role in the actions identified.

The objectives of the Strategic Program, with its heavy emphasis on sustainable development, on strengthening the natural resources management system, on promoting public participation and community awareness, as well as on fostering the development of sustainable

technologies and supporting rational use of water resources, make it essential that government agencies be involved, directly or indirectly, in most of the proposed actions.

Given the importance of such participation to the success of the program, one priority action proposed is to have the SAP adopted and endorsed by as many of these institutions as possible. This effort should preferably be coordinated by the Binational Commission and carried out through the riparian provincial governments in Argentina and the prefecture and municipalities of Tarija in Bolivia, in the context of the coordination and participation mechanisms that are to be established as part of the institutional development activities.

In addition to governmental agencies and nongovernmental organizations, other stakeholders with interests in the Rio Bermejo Basin have been identified, including producers' associations, users' associations, community associations, public enterprises, industrial firms, agricultural producers and others that are involved in the exploitation of natural resources: water, land, and vegetation. The manner in which these stakeholders carry out their economic activities has a significant impact on major portions of the Rio Bermejo basin and must therefore be taken into account in implementing the strategic actions identified in this program.

#### **6.3 The organizational framework of the SAP**

##### **6.3.1 Background**

The Strategic Action Program includes a series of structural and non-structural activities addressing areas of varying geographic scope, from the basin as a whole to localized areas within the Argentine provinces or the prefecture of Tarija. There are also several agencies that will be responsible for executing these activities. The mechanisms and financing sources involved in each case will determine the manner of implementation of the actions and the administration of the resources committed. The commitment of the institutions responsible for implementing these strategic actions will be particularly important for maintaining project priorities and allocating the financial resources required for implementing the SAP. The success of the program will depend essentially on fulfillment of these institutional commitments.

These factors point to the need for an organizational framework for the implementation phase of the SAP that can serve as an instrument for coordination, programming and control of activities and in turn can stimulate participation by governmental and nongovernmental institutions, producers and service suppliers, and community organizations.

In this respect, the SAP proposes, as a priority measure embracing all activities of immediate interest, the development of an institutional framework for implementing the strategic program that would have authority over the entire basin, reflecting its binational character, and that would involve participation by the provincial governments in Argentina and the prefecture and municipalities of Tarija in Bolivia. This process of institutional development will be based on upgrading and strengthening the Binational Commission and the government agencies for the basin, including the development of an appropriate legislative framework.

It is worth repeating that the SAP is a long-term program (with a 20-year implementation horizon) that includes, to date, more than 130 projects of distinct characteristics and at different stages of progress. There are also many institutions involved: provincial governments, the prefecture of Tarija, municipalities, decentralized public bodies, academic institutions, NGOs etc. Each of these has its own priorities, interests, policies and financing mechanisms, and each moves at its own pace. These complexities must be considered when establishing an organizational structure that is to be properly articulated, sustainable and functional.

### 6.3.2 Organizational framework

Consistent with this vision, an organization is proposed along the following lines, with the understanding that it is ultimately the stakeholders in the basin who, through a broad process of coordination and as a result of the activities called for under the strategic program itself, will define the most appropriate organizational structure for achieving the objectives of the SAP.

a) Creation of a Regional Coordination Commission made up of: the Binational Commission for Development of the Upper Rio Bermejo Basin and the Rio Grande, the Governments of the Argentine Provinces in the Basin, the Prefecture and Municipalities of the Department of Tarija. It would be structured so as to accord equal representation for both countries.

This Regional Commission will be the body responsible for the overall conduct, coordination, programming and supervision of the actions to be undertaken through the SAP, and it will take joint decisions with respect to programming and operating guidelines proposed by the Technical Coordination Units. An important function of this inter-jurisdictional coordination mechanism will be to ensure proper articulation with stakeholders in the various jurisdictions, in order to achieve the program's objectives.

Said Regional the Commission will carry out its activities under the functional responsibility of the Binational Commission, which will be ultimately responsible for its proper implementation and functioning.

b) Creation of Technical Coordination Units in each country, suitably articulated among themselves, which will be in charge of operations and coordination in each country, with the logistic and technical support of COREBE and CONAPIBE. Their makeup will reflect the needs and characteristics of the activities they are to perform, and must provide for participation by the executing agencies of the SAP projects and by the various stakeholders in the basin.

c) Community participation in the SAP will be the responsibility of a Consulting and Advisory Commission comprising representatives of Civil Society Organizations (CSO) with specific interests in managing the basin's resources. A selection procedure will be established under which CSO representatives will be appointed for specified periods of time. This commission will operate under the functional responsibility of the Binational Commission, which will be ultimately responsible for its proper implementation and functioning.

The three units described above will comprise one area of responsibilities for executing the SAP. Another area in the proposed organization would be constituted by the government executing agencies for each jurisdiction that have direct functional responsibility for policies, management, administration and enforcement of environmental and natural resource regulations, or for the execution of infrastructure projects.

A third area will be constituted by the various projects and the entities responsible for their execution. Each of the projects will have its own organizational structure, appropriate to its characteristics, with participation by interested stakeholders. These include public and private bodies such as universities, research centers, NGOs and other executing bodies that may be called upon to undertake specific studies and activities.

## 7. PUBLIC PARTICIPATION

Throughout the process of formulating the strategic actions identified in this program, public participation has played an important and central role in developing the specific activities and in identifying areas for intervention in the Rio Bermejo basin. More than 1000 individuals have contributed their time and ideas during a series of regional

workshops and meetings held over a period of time that began with initiation of PDF block B in December 1995 and has culminated in this Strategic Program in December 1999.

Table 7.1, in Annex V, presents the most relevant statistics reflecting the results of the various meetings and the information gathering process and other participation and consultation activities.

The challenge of fostering sustainable development in a broad area with a complex social and institutional setting that includes two countries, great ethnic, cultural and ecological diversity, five administrative units (the department of Tarija in Bolivia and the provinces of Salta, Jujuy, Chaco and Formosa in Argentina) demands strong participation by the different stakeholders involved.

The Work Elements for the first phase of the SAP embraced the whole diversity of stakeholders in the basin:

- The government sector (national, provincial or departmental and municipal) with jurisdiction in the basin, both through direct participation of their authorities and through that of their technical and decentralized institutions. In the case of Argentina, this sector has been the most active one, and its participation has furthermore produced a tangible element of institutional strengthening<sup>15</sup>.
- The academic sector, which participated in generating new knowledge, basic or applied, through research institutes and local universities studying the basin.
- Nongovernmental organizations (NGOs), including those of a social or conservationists bent as well as producer and business groups.<sup>16</sup>
- Private businesses and mixed enterprises.
- Private landowners and the general public, as sponsors or beneficiaries of several demonstration projects.<sup>17</sup>

A great variety of public participation mechanisms were used during the SAP formulation phase. They included seminars and workshops, working groups, working meetings, modern communication media (email, mailing lists and the Internet), interviews with key individuals, surveys, meetings with institutions, direct participation by beneficiaries in community undertakings, etc.

The specific implementation of these mechanisms varied depending on the objective, the issues under consideration, and the context. Thus they differed according to whether they were used in defining

priorities and proposals, in validating results, in the demonstration project implementation phase or in public consultation on specific issues.

In the next stage of implementing the SAP, participation and consultation efforts will be intensified, (i) as an integral part of implementing the proposed strategies, and (ii) through a specific public participation program. In Bolivia, these activities will complement policies and measures with a similar thrust that are part of the government decentralization process that is now underway; in Argentina, this effort will represent a shift from the typically technocratic process through which development activities have been planned to date. This new approach has awakened great interest in the region and has created high expectations among the various stakeholders in the basin. The process acquired momentum during formulation of the Strategic Program and will be further intensified in the next stage of the SAP.

## 8. FINANCING

The diversity of projects and of the institutions involved, the different stage of progress of each project and the high level of investment required, in particular for infrastructure works, point to a complex system for financing the program.

The financing needed to implement the strategic actions defined in this paper will require funding from a great variety of sources, national, regional and international. Depending on the type of project to be financed, a portion of the funding could be provided in the form of loans or grants by various international or regional financial institutions. As well, resources could come from public or private funding generated locally or contributions from government budgets at various levels, either in cash or in kind, through the provision of technical, logistical and infrastructure support by government organizations.

Annex IV summarizes these financing needs, showing estimated costs for each project and a breakdown by source of funding. This is an ambitious program, amounting to some US\$470 million over the entire implementation period.

The investment program calls for financing of:

- Basic studies, pilot projects, institutional strengthening, information and monitoring systems, public participation, etc. A portion of these resources will be covered by the Global

<sup>15</sup> Special reference should be made here to the Government Working Group for Formulation of the SAP in Argentina, consisting of representatives of government agencies responsible for water and natural resources and the environment in the provinces of Chaco, Formosa, Jujuy and Salta, the Argentine Delegation to the Binational Commission for the Rio Bermejo basin and the Regional Commission for the Rio Bermejo.

<sup>16</sup> In particular, in Argentina, the initiative to establish a Representative Mechanism for Communication with NGOs (2d Regional Workshop for Formulation of the SAP, Formosa, May 1998) and the Group of Organizations of Civil Society (3d Regional Workshop for Formulation of the SAP, Jujuy, November 1998).

Environmental Facility and by local and regional institutions.

- Construction of facilities for water quality control, environmental protection measures, natural resource management and sustainable use of natural resources. This represents the bulk of the SAP investments. Financing them will require strong support from international and national financial agencies, in light of the limited funds available to regional institutions.

Given the long-term implementation horizon, and a financial context that is not yet clearly defined for many of the strategic activities, it is advisable to consider a specific strategy for ensuring success of the financing program. This strategy would be based on the following components:

- Completion of project preparation and engineering design for strategic actions that still lack such studies, to facilitate the channeling of resources.
- Coordination with public institutions so that they will maintain and respect the priority of SAP actions and their financing commitments, especially considering that environmental issues are not always accorded top priority at the political level. Development of an institutional framework for the basin is part of this component.
- Systematic review and updating of the SAP as a rational planning instrument, so as to identify priority problems in the basin and define strategic responses. The SAP in fact constitutes a programming framework for ensuring that projects will be sustainable, and it will consequently be an important mechanism for securing the financing required for its projects. Moreover, this approach will allow international funding agencies to make contact with the responsible regional institutions.
- For revenue-generating projects, thought will be given to licensing them under concession to the private sector.
- Develop a financial management plan that will, among other things, identify possible sources of project financing and sponsorship.

## 9. RISKS AND SUSTAINABILITY

In terms of SAP objectives, the principal risk facing development efforts in the Rio Bermejo basin is that environmental considerations will not be adequately incorporated into projects, programs, policies and activities in the manner needed to ensure sustainability, within a comprehensive vision of the basin. This could give rise to undesirable environmental effects, such as damage to the natural

resource base, flooding, pollution of ecosystems and loss of productive units. To ensure sustainability, there will have to be appropriate institutional development to ensure proper regional planning and coordination, with direct participation by the competent jurisdictions and consultation of all stakeholders in the basin. Efforts will be made to develop and strengthen the binational and regional organizations involved, the relevant government agencies of the Provinces of Chaco, Formosa, Salta and Jujuy in Argentina and those of the prefecture of Tarija in Bolivia and, as well, non-governmental organizations so that they can be taken an active part in the consultation process. The intent will be to develop and harmonize the regional regulatory framework and that of the various jurisdictions in a manner consistent with the principles and policies of the SAP. This in turn will rely on complementary programs of information and education supported by the schools, universities and NGOs. Comprehensive programs for environmental zoning and land-use planning will also be important in this process.

There is a risk that national governments will not accord enough importance to the need to open binational and regional organizations to participation by the competent jurisdictional players or equip them to take on the functions of basin-wide entities embracing the entire Rio Bermejo Basin. There is also a risk that provincial governments will fail to complete and harmonize their environmental legal frameworks. The result of such failure would be that the mechanisms and regulations essential for the integrated management of the basin's natural resources would not be adopted. A further risk is that the public participation program will fall short of its goal for lack of response, and the inadequacy of local capacities and resources.

Experience gained during the program formulation stage suggests that significant progress is being made in instilling an awareness of the need to incorporate environmental issues in development programs and projects and to foster participatory decision making about projects, based on broad public information and consultation. Progress has also been made in the use of coordination and participation mechanisms at the governmental and nongovernmental level, thereby strengthening the regional vision of the basin and encouraging a joint inter-jurisdictional approach to issues of general interest relating to shared resources. This suggests that the risks discussed above can be minimized through the explicit commitment and support of the various stakeholders for this Strategic Action Program.

One other important risk relates to the lack of adequate human and financial resources allocated by national and regional institutions to implementation of the priority activities defined in the SAP. Faced with such

<sup>17</sup> E.g. establishment of the Regional Group of Experts made up of members of the Bermejo community in Argentina with expertise or interests in environmental management and natural resource issues in the Rio Bermejo basin

a great demand on their resources, they will have to resort to various financing procedures such as: international lending and technical cooperation, donations from multilateral cooperation agencies, bilateral cooperation agreements, participation by private banks in undertaking private sector projects within the strategies proposed. These funds will constitute the principal source of financing for ensuring that counterpart contributions are adequate to the budgets and resources currently available and planned for the future. Both sources of funding will help to minimize the financial risks during implementation of the Strategic Action Program and will support management of the basin and help to develop practical approaches to the stewardship of the basin's environmental resources. Moreover, account must be taken of other sectoral projects financed with national and international funds in the area of natural risk management, sanitary and storm sewer effluents and water quality control infrastructure that are now underway or in the pipeline. Annex III summarizes the plans and programs now in execution by different government units in Argentina and Bolivia and offers an appreciation of the magnitude of funds that were earmarked for the Rio Bermejo region in mid-1999.

## **10. MONITORING, EVALUATION AND DISSEMINATION**

It is intended that the Binational Commission, with participation by the Technical Commission composed of the various participating institutions, will be responsible for monitoring and evaluating the projects called for under the SAP. Procedures for this will be prepared as part of the institutional strengthening program during the initial phase of execution.

This program will contain at least the following elements: (i) technical coefficients that will be used for constantly monitoring the progress of programs, projects and activities, with respect to financial ratios and disbursement schedules; (ii) institutional capacity indicators, measured in terms of the results

achieved compared to the commitments undertaken by the participating institutions; (iii) management performance in terms of executing projects in accordance with the programmed schedule; (iv) institutional obstacles; (v) technical coefficients on the progress status of projects, studies, designs, management plans, land-use planning, infrastructure works, social participation, research and extension programs, pilot projects, public information programs, all measured against the goals and indicators set out in the SAP. This methodology will be prepared and submitted for consideration by the executing agencies to ensure that they agree with it and will apply it during execution of the SAP.

Dissemination of results. The SAP calls for specific programs of extension, dissemination, training and education. As well, functioning of the Regional Commission and the Consulting and Advisory Commission will ensure public and institutional participation in the SAP. They will be responsible for the tasks of supervising, of publicizing the program and creating an awareness of the environmental problems at issue, the ways of addressing them, and the results achieved by SAP projects, within an integrated vision of the basin.

The results of research and pilot projects will also be communicated to producers' associations and other interested stakeholders, so they can be replicated within the basin. Workshops, conferences and the mass media (radio, TV, Internet) will be used for this purpose.

Other basic studies and research will be prepared and data will be generated during the implementation stage of the SAP, and the results will be shared with stakeholders in the basin. A basin-wide information network will be established, including a natural resources monitoring system and a geographic information system, as a mechanism for disseminating information about the status of natural resources, the results of the program, and the project proposals that are generated.



## FIGURE INDEX

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- Figure 1**      Localization of the Bermejo River Basin
- Figure 2**      Bermejo River Basin. Political and Administrative division
- Figure 3**      Bermejo River Basin. Drainage network.

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

**Location of the  
Bermejo River Basin**

Figure N° 1

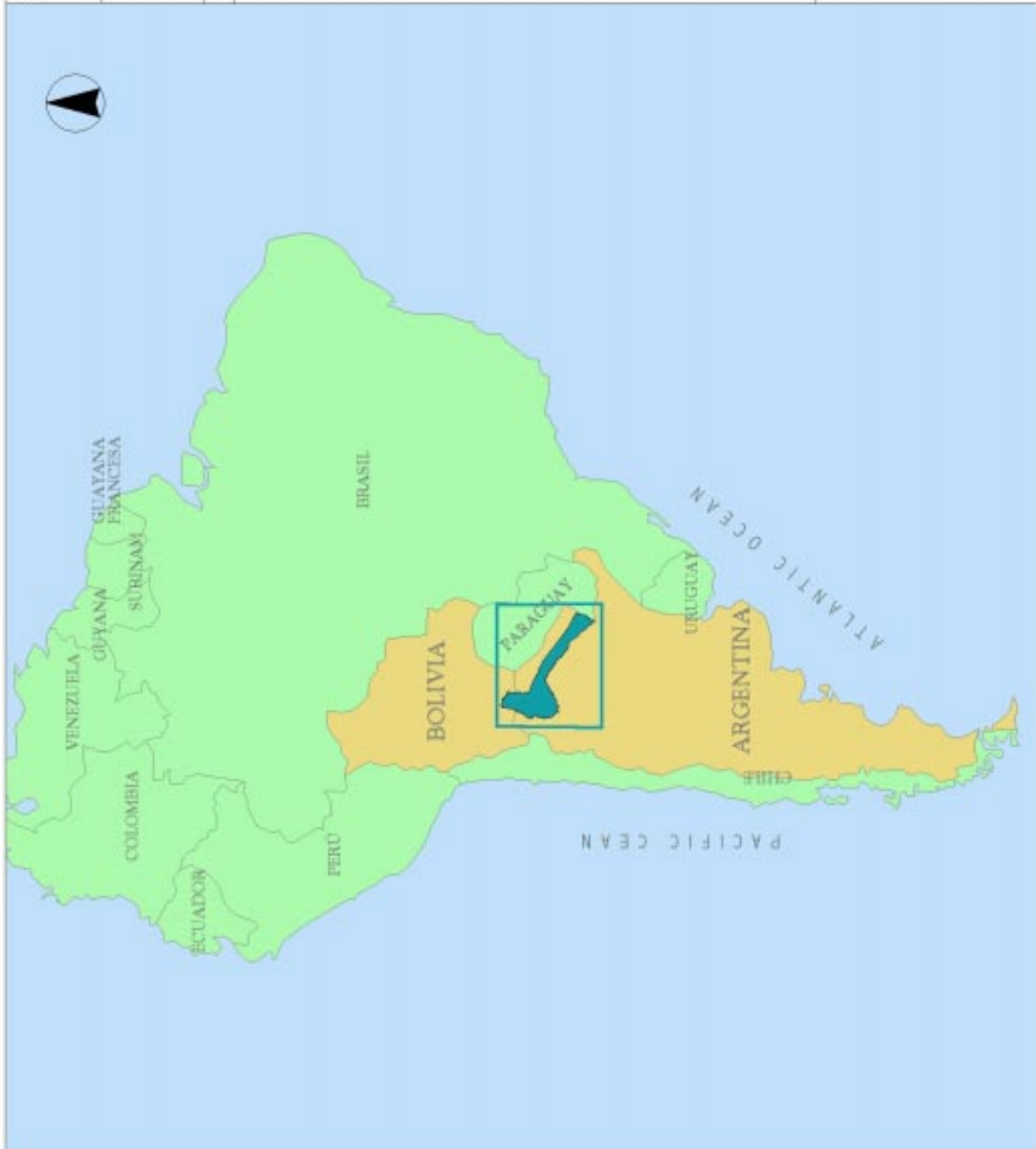
Legend:

- Zone of Interest
- Boundaries of the Basin
- Countries Involved
- Rest of South America

Scale: 0 500000 1000000 Meters

PROJECTION U.T.M. 20  
SCALE 1:27.000.000

- National Commission for the Development of the Upper Bermejo Basin and Grande de Tarija River Basin
- United Nations Environment Program
- Organization of American States
- Global Environment Facility



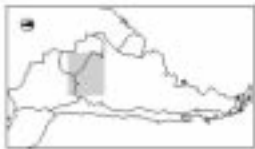


**STRATEGIC ACTION PROGRAM FOR THE BINATIONAL BASIN OF THE BERMEJO RIVER**

**Administrative Division The Bermejo River Basin**

**Figure N° 2**

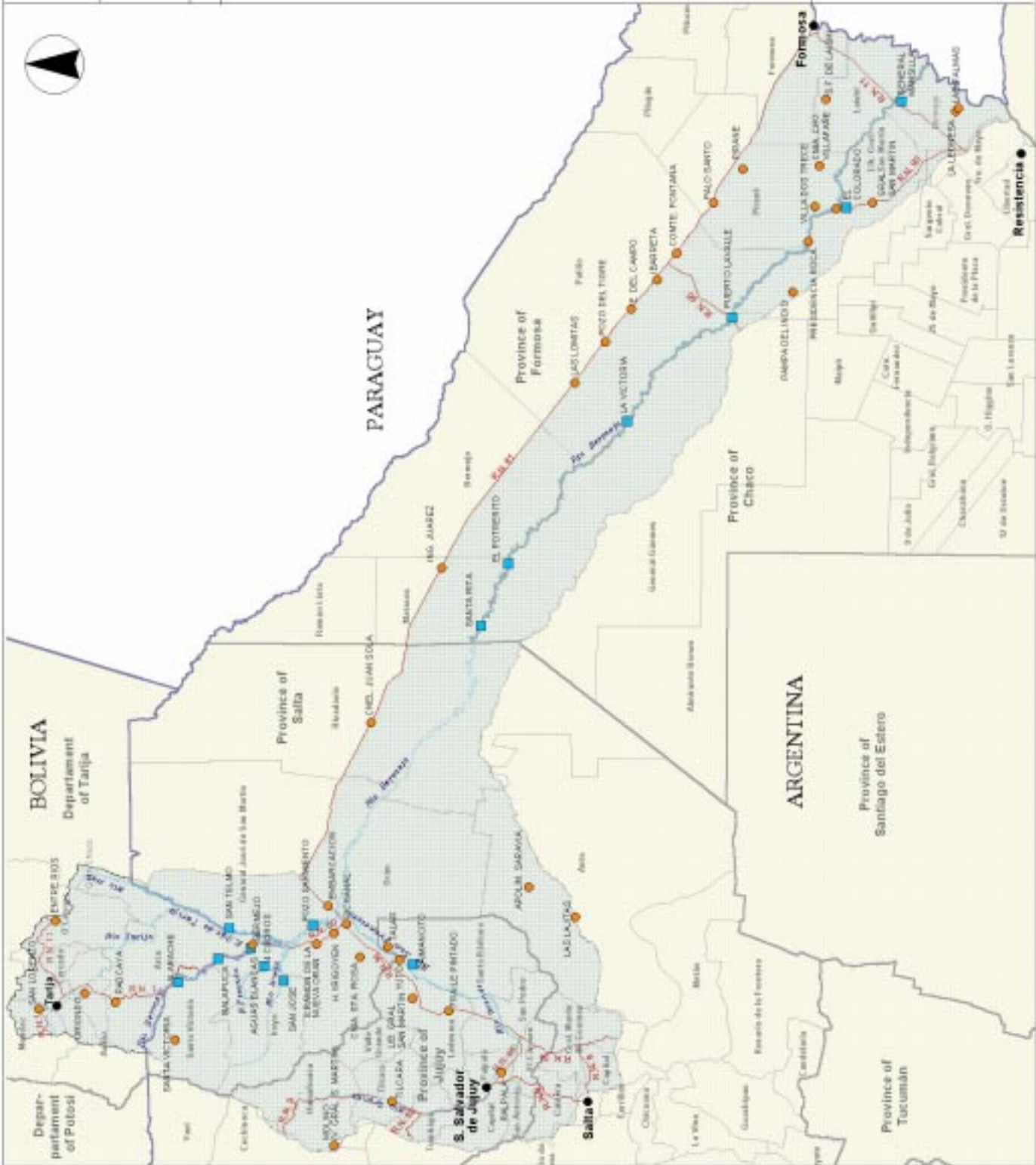
- Legend**
- Capital Cities
  - Main Cities
  - Hydrological Stations
  - Principal Parameters Measurement National Rivers (P.N.)
  - National Boundary
  - Provincial Boundary - Argentina
  - Departmental Boundary - Bolivia
  - Boundary of departments - Argentina
  - Boundary of provinces - Bolivia
  - Basin Boundary



Graphical Scale  
50000 0 50000 Meters

GAUSS KRUGGER PROJECTION, ZONE 4  
SCALE 1:2.500.000

NOTE: Information is based on the latest available data.





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

**Drainage Network  
Bermejo River Basin**

**Figure N° 3**

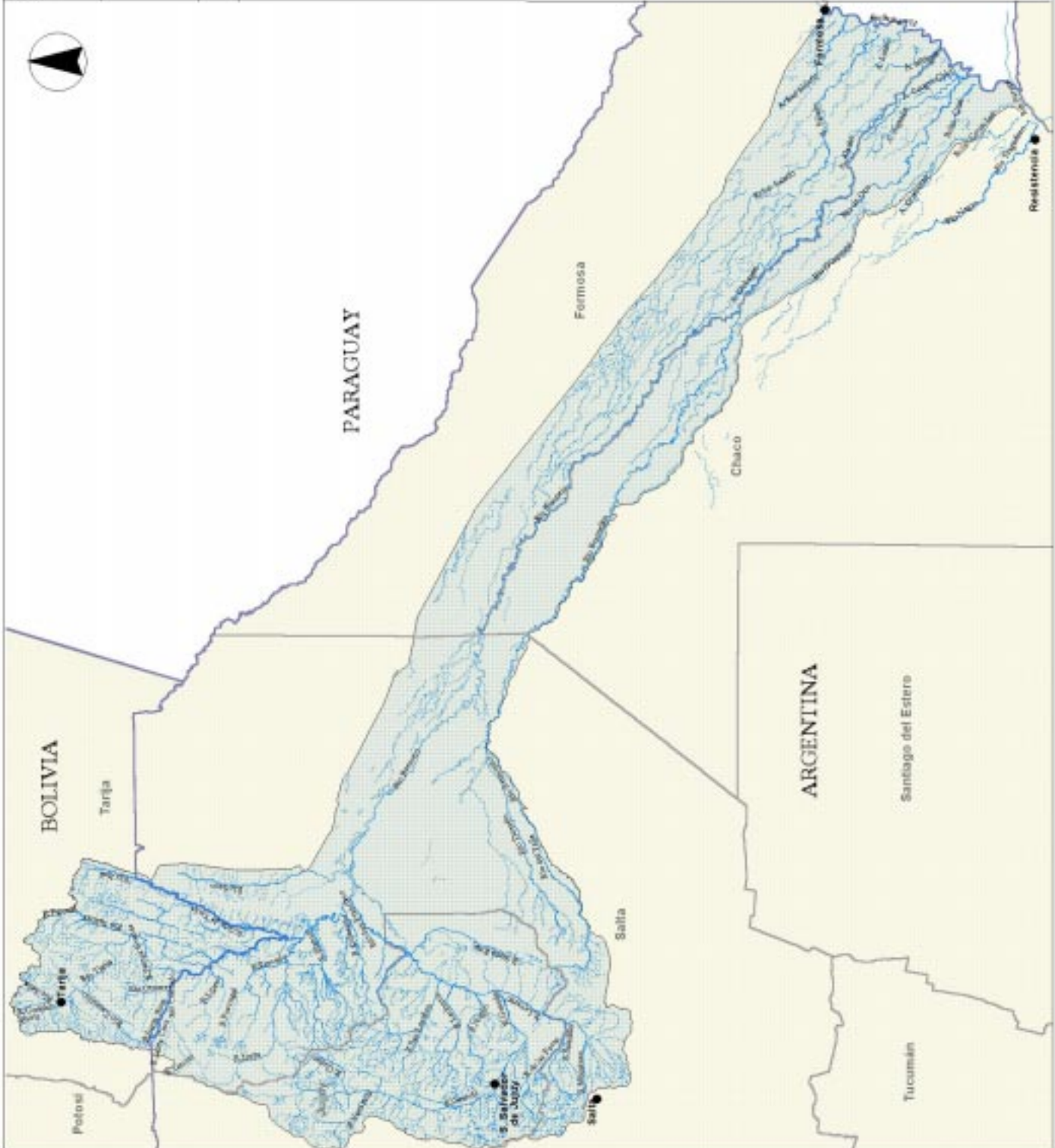
- References:
- Capital Cities
  - Hydrological Net
  - ▬ Permanent watercourses
  - ▬ Temporary watercourses
  - ▬ International Boundary
  - ▬ Provincial Boundary - Argentina
  - ▬ Departmental Boundary - Bolivia
  - ▬ State Boundary
  - ▬ Bolivia/Argentina



Graphic Scale:  
50000 0 50000 Meters

GAUSS KRUGGER PROJECTION FAJA 4  
SCALE 1:3,500,000

Note: Political purposes beyond the Basin are not shown.





## **ANNEX I**

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GOVERNMENT AGENCIES RESPONSIBLE FOR MANAGING WATER AND OTHER NATURAL RESOURCES  
IN THE RIO BERMEJO BASIN

NONGOVERNMENTAL ORGANIZATIONS UNDERTAKING ACTIVITIES IN THE RIO BERMEJO BASIN

SUMMARIZED LIST OF INSTITUTIONS THAT HAVE PARTICIPATED EITHER DIRECTLY OR INDIRECTLY IN  
THE FORMULATION OF THE SAP



**Table 1.2: GOVERNMENT AGENCIES RESPONSIBLE FOR MANAGING WATER AND OTHER NATURAL RESOURCES IN THE RÍO BERMEJO BASIN**

Agency / Institution	Country Province Department	Drinking Water and Clean-up	Flood Control	Pollution Control
Upper Basin Binational Commission	Arg. and Bol.		•	•
Secretariat of Sustainable Development and Environmental Policy	Argentina	•	•	•
Regional Commission for the Río Bermejo – COREBE	Argentina		•	
Provincial Water Administration	Chaco		IA	IA
Under Secretariat of Natural Resources and the Environment	Chaco			
SAMEEP	Chaco	•		
Under Secretariat of Natural Resources and Ecology	Formosa		•	IA
Directorate of Water Resources	Formosa		IA	
Provincial Drinking Water Service	Formosa	•		
General Directorate of Renewable Natural Resources of Jujuy	Jujuy			•
Provincial Directorate of Water Resources	Jujuy		IA	•
Agua de los Andes S.A.	Jujuy	•		
Superintendency of Public Services SUSEPU	Jujuy			IA
Secretary of Environment and Sustainable Development	Salta			IA
Infrastructure and Development Unit	Salta	IA	IA	IA
Municipalities <sup>1</sup>	Cuenca	•		
Technical Office of the National Commission of the Pilcomayo and Bermejo Rivers (CONAPIBE)	Bolivia		•	•
Ministry of the President's Office (funding)	Bolivia	•	•	
General Directorate of Border Development, Environmental Protection	Bolivia			
General Directorate of Energy	Bolivia			
General Directorate of Agriculture	Bolivia		•	•
General Directorate of Forestry and Sylviculture	Bolivia			
General Directorate of Farm Land and Irrigation	Bolivia			
General Directorate of the Environment	Bolivia		•	•
General Directorate of Biodiversity	Bolivia			
Vice Ministry of Basic Services	Bolivia	•		
National Meteorology and Hydrology Service	Bolivia			
Prefecture	Tarija	•	•	•
Town Councils	Tarija	•	•	•
Water Service and Drainage Cooperative of Tarija	Tarija	•		

References:

**IA:** Implementing Authority

•• : Involved

Hydroelectric Power	Irrigation	Soil	Flora, Wildlife, Forests, NPAs	Other
•	•			•
•		•	•	•
•	•			•
	IA			•
	•	IA	IA	•
	IA	IA	IA	•
•	IA			•
		IA	IA	•
IA	IA			•
•	•	•	•	•
•	•			•
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•		•	•	•
	•			•
	•	•	•	•
•	•	•	•	•
	•			•

**Table 1.3 NONGOVERNMENTAL ORGANIZATIONS UNDERTAKING ACTIVITIES IN THE BERMEJO RIVER BASIN**

<b>ORGANIZATION</b>	<b>Zone</b>	<b>Conservation</b>	<b>Education</b>	<b>Production</b>	<b>Social Assistance</b>	<b>Others</b>
Association of Friends of the Aborigine (SAMAB)	Argentina		R		R	
Association of the Anglican Church (ASOCIANA)	Argentina		R		R	
Agricultural Producer Defense Association	Argentina					R
Association for the Promotion of Culture and Development	Chaco		L	L	L	L
Association for the Promotion and Defense of the Environment (APROMA)	Argentina	R	R			
Chaco Association of Promoters (APROCH)	Chaco		L			
Cáritas	Argentina		N		N	
Ce.Ca.Zo. (Zone Training Center)	Argentina		R			
Palo Santo Agricultural Education Center	Argentina		R		R	
Research Center for the Reconversion of the North (CIRENOR)	Formosa	L	L			L
Center of the Old People of the Chaco	Argentina					R
Rio Negro Recovery Commission	Chaco	L				
ENDEPA	Argentina		N		N	
EMPRENDER	Argentina		R			R
Argentine Federation of Evangelical Churches (FAIE)	Argentina			N		
FUDECHA (Chaco Ecological Foundation)	Argentina	R	R			
Total Environment Foundation	Argentina	R	R			R
Geopuna Foundation	Argentina	R	R			
Kallpa Foundation for Integrated Forest Management	Salta	L	L	L		L
Big North Foundation	Argentina	R	R			
PACHA MAMA Foundation	Salta	L				
S.O.S Foundation	Argentina	R				
Argentine Wildlife Foundation (FVSa)	Argentina	N	N			N
FUNDALES	Salta					L
FUNDAPAZ (Foundation for Development in Justice and Peace)	Argentina		N		N	
GREENPEACE	International	I	I			
Chaco Ecologist Group	Argentina	R				
Institute for Social Development and Human Promotion (INDES)	Argentina		N		N	
Institute of Popular Culture (INCUPO)	Argentina		N		N	
United Committee of Missions (JUM)	Argentina				R	
KHANANYE	Argentina	R				
Yaguarete	Argentina	R				
Argentine Ecologist Movement	Formosa	L				
PIRCA	Argentina	R				
Chaco Rural Society	Chaco			L		L

**Table 1.3 Continued**

<b>ORGANIZATION</b>	<b>Zone</b>	<b>Conservation</b>	<b>Education</b>	<b>Production</b>	<b>Social Assistance</b>	<b>Others</b>
Formosa Rural Society	Formosa			L		L
Jujuy Rural Society	Jujuy			L		L
Salta Rural Society	Salta			L		L
UNAMBI	Argentina	R				
ACLO – Loyola Cultural Activo	Tarija	X	X	X	X	X
Tarija Regional Development Study Center (CERDET)	Tarija	X	X	X	X	X
Education and Future (EdyFU)	Tarija		X	X		
Cooperative for Foreign Remittances (CARE)						
Agricultural Research and Training Center (CICA)	Bolivia		X	X	X	X
	Tarija		X	X		X
CARITAS, Tarija Diocese	Bolivia	X	X	X	X	
Peasant Research and Support Center (CIAC)	Tarija	X	X	X	X	X
People’s Research and Training Center (CICAP)	Tarija	X	X	X		X
Peasant Research and Training Institute (IICCA)	Tarija		X	X	X	X
Tarija Social Pastoral	Bolivia		X	X	X	X
Tarija International Plan	Bolivia	X	X	X	X	X
Green Life	Tarija	X	X	X		X
Church Social Assistance Office (OASI)	Tarija		X		X	X
Diogracio Vides Intercommune Peasant Organization	Tarija		X	X	X	X
PROMUJER – Programs for Women	Tarija		X	X	X	X
PDA – Padcaya Area Development Project	Tarija			X	X	
Environment Protection of Tarija (PROMETA)	Tarija	X	X	X		X
FADES – Social Development Support Fund	Bolivia			X		X
Pro-Hábitat	Bolivia		X	X		X
Esperanza Bolivia	Bolivia		X	X	X	X

References

Scope of Action:

- I** = International
- N** = National
- R** = Regional
- L** = Local

## **SUMMARIZED LIST OF INSTITUTIONS THAT HAVE PARTICIPATED EITHER DIRECTLY OR INDIRECTLY IN THE FORMULATION OF THE SAP**

### **BINATIONAL AND INTERNATIONAL INSTITUTIONS**

1. Binational Commission for the Development of the Upper Basin of the Río Bermejo and the Río Grande de Tarija
2. Organization of American States (OAS)
3. United Nations Environment Programme (UNEP)
4. Global Environmental Facility (GEF)

### **GOVERNMENTAL AND NONGOVERNMENTAL INSTITUTIONS IN ARGENTINA**

1. National Parks Administration, APN
2. Center for Population Studies (CENEP)
3. Regional Commission for the Río Bermejo (COREBE)
4. CHACO, Provincial Water Administration, Directorate of Basic Studies
5. CHACO, Provincial Water Administration
6. CHACO, Directorate of Soils, Secretariat of Natural Resources and the Environment
7. CHACO, Total Environment Foundation
8. CHACO, Institute for Social Development and Human Promotion (INDES)
9. CHACO, Provincial Settlement Institute
10. NW Argentina Regional Technical Delegation, National Parks Administration
11. EVARSA, Evaluación de Recursos, S.A.
12. FORMOSA, Forestry Directorate, Secretariat of Natural Resources and Ecology
13. FORMOSA, School No. 109, Bo. El Zapallito
14. FORMOSA, School No. 404
15. FORMOSA, School No. 43
16. FORMOSA, Federation of NGOs / CIRENOR
17. FORMOSA, Ministry of Education, General Directorate of Basic Education
18. FORMOSA, Ministry of Production
19. FORMOSA, Ministry of Production, Directorate of Water and Soil
20. FORMOSA, Gral. Lucio V. Mansilla Municipality
21. FORMOSA, Mayor Villafañe Municipality
22. FORMOSA, Pozo del Tigre Municipality
23. FORMOSA, Central Program Administration Unit
24. Environment and Natural Resources Foundation (FARN)
25. Argentine National Gendarmes, Environmental Division, Salta Group
26. National Water and Environment Institute, Hydraulics and Environmental Laboratory
27. National Water and Environment Institute, National Toxic Waste and Water Pollution Program
28. National Water and Environment Institute, Hydrology Center
29. INTA Ibarreta Agricultural Extension Center, Formosa
30. INTA Chaco Regional Center – Formosa
31. INTA Salta Regional Center, Salta Station
32. INTA Colonia Benitez Agricultural Experimental Station
33. INTA El Colorado Agricultural Experimental Station, Formosa
34. INTA Saénz Peña Agricultural Experimental Station
35. INTA Climate and Water Institute, Castelar
36. INTA Soil Institute, Castelar
37. JUJUY, Aguas de los Andes S.A.
38. JUJUY, General Directorate of Renewable Natural Resources
39. JUJUY, Provincial Directorate of Hydraulics
40. JUJUY, Superintendence of Public Services (SUSEPU)
41. Las Yungas Ecological Research Laboratory (LIEY), Tucumán University
42. Argentine Ecological Movement (El Colorado Base), Formosa
43. SALTA, former General Water Administration of Salta (AGAS)
44. SALTA, Association of Alternative Tourism Operators of Salta (ADOPTAS)
45. SALTA, Environment Directorate, Ministry of Public Health
46. SALTA, Directorate of the Environment and Natural Resources
47. SALTA, Los Toldos Municipality
48. SALTA, Provincial Tourism Secretariat
49. University of Buenos Aires, Landscape and Environment Study Group (GEPAMA)

50. University of Buenos Aires, Regional Ecology Study Group (GESER)
51. National University of Formosa
52. National University of Formosa, Sylviculture Institute
53. National University of Jujuy
54. National University of Jujuy, Geology and Mining Institute
55. National University of Salta, Faculty of Natural Sciences, Soils Department
56. National University of Salta, Faculty of Natural Sciences, Geomorphology Department
57. National University of Salta, Sociodemographic Study Group (GREDES)
58. National University of the Northeast, Faculties of Engineering and Humanities, Applied Geoscience Institute
59. National University of the Northeast, Engineering Faculty, Hydraulics Department

## **GOVERNMENTAL AND NONGOVERNMENTAL INSTITUTIONS IN BOLIVIA**

### **PUBLIC INSTITUTIONS**

1. Prefecture of Tarija Department:
  - Directorate of Economic Development
    - Basic Clean-up Unit
    - Agricultural Development Unit
    - Strategic Food Security Program
  - Directorate of Sustainable Development and the Environment
    - Forestry Development Unit
  - Social Development Directorate
    - Prefecture Action Program
    - National Governance Program
  - Subprefecture of Méndez Province
  - Subprefecture of Avilés Province
  - Subprefecture of Arce Province
  - Bermejo Town Council
  - Tarija Department Council
2. General Directorate of Biodiversity, Vice Ministry of Sustainable Development and the Environment
3. ZONISIG
4. Tarija Executive Program for Land Recovery, PERTT
5. San Jacinto Association
6. National Meteorology and Hydrology Service, SENAMHI
7. National Irrigation Program, PRONAR
8. Bolivian Agricultural Technology Institute, IBTA
9. Cercado Municipal Mayor's office
  - Cercado Province Municipal Council
  - Technical Unit for Planning
  - Technical Unit for Urban Development
  - Tarija Municipal Sanitation Corporation
10. San Lorenzo Municipal Mayor's Office
11. Padcaya Municipal Mayor's Office
12. Bermejo Municipal Mayor's Office
13. Uriondo Municipal Mayor's Office
14. Entre Ríos Municipal Mayor's Office
15. Juan Misael Saracho Autonomous University
  - Research Directorate
  - Faculty of Science and Technology
    - Civil Engineering School
  - Faculty of Forestry and Agronomic Science
    - Agronomic Engineering School
    - Forestry Engineering School
  - Faculty of Social and Legal Science
    - Law school
  - Bolivian Inter-University Water Resource Institute, INIBREH
16. Social Investment Fund, FIS
17. Campesino Development Fund, FDC
18. National Agrarian Reform Institute, INRA

19. Tarija Parliamentary Brigade
20. Tarija District Court

#### **PRIVATE INSTITUTIONS**

21. Drinking Water and Drainage Cooperative of Tarija, COSAAL
22. Tarija Civic Committee
23. Union Federation of Rural Workers of Tarija
24. Union Federation of Rural Workers of Bermejo
25. Volunteers of the Peace Corps
26. Federation of Neighborhood Committees of Tarija
27. College of Agronomic Engineers

#### **NONGOVERNMENTAL ORGANIZATIONS**

28. Tarija Regional Development Study Center, CERDET
29. Agricultural Research and Training Center, CICA
30. Development and Environment Information Center, CIRDEMA
31. Vida Verde
32. Tarija Environmental Protection, PROMETA
33. Loyola Cultural Action, ACLO
34. Tarija Social Pastoral
35. Tarija International Plan
36. Church Social Assistance Office, OASI
37. Tarija Environmental and Development Forum
38. Campesino Research and Support Center, CIAC
39. Campesino Research and Training Institute, IICCA

## **ANNEX II**

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LIST OF DOCUMENTS DRAWN UP DURING FORMULATION OF THE SAP  
POLICY FRAMEWORK FOR EXECUTING SAP ACTIONS





## LIST OF DOCUMENTS DRAWN UP DURING FORMULATION OF THE SAP

1. PEA El. 1.1. 1999a. Instituto de Suelos. INTA (Coord.). Universidad Nacional de Jujuy, Universidad Nacional de Salta, EEA Cerrillos- INTA. *Digital Thematic Cartography of Argentine Territory in the Upper Bermejo River Basin; (base map, geology, geomorphology, hidrology, soils, vegetation, population and infrastructure, land use)*. Elemento 1.1: Movimiento Transfronterizo de Contaminantes. Instituto Nacional de Tecnología Agropecuaria. Buenos Aires, Argentina.
2. PEA El. 1.1. 1999b. Brea, D., et al. *Analysis of the Sediment Production and Transport in the Upper Bermejo River Basin and its Impact in the Paraná Waterway, Delta del Paraná and Río de la Plata*. Instituto Nacional del Agua y del Ambiente. Elemento 1.1.: Movimiento Transfronterizo de Contaminantes. Buenos Aires, Argentina.
3. PEA El. 1.1. 1999c. Hopwood, H.J. *Sediment Load of the Bermejo River and the Evolution of the Delta del Paraná and Río de la Plata*. Danish Hydraulic Institute. Elemento 1.1: Movimiento Transfronterizo de Contaminantes. Buenos Aires, Argentina.
4. PEA El. 1.1. 1999d. Peviani, M. *Morphological Model of the Upper Bermejo River*. Elemento 1.1: Movimiento Transfronterizo de Contaminantes. Italia.
5. PEA El. 1.1. 1999e. Universidad Autónoma Juan Misael Saracho (UJMS); *Study of environmental clean-up of the Guadalquivir River*. Elemento 1.1 Movimiento Transfronterizo de Contaminantes. Volúmenes 4.110.1 a 4.110.5. Tarija, Bolivia.
6. PEA El. 1.1. 1999f. Zonificación Agroecológica y Socioeconómica con Sistemas de Información Geográfica (ZONISIG). *Digital Thematic Cartography of the Bermejo River Basin (Bolivia). Maps and Report*. Elemento 1.1 Movimiento Transfronterizo de Contaminantes. Tarija, , Bolivia.
7. PEA El. 2.1. 1999. Benítez A. *Criteria and Parameters for the Classification of Water Courses*. El. 2.1. Classification of water courses. Volúmenes 4.11.1 a 4.11.6. Tarija, Bolivia.
8. PEA El. 2.2. 1999b. *Integrated Management Plan of the Nature Resources of the Camacho River Basin*. Elemento 2.2. Control de Erosión, Santa Ana / Camacho. Volúmenes 4.90.1 a 4.90.11. Tarija, Bolivia.
9. PEA El. 2.2. 1999c. *Integrated Management Plan of the Nature Resources of the Santa Ana River Basin*. Elemento 2.2. Control de Erosión, Santa Ana / Camacho. Volúmenes 4.80.1 a 4.80.17. Tarija, Bolivia.
10. PEA El. 2.3 1999. IICCA. *Soils Use, Legal Status and Land Ownership in the Central valley of Tarija and its relationship with the erosion*. Elemento. 2.3 Tenencia de la Tierra, Valle Central de Tarija. Volúmenes 4.60.1 a 4.60.6. Tarija, Bolivia.
11. PEA 2.4. 1999. Alzérreca, H. *Study of pasture lands (CANAPAS) of the Central Valley of Tarija*. Elemento 2.4 Manejo de Pasturas, Valle Central de Tarija. Volúmenes 4.70.1 a 4.11.6. Tarija, Bolivia.
12. PEA El. 2.5. 1998. Arrieta, J.; Pastor, C. *Socio-economic and Environmental Survey of the Communities along the Middle and Lower reaches of the Bermejo River*. Informe y Anexos. Elemento: 2.5: Uso del Suelo en la Cuenca del Río Inferior. Buenos Aires, Argentina.
13. PEA El. 2.5. 1999. Administración Provincial del Agua (Coord.), Centro de Geociencias Aplicadas (UNNE), Departamento de Hidráulica (UNNE), INTA E.E.R.A. Saénz Peña, INTA E.E.R.A. C. Benítez, Dirección de Suelos y Agua Rural de la Subsecretaría de Recursos Naturales y Medio Ambiente de la Pcia. del Chaco. *Digital Thematic Cartography of the Lower Bermejo River Basin*. Elemento 2.5: Uso de la Tierra en la Cuenca del Río Bermejo. Chaco, Argentina.
14. PEA El. 2.5. 1999b. Brea, D., et al. *Study of fluvio-morphological dynamics in the lower reach of the Bermejo River*. Instituto Nacional del Agua y del Ambiente. Elemento 2.5: Uso del Suelo en la Cuenca Inferior del Río Bermejo. Buenos Aires, Argentina.
15. PEA El. 2.6. 1999. Cardozo, J. et al. *Increase of Forage Yields through Water Management in Marshlands and Swamplands, and Productive Recovery of Land Infested with Vinal*. Elemento 2.6: Manejo de Forrajes. Chaco Húmedo. Formosa, Argentina.
16. PEA El. 3.1. 1999. Marconi, P. et al. *Transition Forest in the Province of Salta: Identification of Sustainable Alternative Practices of Ecotourism-type and Implementation of the Pilot Demonstration Project*. Administración de Parques Nacionales. Elemento 3.1. : Bosques de Transición Salta, Argentina.
17. PEA El. 3.2. 1999a. *Sediment Control in the Tolomosa River Basin - Pilot Demonstration Project*. Elemento 3.2 Manejo de la Cuenca del río Tolomosa. Volúmenes 4.86.1 a 4.86.6. Documentos de Construcción. Tarija, Bolivia.
18. PEA El. 3.2. 1999b. *Sediment Control in the Tolomosa River Basin - Pilot Demonstration Project*. Elemento 3.2. Manejo de la Cuenca del río Tolomosa. Volúmenes 4.87.1 a 4.87.7. Documentos de Prácticas Biológicas. Tarija, Bolivia.

19. PEA El. 3.3. 1999. Brown, A.; Grau, A. *Strengthening of Sustainable Production Diversity (Community of Los Toldos, Salta)*. Laboratorio de Investigaciones Ecológicas de las Yungas (LIEY). Elemento 3.3: Desarrollo Sustentable en las Yungas. Tucumán, Argentina.
20. PEA El. 3.4. 1999. Vargas R. (coord.) et al. *Socioeconomic and Environmental Constraints Restricting Sustainable Development*. Elemento 3.4: Remoción de Barreras Chaco Húmedo y Seco. Chaco, Argentina.
21. PEA El. 4.1. 1997. *Rehabilitation and Improvement of the Hydrometeorological Network of the Upper Bermejo River and Grande de Tarija River Basin*. Elemento 4.1. Red Hidrometeorológica. Volúmenes 3.13.1 y 4.13.2. Tarija, Bolivia.
22. PEA El. 4.1. 1999a. Carrizo, R. *Proposal for the Water Quality Component. Environment Information System of the Bermejo River Basin*. Elemento 4.1: Red Hidrometeorológica. Buenos Aires, Argentina.
23. PEA El. 4.1. 1999b. Malinow, G. *Proposal for the Hydrometeorological and Hydrosedimentological Network of the Environment Information System of the Bermejo River Basin*. Elemento 4.1: Red Hidrometeorológica. Buenos Aires, Argentina.
24. PEA El. 4.2. 1998. Gabay, M; De Donatis, T. *Analysis of legal environmental framework the Bermejo River Basin in Argentine Territory*. Elemento 4.2: Legislación Ambiental, COREBE. Buenos Aires, Argentina.
25. PEA El. 4.2. 1999. Rovere, M.; Cabrera, M. *Strengthening and Harmonization of the Legal and Institutional Framework for Environmental Management in the Bermejo River Basin*. Elemento. 4.2: Legislación Ambiental. Fundación Ambiente y Recursos Naturales. Buenos Aires, Argentina.
26. PEA El. 4.2. 1999. Darwich, E. *Collection and Proposal of Environmental Laws in Bolivia*. Elemento 4.2: Legislación Ambiental, Volúmenes 4.95.1 a 4.95.2.. Tarija, Bolivia.
27. PEA El. 4.3. 1999. Protección del Medio Ambiente Tarija (PROMETA). *Baritú - Tariquía Environmental Corridor Proposal*. Elemento 4.3 Corredor Biológico Baritú Tariquía. Volúmenes 4.100.1 a 4.100.6. Tarija, Bolivia.
28. PEA El. 5.1. 1999a. Lattes, A. Boleda, M. et al. *Transboundary Migrations in the Bermejo River Basin*. Volúmen I y II. Elemento 5.1: Migraciones Transfronterizas. CENEP y GREDES. Buenos Aires- Salta, Argentina.
29. PEA El. 5.1. 1999b. Guevara J. OASI; *Study of Transboundary Migration*. Elemento 5.1 Migraciones Transfronterizas. Volúmenes 4.110.1 a 4.110.5. Tarija, Bolivia.
30. PEA El. 5.2. 1999. Pérez, V. et al. *Promoting Forestry Awareness in the Community through Schools and Municipalities*. Informe y Anexos. Elemento 5.2: Educación Ambiental. Formosa, Argentina.
31. PEA El. 6.1 1999a. Adámoli, J; Morello, J. et al. *Ecological and Environmental Zoning of the Bermejo River Basin*. Elemento 6.1: Formulación del Programa Estratégico de Acción. Buenos Aires, Argentina.
32. PEA El. 6.1. 1999b. Laurelli E; Vaghi A. *The Bermejo River Basin into the Regional Framework*. Elemento 6.1: Formulación del Programa Estratégico de Acción. Buenos Aires, Argentina.
33. PEA El. 6.1. 1999c. Manzanal M, Arrieta J. *Socio-economic Analysis of the Bermejo River Basin in Argentine Territory*. Elemento 6.1: Formulación del Programa Estratégico de Acción. Buenos Aires, Argentina.
34. PEA El. 6.1. 1999d.. *Regional Survey of Environmental and Development Projects and Initiatives*. Elemento 6.1: Formulación del Programa Estratégico de Acción. Buenos Aires, Argentina.
35. PEA El. 6.1. 1999e. Seoane, R.S.; Moyano, M.C. *Analysis of the Impact of Climate Change on the Hydrology of the Bermejo River Basin*. Elemento 6.1 Formulación del Programa Estratégico de Acción para la Cuenca del Río Bermejo. Instituto Nacional del Agua y del Ambiente. Buenos Aires, Argentina.
36. PEA El. 6.1. 1999f. *Transboundary Diagnostic Analysis of the Bermejo River Basin in Argentina*. El. 6.1 Formulación del Programa Estratégico de Acción Ambiental. Buenos Aires, Argentina.
37. PEA El. 6.1. 1999g. *Transboundary Diagnostic Analysis of the Bermejo River Basin in Bolivia*. El. 6.1 Formulación del Programa Estratégico de Acción Ambiental. Informe y Mapas. Tarija, Bolivia.
38. PEA El. 6.1. 1999h. Universidad Autónoma Juan Misael Saracho (UJMS). *Flood Control in Tarija City*. Elemento 6.1 Formulación del Programa Estratégico de Acción. Volúmenes 4.110.6 a 4.110.8. Tarija, Bolivia.
39. PEA El. 6.2. 1997. Programa Estratégico de Acción, *First Regional Workshop for the Formulation of the Strategic Action Program*. Elemento 6.2: Participación Pública. Salta, Argentina.
40. PEA El. 6.2. 1998a. Programa Estratégico de Acción. *Second Regional Workshop for the Formulation of the Strategic Action Program*. Elemento 6.2: Participación Pública. Formosa, Argentina.
41. PEA El. 6.2. 1998b. Programa Estratégico de Acción. *Third Regional Workshop for the Formulation of the Strategic Action Program*. Elemento 6.2: Participación Pública. Jujuy, Argentina.

## POLICY FRAMEWORK FOR EXECUTING SAP ACTIONS

The planning and implementation of the actions to be carried out as a part of the SAP will take the following into account:

- Integral water management plans, in the context of integrated basin-wide natural resource management, as a tool for tackling environmental problems.
- Joint, integrated, comprehensive management of the quantity and quality of rainwater, surface water, and ground water and of their spatial and temporal distribution, taking into account the repercussions upstream and downstream of the management actions, sectoral and regional relations, and social equity.
- Systematic evaluations and forecasts of the quantity and quality of surface and ground water resources in order to estimate the total volume of available resources and their future potential supply, to determine current quality levels, to predict possible conflicts between supply and demand, and to supply a scientific database for the rational use thereof.
- Developing, agreeing on, and harmoniously implementing, with a basin-wide approach and within the corresponding jurisdictions, the following measures as instruments for the sustainable management of natural resources:
  - Classification of water courses. Guide levels and environmental quality targets.
  - Pollutant emission limits.
  - Rules governing access to and availability of water resources (system of permits and concessions).
  - Environmental impact assessment procedures.
  - Land use planning, environmental or territorial zoning.
  - Economic and financial incentives and disincentives.
  - Informed decision-making processes regarding development actions.
  - Methods for participation and public consultation.
  - Environmental education and community awareness programs.
  - Systems for assessing and controlling natural resources and the use thereof.
  - Environmental information systems, and decision support systems.
- Establishment of quality standards for all bodies of water (surface and underground), according to natural conditions and usage, with a view toward progressive improvements in quality.
- Prevention and control of pollution through an appropriate combination of pollution reduction strategies at the source, environmental impact assessments, and the effective implementation of standards for the most important localized discharges and the dispersed releases that pose the greatest risk, in accordance with the possibilities for socio-economic development.
- Clean-up of polluted water courses and the systematic assessment and monitoring of water resources as part of the water quality improvement policies.
- Flood mitigation plans must include urban development provisions and the restoration of affected areas, together with the construction of protective infrastructure in both urban and rural areas.
- Strengthening the institutions charged with managing natural resources in the basin, particularly those responsible for managing water resources, environmental information and monitoring, compliance with environmental standards, and environmental education.
- Conducting basic studies into natural resources to gain a better understanding of the potential that exists and the possibilities for sustainable use.
- Nature conservation – an essential task for maintaining the water supply – involves redefining, connecting, and consolidating the basin's areas that are currently protected and strengthening the institutions responsible for managing them.
- Promoting appropriate productive models and technologies in the fields of agriculture, livestock raising, and forestry.
- Promoting actions aimed at improving output and productivity, creating jobs, and increasing the coverage of basic services, particularly those geared toward the most vulnerable population segments.
- Sustainable use of water resources, through regulation, irrigation, and other efforts.
- Free access to reliable information at all levels, using modern communications and network technologies to the extent that is possible.
- Active involvement of communities and the private sector in all stages of natural resource management.
- Research, technological development, and access to suitable technologies for assessing, planning, using, and controlling water resources and other related natural resources.



**ANNEX III**

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PLANS AND PROGRAMS BEING EXECUTED:  
INVESTMENTS IN THE BERMEJO RIVER BASIN



**DIRECTORY OF PLANS AND DEVELOPMENT PROGRAMS WITHIN THE BERMEJO RIVER BINATIONAL BASIN**

PLAN OR PROGRAM	AGENCY	FOCAL AREA	FINANCING (Million US \$)					SCOPE
			World Bank	InterAmerican Development Bank	GEF	Government	Provincial	
Native Forests and Protected Areas Project	Sec. of Natural Resources and Sustainable Development (SRNyDS)-APN	Natural resource management		19.50	10.00	12.50		Argentina
PROSOFA	Secretariat of Social Development	Social development				3.00	22.00	10 Provinces FONPLATA
National drinking water and clean-up program, stage VI	Secretariat of Public Works	Infrastructure	200.00			25.00	25.00	20 Provinces
PRISE – Primary education reform and investment program	Ministry of Culture and Education	Institutional strengthening	300.00			300.00		18 Provinces
Institutional development and social investment in municipalities	Secretariat of Social Development	Institutional Strengthening	210.00				90.00	14 Provinces
Sectoral highway maintenance and repair program	National Highway Directorate	Infrastructure	340.00			416.00		Argentina
PROMIN I – Mother-and-baby and nutrition program I	Ministry of Health and Social Action	Social assistance	100.00			30.00	30.00	9 Provinces
Provincias II – Second provincial development program	Ministry of the Interior	Institutional strengthening	225.00				96.00	17 Provinces
PASMA I & II – Technical assistance mining sector development	Ministry of the Economy and Public Works and Services	Technical assistance	69.60			17.00		Argentina



**DIRECTORY OF PLANS AND DEVELOPMENT PROGRAMS WITHIN THE BERMEJO RIVER BINATIONAL BASIN**

PLAN OR PROGRAM	AGENCY	FOCAL AREA	FINANCING (Million US \$)					SCOPE	
			World Bank	InterAmerican Development Bank	GEF	Government	Provincial		Other
Forestry development project	Setariat of Agriculture, Livestock, Fisheries, & Food (SAGPyA)	Institutional strengthening, Research		16.00		10.00			Argentina
Preservation and improvement of provincial roads I	Ministry of the Interior	Infrastructure, Institutional strengthening		300.00			1,200.00		8 Provinces
PROMIN II – Mother and-baby and nutrition program II	Ministry of Health and Social Action	Social assistance		100.00		53.90	17.10		17 Provinces
Second loan for provincial reform (PRL II)	Ministry of the Economy and Public Works and Services	Institutional strengthening		75.00					
PROSAP – Provincial agricultural services program	SAGPyA	Institutional strengthening	125.00	125.00		45.00	45.00	17.20	22 Provinces
PRODERNEA – Program of credit and technical support for small-scale farmers in NE Argentina	SAGPyA	Institutional strengthening, Small-scale farmers				57.50 (*)			4 Provinces
PROPASA	SRNyDS	Drinking water and clean-up				17.00 (*)			NE Argentina, NW Argentina
PRANI – Children’s nutrition and food program	Secretariat of Social Development	Social assistance				36.00 (*)			22 Provinces
PROHUERTA – Orchards program	Secretariat of Social Development – SAGPyA – National Agricultural Technology Institute (INTA)	Self-management				10.00 (*)			Argentina

**DIRECTORY OF PLANS AND DEVELOPMENT PROGRAMS WITHIN THE BERMEJO RIVER BINATIONAL BASIN**

PLAN OR PROGRAM	AGENCY	FOCAL AREA	FINANCING (Million US \$)					SCOPE
			World Bank	InterAmerican Development Bank	GEF	Government	Provincial	
FOPAR – Participatory social investment fund	Secretariat of Social Development	Self-management				17.60 (*)		9 Provinces
SIEMPRO –Social programs information, monitoring, and assessment system	Secretariat of Social Development	Institutional strengthening				7.50 (*)		Argentina
Civil society strengthening plan	Secretariat of Social Development	Institutional strengthening				9.20 (*)		Argentina
Social educational plan – PSE I & II	Ministry of Culture and Education	Education				104.00 (*)		Argentina
<i>Forestar</i>	Ministry of Labor and Social Security	Job creation				6.00 (*)		Argentina
Community services II	Ministry of Labor and Social Security	Job creation				42.10 (*)		Argentina
<i>Trabajar</i> II & III	Ministry of Labor and Social Security	Job creation				300.00 (*)		Argentina
PRODISM - Program of funding for municipalities	Secretariat of Social Development	Institutional development				57.00 (*)		Argentina
PSA - Social agricultural program	SAGPYA – INTA	Strengthening Productive capacity				9.40 (*)		21 Provinces
ASOMA – Solidarity with the elderly	Secretariat of Social Development	Social assistance				29.20 (*)		Argentina

**DIRECTORY OF PLANS AND DEVELOPMENT PROGRAMS WITHIN THE BERMEJO RIVER BINATIONAL BASIN**

PLAN OR PROGRAM	AGENCY	FOCAL AREA	FINANCING (Million US \$)					SCOPE
			World Bank	InterAmerican Development Bank	GEF	Government	Provincial	
<i>Probienestar</i>	INSSPJP	Social assistance				62.90 (*)		Argentina
FO.NA.VI – National housing fund	Secretariat of Social Development	Home construction				970.00 (*)		Argentina
PREI – Program for flood victims; house rebuilding subprogram	Ministry of the Interior	Infrastructure repairs				3.80 (*)		6 Provinces
Programs by the Chaco Secretariat of Social Development	Secretariat of Social Development – Chaco	Social assistance					2.90 (+)	Chaco
POSOCO – Community social policies	Secretariat of Social Development	Social assistance				92.40 (*)		Argentina
PROSONU – Nutritional social program	Secretariat of Social Development	Social assistance				106.30 (*)		Argentina
CENOC – National Center for Community Organizations	Secretariat of Social Development	Institutional strengthening, Organization Strengthening				5.60 (*)		Argentina
INAI – Actions by the National Aborigine Affairs Institute	Secretariat of Social Development	Social development				6.60 (*)		Argentina
Attention for priority groups	Secretariat of Social Development	Social assistance				2.20 (*)		Argentina
PAGV – Attention for vulnerable groups	Secretariat of Social Development	Social assistance				1.20 (*)		11 Provinces
PFDJ – Youth Development strengthening plan	Secretariat of Social Development	Community organization				3.70 (*)		Argentina

**DIRECTORY OF PLANS AND DEVELOPMENT PROGRAMS WITHIN THE BERMEJO RIVER BINATIONAL BASIN**

PLAN OR PROGRAM	AGENCY	FOCAL AREA	FINANCING (Million US \$)					SCOPE
			World Bank	InterAmerican Development Bank	GEF	Government	Provincial	
EMPRENDER	Ministry of Labor and Social Security	Promoting employment				4.00 (*)		Argentina
<b>TOTAL</b>			<b>835.00</b>	<b>1,370.10</b>	<b>10.00</b>	<b>2,821.85</b>	<b>1,506.00</b>	<b>39.20</b>
<b>PRO-RATED TOTAL FOR BERMEJO BASIN RIPARIAN PROVINCES IN ARGENTINA</b>			<b>160.75</b>	<b>275.52</b>	<b>1.5</b>	<b>461.00</b>	<b>181.27</b>	<b>11.38</b>

(\*) Estimated program budgets based on 1997 figures. Source: SIEMPRO.

(+) Funds spent by different programs.

**DIRECTORY OF PLANS AND DEVELOPMENT PROGRAMS WITHIN THE BERMEJO RIVER BINATIONAL BASIN**

PLAN OR PROGRAM	AGENCY	FOCAL AREA	FINANCING (Million US \$)					SCOPE	
			World Bank	InterAmerican Development Bank	GEF	Government	Provincial		Other
PRODIZAVAT - Integral development program in the Andean zone and high valley of Tarija	Prefecture of Tarija	Rural development				4.00		16.00	Tarija EEC
Erosion control project in the El Monte and San Pedro subbasins	PERTT	Reforestation and soil reclamation				1.00		3.80	Tarija JICA
Roads program	National Roads Service (SENAC)	Surfacing trunk highways				13.00		33.00	Tarija CAF
Water resources program, Phase 3	Prefecture of Tarija	Well drilling				0.80		2.00	Tarija Popular Republic of China
Water supply program	National Fund for Regional Development	Water supply and sanitation, City of Bermejo	4.00			2.00			City of Bermejo
Urban development program	National Fund for Regional Development	Infrastructure development	9.25						City of Tarija, Tarija
Participatory rural investment project	National Fund for Regional Development	Municipal strengthening	1.00			0.20			Tarija
Production support program	Rural Development Fund (FDC)	Rural development	1.50			0.30			Tarija
Multisectoral program	PRONAR, Prefecture of Tarija	Regional development		5.30		0.80			Tarija
Land use planning/ GIS	ZONISIG					0.40		2.00	Tarija NETHERLANDS

**DIRECTORY OF PLANS AND DEVELOPMENT PROGRAMS WITHIN THE BERMEJO RIVER BINATIONAL BASIN**

PLAN OR PROGRAM	AGENCY	FOCAL AREA	FINANCING (Million US \$)					SCOPE	
			World Bank	InterAmerican Development Bank	GEF	Government	Provincial		Other
AUTAPO – Support for Tarija and Potosi Universities	Juan Misael Saracho University, Tomas Frias University	Institutional strengthening				0.10		2.00	Tarija NETHERLANDS
Production support program	Rural Development Fund (FDC)	Rural development				0.40		2.00	Tarija GERMANY (KFW)
Natural resources and environment program	Rural Development Fund (FDC)	Rural Development				0.10		0.50	Tarija GERMANY (KFW)
Social Development Program	Social Investment Fund (FIS)	Social development	2.50	2.50		0.80			
<b>TOTAL</b>			<b>18.25</b>	<b>7.80</b>		<b>23.90</b>		<b>61.30</b>	
<b>PRO-RATED TOTAL FOR BOLIVIA AND ITS RIPARIAN PREFECTURES AND MUNICIPALITIES</b>			<b>18.25</b>	<b>7.80</b>		<b>23.90</b>		<b>61.30</b>	



**ANNEX IV**

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**PRIORITY ACTIONS, LOCATION AND SCOPE**



## Priority Actions

Num.	Location	STRATEGIC AREAS AND ACTIONS	
<b>A. INSTITUTIONAL DEVELOPMENT</b>			
<b>a.1 Adapting and Strengthening the Binational Commission</b>			
1	Basin	Institutional development for basin-wide integrated, interjurisdictional, binational management.	Establishment of an interjurisdictional mechanism for coordination, programming, and control within the arena of the Binational Commission. Extension of the BC's jurisdiction to the entire basin. Design of a basin-wide interjurisdictional entity, and consensus-based strategy for its introduction. Trained personnel and technical equipment for operations.
2	Basin	Institutional development for basin-wide integrated, interjurisdictional management in Argentina.	Consolidation of a basin-wide interjurisdictional entity in Argentina. Trained personnel and technical equipment for operations.
<b>a.2 Development and Harmonization of the Regulatory Framework for the Sustainable Use and Conservation of Natural Resources</b>			
3	Basin	Development and harmonization of legal frameworks for the sustainable management of water resources.	Identification and recommendation of strategies for establishing common environmental quality goals and policies. Joint technical proposals at the interjurisdictional level in Argentina and at the binational level on basic issues for the sustainable management of water resources.
4	Basin	Harmonization of the legal frameworks set by Argentina's provincial jurisdictions	Regional agreement on guidelines for harmonizing provinces' legal frameworks, particularly their laws dealing with the environment, water codes and laws, and environmental impact assessment provisions
<b>a.3 Implementation of Mechanisms for Coordination and Sectoral and Jurisdictional Interconnections</b>			
5	Basin	Development and implementation of networks and/or effective mechanisms for sectoral and jurisdictional coordination and interconnection in the Bermejo Basin.	Interconnection of interest groups at the basin level. Two regional workshops for each interest group carried out.
<b>a.4 Implementation and Strengthening of the Basin Environmental Information System</b>			
6	Basin	Integral environmental information system and database for the Basin.	Implementation of an information system that will allow the status and use of the basin's natural resources to be established and publicized; Provision of reliable information on different environmental parameters; Promotion of the interinstitutional strengthening and coordination of the agencies responsible.
<b>a.5 Formulation and Implementation of Integral Management Plans for Basins, Environmental Zoning, and Territorial Ordering</b>			
7	Basin	Environmental zoning and territorial ordering	Provision of basic instruments to direct land occupation and economic activities in terms of the suitability of natural resources.
<b>a.6 Institutional Strengthening for Integrated Natural Resource Management</b>			
8	Basin	Strengthening institutions and the capacity of government and civil society organizations involved with the management of natural resources in the Bermejo Basin.	Institutional requirements at the regional level have been identified, measured, and harmonized. Implementation strategies. Organizational, technical, human, and operational requirements have been identified, measured, and harmonized at the regional level. Strategies for implementation. Strengthening actions for agencies working with natural resources in the basin completed.
<b>a.5 Formulation and Implementation of Integral Management Plans for Basins, Environmental Zoning, and Territorial Ordering</b>			
9	Basin	Strengthening and development of economic instruments.	Consensus-based strategies for the incorporation of instruments that reflect the economic, social, and environmental value of water. Analysis carried out of pilot demonstration applications
10	Basin	Incorporation of environmental and social costs into projects – Equity accounts.	Strategies for the incorporation of environmental and social costs in the decision-making processes of the projects agreed upon. Consensus-based guidelines for assessing natural resources and services. Pilot case developed.
11	Basin	Sustainability guidelines in financial assistance mechanisms.	Sustainability guidelines for investment projects at the regional level identified and agreed upon. Strategies for applying them to financial assistance mechanisms determined.
12	Basin	Evaluation of incremental costs.	Provision of guides or manuals for regional application. Examples of application to base line projects. Strategies for implementation in project assessment.

1 Includes agencies, organizations, and institutions that are executing, proposing, participating in, or interested in the project.

2 BC\*\* refers to the Binational Commission after implementation of the interjurisdictional coordination mechanism.

3 COREBE\* refers to that regional agency after becoming the interjurisdictional entity for the basin in Argentina.

Participants <sup>1</sup>	Progress Status	Total Amount
Provinces. Prefecture of Tarija BC* <sup>2</sup> . For. Aff.	PROFILE	570.000
Provinces, COREBE, Nation	PROFILE	150.000
BC** , prov. WR and NR/Environ Org., reg. & nat. technical institutes	PROFILE	534.000
COREBE* <sup>3</sup> prov. WR and NR/ Environ Org., Prov. Legislatures	FD / P	180.000
BC** WR, NR/Env. Education, S&T, jurisdictional., Universities, Educ. Estab., Civil Society Orgs.	PROFILE	195.000
BC** , WR, NR/Env., INTA, SENAMHI, S&T, Prod. Orgs., Users	PROFILE	1.840.000
BC** , Prefecture of Tarija, Prov. WR and NR/Environ Orgs., Municips., Civil Society Orgs.	PROFILE	1.100.000
Tarija, Provinces, WR & NR Orgs., S&T Orgs., Users, CSO	PROFILE	1.900.000
BC** ; WR, NR, & Econ. Orgs.	PROFILE	91.000
BC** , WR & NR/Env. Orgs. from Tarija & Prov. Munic. & Orgs. from selected case	PROFILE	267.000
BC**	FD / P	100.000
BC**	FD / P	100.000

## Priority Actions - Continued

Num.	Location	STRATEGIC AREAS AND ACTIONS	
<b>B. ENVIRONMENTAL PREVENTION, PROTECTION, AND REHABILITATION</b>			
<b>b.1 Protecting Biodiversity and Natural Heritage</b>			
13	Chaco LB-A	Restoration of damaged forests.	Defining forestry management alternatives for the recovery of native forests
14	Salta UB-A	Ecotourism-type sustainable use in transition forest. Monitoring practices carried out in the vicinity of El Rey N.P. Repeat exercise in Calilegua N.P	Repeating and assessing the tests of the Transition Forests project.
15	Arce UB-B	Management and conservation of El Nueve gorge	Reforestation, conservation of forestry resources and soils, in order to prevent silting of the city's drinking water supply and reduced soil fertility
16	Entre Ríos & Carapará UB-B	Management and conservation of sub-Andean natural resources	Completing knowledge of the ecology and sustainable development of the sub-Andean ecosystem; Promoting the integrated and rational use of natural resources; Restoring vegetation in the project area
17	Tarija UB-B	Biodiversity study	Studying the current situation of the biota and proposing actions for its conservation and management; Discovering the status of the conservation of ecoregions, identifying problems that affect them, and proposing solutions
18	Padcaya & O'Connor UB-B	Evaluation of sub-Andean pastureland	Generating basic information and recommendations for drawing up a sustainable management plan for the pastureland in the sub-Andean area. Classifying transhumance stockraising and the use of natural resources
<b>b.2 Strengthening and Consolidating the Protected Areas System</b>			
19	Méndez & Arce UB-B	Zoning and management plan for the Sama and Tariquía biological reserves	Preparing (in agreement with the Directorate of Protected Areas) a proposal for redefining, reclassifying, and zoning the Sama y Tariquía reserves in accordance with their ecologies, economies, and political and social realities, and designing a management plan
20	Arce-UBB & Salta-UBA	Baritú-Tariquía ecological corridor	Making functional continuity between the two protected areas a reality through the corridor, the integral management of natural resources, and the administration of existing protected areas, in order to preserve a representative portion of Bolivia's Tucuman forest
21	Basin	Binational trust fund for protected areas in the Río Bermejo basin	Establishing a financial mechanism to provide funds for the conservation and sustainable development of the Tariquía, Sama and Baritú, Calilegua, and El Rey protected areas and the other natural protected areas in the basin. It is catalogued among the categories of biodiversity and international waters of the GEF
22	Chaco-Formosa LB-A	Teuco National Park	Studies and proposal for the creation of the Park
23	Formosa LB-A	Teuquito National Park	Preserving the natural values of the semi-arid Chaco and counteracting the effects of the transformation processes taking place in the west of Formosa province, which imply clearances, the alteration of water courses, and pressure on flora and wildlife.
24	Salta - Jujuy UB-A	Teuquito National Park	Establishing and implementing a conservation strategy for the foothill forests
25	Salta UB-A	Stabilization of microbasins and conservation of biodiversity in the Baritú subbasin	Granting the area protected status as a Natural Reserve in order to permanently regulate the land use methods and their intensity and allow the development of management projects, ensuring its continuity over time. II) Controlling erosion in the Río Baritú basin by means of a large number of small projects. III) Carrying out mechanical, biomechanical, and biological projects to stabilize microbasins
<b>b.3 Implementation of Plans to Mitigate the Effects of Floods and other Climatological Disasters</b>			
26	Arce UB-B	Program of defense construction in the Bermejo urban area	Allowing recovery and consolidation of land, preventing human losses and material losses in the urban infrastructure of the city of Bermejo
27	Arce UB-B	Program of defense construction on the Río Bermejo and the Río Grande de Tarija: <ul style="list-style-type: none"> <li>• Talita defenses • Campo Grande defenses</li> <li>• Naranjitos defenses • Porcelana defenses</li> <li>• Candado Grande defenses</li> <li>• Arrozales defenses</li> </ul>	Controlling swelling of the Río Bermejo and the Río Tarija in order to protect farmland. The Project plans the construction of 1,500 m of gabions and the cladding of 2,100 m of embankments, to the benefit of 5,500 families.

Participants	Progress Status	Total Amount
Forestry Directorate of Chaco	IDEA	126.000
APN – DTRNOA	PROFILE	330.000
Prefecture, Municipality of Bermejo	FD / P	115.000
BC** , Municipalities	PROFILE	2.100.000
BC**	PROFILE	200.000
BC**	PROFILE	65.000
PROMETA	IDEA	1.000.000
BC** , PROMETA (Bolivia), APN (Argentina)	AP/F	1.500.000
Contrib. agencies, BC** , PROMETA (Bolivia) APN (Argentina)	DP / F	25.000.000
APN DTRNEA – FUNAT	IDEA	150.000
APN DTRNEA	PD / PF	100.000
APN DTRNOA	PD / PF	120.000
APN – DTRNOA, INTA, UNSa	AP/F	388.000
Prefecture of Tarija, Municipality of Bermejo	DP / F	516.000
Prefecture, Municipality of Bermejo	DP / F	3.000.000

## Priority Actions - Continued

Num.	Location		STRATEGIC AREAS AND ACTIONS
28	Arce UB-B	Channeling Cinco gorge	Helping improve the urban road infrastructure for smoother vehicle and pedestrian traffic by preventing flooding and sources of infection. The project plans to channel the gorge, benefiting 5,000 families
29	Uriondo, Avilés UB-B	Program of defense construction in Uriondo: <ul style="list-style-type: none"> <li>• Calamuchita Mururayo defenses</li> <li>• Alizos defenses</li> <li>• San Nicolás defenses</li> <li>• La Ventolera defenses</li> <li>• Colón Sud defenses</li> <li>• Saladillo defenses</li> <li>• Huayriguana defenses</li> <li>• San Isidro – La Choza defenses</li> <li>• Colón Norte defenses</li> </ul>	Protecting farmland and pastureland, allowing flooding to be controlled and preventing the constant loss of productive land caused by strong, periodical rains. The project will benefit 500 poor families who live in the program area
30	O'Connor UB-B	Construction of defenses on the Río Pajonal, Río Santa Ana, and Río Salinas	Protection and recovery of arable land on river banks, thus avoiding the destruction of roads, homes, and other property. The construction of gabions is planned to protect 150 ha of land that is currently farmed, directly benefiting 400 families.
31	Cercado UB-B	Program of defense construction, Cercado Prov.: <ul style="list-style-type: none"> <li>• Bella Vista defenses</li> <li>• San Andrés defenses</li> <li>• Pantipampa defenses</li> </ul>	Allowing the recovery and consolidation of land and preventing the loss of natural resources caused by flood erosion; this will benefit 150 families
32	Cercado UB-B	Flood control in the city of Tarija	Defining the areas of the city at risk from floods and implementing solutions to reduce their effects, including protection projects and urban zoning provisions
33	Tarija UB-B	Anti-hailstorm system – Central valley of Tarija	Implementing a hailstorm protection system to mitigate the damage caused by hail to vegetable, fruit, and vine crops in the central valley of Tarija, the main agricultural area of Tarija Department
34	Chaco LB-A	Flood defenses system, Gral. San Martín Department	Flood defense, management, and control projects. Drafting an outline of the agricultural and agribusiness productive project. Sustainable development of the agricultural sector by improving its productive situation. Diversification of regional productive structures through land recovery
35	Chaco LB-A	Clean-up and reactivation of Río Guaycurú riverbeds	Clean-up and reactivation of riverbeds. Improvements to their capacity and drainage in order to prepare new areas for farming and forestry
36	Formosa LB-A	Protection of Lavalle Bridge against support erosion	Protection and maintenance work on the Lavalle bridge
37	Formosa LB-A	Protection of banks from erosion of slopes in El Colorado	Construction of slope protection structures, in order to prevent erosion and landslides caused by the action of the Río Bermejo and affecting urban areas of the city of El Colorado.
38	Formosa LB-A	Realignment of embankment against overflowing, KM 503 NRB	Survey of the current state and repair of the embankments
39	Formosa LB-A	Realignment and extension of San Pedro embankment	General survey of current state. Topographic study of the current area of overflows. Reparation of embankments. Construction project for additional embankment. Construction of embankment to protect against overflowing. Construction projects
40	Formosa LB-A	Repair of drainage network in the southeast region	Adapting the hydraulics of riverbeds and channels to maximize efficiency and yield. Correction of the effluent evacuation deficit in the southeast area. Repair and adaptation of existing engineering works and execution of additional projects
41	Salta UB-A	Paisanidis – Colonia Santa Rosa rainwater drainage channel	Solving a serious flooding problems in summer months that damage a wide farming sector and the population of Colonia Santa Rosa. Intercepting excess rainwater and preventing its uncontrolled entry into farmland and the town
42	Salta UB-A	Drainage in the Río Pescado agricultural area	Conducting studies and designing projects to provide the area with a network of rainwater channels, creating a rational surface drainage system to prevent the floods that occur at present and conflicts among neighboring farmers
<b>b.4</b>	<b>Prevention, Pollution Control, and Environmental</b>		<b>Clean-up of Bodies of Water</b>
43	Méndez Cercado UB-B	Environmental clean-up of the Río Guadalquivir	Solving environmental clean-up and water quality sustainability in the Río Guadalquivir, thus reducing the environmental problems occurring at present
44	Arce UB-B	Study for the environmental clean-up of watercourses in the Bermejo Triangle	Assessing the level of pollution and its main causes, and proposing solutions for environmental clean-up and water quality sustainability of the El Nueve and El Cinco gorges and the Río Grande de Tarija and Río Bermejo that have been affected by industrial and organic pollution

<b>Participants</b>	<b>Progress Status</b>	<b>Total Amount</b>
Prefecture, Municipality	DP / F	150.000
Prefecture, Municipality of Uriondo	PD / PF	800.000
Prefecture, Municipality of Entre Rios	PD / PF	2.000.000
Prefecture, Municipality of Cercado	PD / PF	360.000
BC** , and Municipality of Cercado	DP / F	10.300.000
Prefecture of Tarija, BC**	DP / F	1.600.000
APA	PD / PF	8.100.000
APA, Municipalities, Producers' Orgs	PD / PF	5.940.000
Directorate of WR	PD / PF	250.000
Directorate of WR, Direc. Water & Soil	PD / PF	1.232.000
Directorate of WR, Direc. Water & Soil	PD / PF	135.000
Directorate of WR, Direc. Water & Soil	PD / PF	2.575.500
Central Program Admin. Unit, Municipalities, Producers' Orgs	FD / P	3.806.000
AGAS Min. Prod & Empl	FD / P	1.061.000
AGAS Min. Prod & Empl	IDEA	100.000
BC** , and Municipalities	AP / P	9.823.000
BC**	PROFILE	57.000

## Priority Actions - Continued

Num.	Location		STRATEGIC AREAS AND ACTIONS
45	Formosa LB-A	Installation of a sewerage system in the city of Pirané	Design of a project to provide the city of Pirané with a sewerage system, comprising a network of sewers and a treatment plant
46	Jujuy UB-A	Sewerage main, Villa Jardín de Reyes	Sewerage service covering Villa Jardín de Reyes
47	Jujuy UB-A	Reuse of sewage – Finca El Pongo	Rational management of treated effluent in stabilizing ponds, its use for industrial crops, reducing the possibility of polluting the Río Grande
48	Salta UB-A, Arce UB-B	Prevention of endemic illness in border areas	Exploring alternatives for overcoming the root causes of the expansion of diseases along the border between Argentina y Bolivia. Experiments with a crossborder health system. Improving habitats and cleanliness. Experiments with alternative forms of production. Border integration
<b>b.5 Prevention and Control of Erosion and Sedimentation</b>			
49	Formosa LB-A	Recovery of degraded grasslands and control of erosion caused by water	Development and application of a technological method for recovering pastureland. Drafting of management standards
50	Salta UB-A	Sustainable management of the basin of the Río Blanco or Zenta	Placing 140,000 ha of land degraded by over-pasturing under integrated management and reestablishing hydrological balance
51	Cercado UB-B	Sediment control in the Río Tolomosa basin	Control of transit sediments and soil erosion to reduce build-up at the San Jacinto dam; this will bring about a 25% reduction in the sediment reaching the dam, increasing the useful life of this multipurpose infrastructure: irrigation, electricity, drinking water, tourism, etc
52	Jujuy UB-A	Erosion control in the Arroyo del Medio basin	Control of accelerated water erosion by managing pastureland and water and forestry projects
<b>C. SUSTAINABLE DEVELOPMENT OF NATURAL RESOURCES</b>			
<b>c.1 Development and Implementation of Integral Basin Management Plans</b>			
53	Basin	Program for the Integrated Management of Water Resources (PMIRH-CRB).	Having consolidated a program framework for the integrated management of resources at a regionally consolidated basin-wide level, including development initiatives in the context of preventing erosion and pollution and preserving nature for protective purposes
54	MéndeZ , Cercado UB-B	Integral Natural Resource Management Plan for the Upper Basin of the Río Guadalquivir	Controlling erosion and floods and managing natural resources on a sustainable basis; Construction and improvement of hydraulic infrastructure for irrigation and sediment control; Encouraging the adoption of farming technologies that help reduce erosion and the transportation of sediment; Protecting the quality levels of rivers and restoring the environment
55	Cercado UB-B	Integral Natural Resource Management in the Río Santa Ana Basin	Implementing a system for managing natural resources in the Río Santa Ana Basin, with a view to environmental sustainability; Introducing practices and carrying out projects to control erosion; Working for equality in these undertakings with the participation of the basin's inhabitants and stakeholders; Improving living standards for the population
56	Arce y Avilés UB-B	Integral Resource Management in the Río Camacho Basin	Achieving a pattern of natural resource usage in the basin to ensure sustainable economic growth; Introducing practices and carrying out projects to control erosion; Developing a rational natural resource management system in the basin to improve the environment
57	Chaco LB-A	Study for the integral development of the Río Bermejito Basin	Collection of background information. Socio-economic analysis. Basic studies of hydrology, hydraulics, climatology, topography
58	Salta UB-A	Integrated management of the Río Iruya Basin	Formulating a basin management program
<b>c.2 Implementation of Basin-Wide Sustainable Natural Resource Management Programs</b>			
59	Jujuy UB-A	Management of the Río Grande Basin: Systematization of the Río Huasamayo Basin	Actions in the fields of forestry, farming, and small projects for controlling flood erosion
<b>c.3 Development, Validation, and Application of Appropriate Technologies and Sustainable Productive Models</b>			
60	Formosa LB-A	Evaluation of the quality and health of soils used for farming and forage	Information, awareness, and training in correct soil use geared toward organic production
61	Basin	Access to, validation of, and application of sustainable technologies	Providing technical, legal, institutional, and financial strategies for the definition and validation of specialized productive models and sustainable practices in the Bermejo Basin
62	Chaco - Formosa LB-A	Sustainable management alternatives in the humid and semihumid regions of the Río Bermejo Basin	Further and promote sustainable management techniques to make good use of natural resources
63	Chaco LB-A	Forestry expansion plan	Recovery, conservation, and preservation of forests through management practices

<b>Participants</b>	<b>Progress Status</b>	<b>Total Amount</b>
Municipality of Pirané	PD / PF	6.300.000
Agua de los Andes SA	IMP	367.000
Agua de los Andes SA	IMP	40.000
FLACAM – Bermejo town council	IMP	1.800.000
INTA El Colorado, Private producers	PD / PF	220.000
FUDECHA	FD / P	1.980.000
BC**, and San Jacinto Association	DP / F	4.150.000
EEA INTA Salta, Municipalities, Producers	IDEA	440.000
BC**; local WR, NR, & Environ. Orgs.; techn. institutes; municipalities; civ. soc. orgs	PROFILE	2.570.000
BC**	DP / F	5.500.000
BC**	DP / F	4.200.000
BC**	DP / F	6.300.000
APA	PD / PF	1.000.000
COREBE*, UNSa, Municipalities	IMP	520.000
DPRH Jujuy, Municip., Producers	PROFILE	250.000
UNAF, Producers	DP / F	110.000
BC**, Prov. NR Orgs., S&T Orgs	FD / P	150.000
INTA – SRF – SRCH – UBA – INDES – Min. Production	PROFILE	1.835.000
IIFA, Producers	IMP	800.000



## Priority Actions - Continued

Num.	Location		STRATEGIC AREAS AND ACTIONS
64	Formosa LB-A	Techniques to improve forestry management in the «parque Chaco – Salteño	Developing systematized technologies for multiple usages, restoration, conservation, and improvement of forests
65	Formosa LB-A	Model nursery to produce species native to the region.	Providing forestation projects with native species; providing producers with training in production techniques and advice on native species
66	Formosa LB-A	Promotion native forest management	Sustainable forestry and livestock production models
67	Jujuy UB-A	Survey and assessment of native forest management alternatives	Evaluation of those that exist and study of the behavior of different managed surfaces
68	Salta UB-A	Productive entrepreneurship for social development	Promoting self-management, food production, and improved resource management
69	Salta UB-A	Production and development of organic crops	Establishing guidelines for farm work that preserve plots for organic production
70	Salta UB-A	Productive diversification of the Yungas using guidelines of sustainability	Implementing and/or improving productive systems based on the ecologically, economically, and socially sustainable use of natural resources
71	Salta UB-A	Carbon fixation in the Río Bermejo Basin	Fixing atmospheric carbon by means of forest plantations (5,500 ha), the management of native forests (72,500 ha), and the establishment of ecological reserves (23,000 ha)
72	Basin	Cultural heritage related to management of water resources	Survey and dissemination of typical traditional cultural phenomena in the basin region
73	Cercado UB-B	Implementation of natural resource management practices at farms	Training for men and women in the management of natural resources on small-scale property, by selecting and equipping farms in 14 communities for the implementation of sustainable management practices for water, soils, vegetation, and livestock
<b>c.4</b>	<b>Implementation of Projects for the Sustainable Development and Use of Water Resources</b>		
74	Chaco LB-A	Expansion of the rice growing area in the Cangüi Grande and Chico basin	Construction of pumping stations, irrigation channels, and drainage. Systematization and leveling of land, service roads. Technical assistance for producers. 1st year: 1000 ha under irrigation. Transfer channel. 2nd year: 3000 ha under irrigation. Pumping station. 3rd year: 4000 ha under irrigation. 4th year: total of 7100 ha under irrigation
75	Chaco LB-A	Expansion of the rice growing area in the Bermejo basin.	Construction of irrigation channels and drainage. Technical assistance for producers
76	Chaco LB-A	Northern aqueduct	Provision of water to settlements in the north, center, west, and southwest of the Chaco. I) Puerto Lavalle – Saenz Peña. II) S. Peña. – Hso. Campo S. Peña – Los Frentones. III) Extension San Bernardo – V. Berthet V. Angela – S. Silvina. Basic studies. Course of the aqueduct. Choice of materials. Alternative courses
77	Chaco LB-A	Supplying water to the center-west of Chaco province	Conducting preliminary technical and economic feasibility studies that will allow the design and implementation of sustainable development actions in the productive areas of Chaco Province, covering the following areas: Providing water to the center-west of the province; agricultural and agribusiness production. Proposals for the specific aspects of water management involved in the project
78	Formosa LB-A	Maintenance and adaptation of outlet of the Laguna Yema channel	Improving outlet capacity. Construction of feeder channels. Removal of sediment from outlet channels and gates. Construction of deflecting breakwaters
79	Formosa LB-A	Relocation and adaptation of the Santa Rita water outlet station	Adapting the outlet structure to the new location of the Río Bermejo drainage channel
80	Jujuy UB-A	Colorado stream project – Santa Clara	The specific goals area: (i) unification of outlets, construction of a redirecting dam and grid outlet that will allow irrigation on both sides of the Colorado stream; (ii) improvement and repair of the guiding infrastructure in principal and secondary channels; (iii) installation of the water measurement and control structures to allow proper distribution of water; (iv) increased efficiency in irrigation to satisfy the demand for water of the existing surfaces
81	Jujuy UB-A	San José del Bordo channel project	Construction of temporary works (caissons, detours, and temporary service roads for the duration of work). Optimization of outlet work. Expansion of the existing sand remover. Repair of the channel bridge over the El Malvar stream. Repair of the siphon beneath the El Mollar stream. Preparing the guard channel. Repairing the service road. Repairing the San José del Bordo channel. Construction of works with reinforced concrete. Raising the channel. Construction and repair of gates and surface drains

<b>Participants</b>	<b>Progress Status</b>	<b>Total Amount</b>
UnaF, Producers	FD / P	63.000
Dir. Forests	PD / PF	210.000
Dir. Forests, Municipalities, Producers	PD / PF	200.000
DGRNR	IDEA	89.000
IPA - Communities	IMP	85.000
IPA - Communities	PD / PF	100.000
LIEY, Communities, Producers	PROFILE	658.000
Agroftal Foundation, LIEY-LISEA, Private Companies	DP / F	2.500.000
BC** , Prov. Orgs., NGOs	PROFILE	280.000
Vida Verde (NGO)	DP / F	180.000
APA	IMP	16.500.000
APA	IMP	2.625.000
APA	PD / PF	152.000.000
COREBE – UNPRE	PD / PF	803.000
Dir. WR	DP / F	1.900.000
Dir. Water & Soil	IMP	200.000
DPRH	DP / F	1.564.000
DPRH	DP / F	1.060.000

## Priority Actions - Continued

Num.	Location		STRATEGIC AREAS AND ACTIONS
82	Jujuy UB-A	Tertiary channels "Integral use of the Perico and Grande Rivers	Implementation of the tertiary irrigation network and appropriate management of infrastructure, avoiding water leaks and losses, increased production through optimization of water resources, increased employment of rural workers
83	Jujuy UB-A	Drainage and irrigation project in Manantiales, Phase I.	Phase I: a) Development of irrigation and drainage infrastructure, b) training and expansion, c) farm credits (soil cleaning).
84	Jujuy UB-A	Carahunco – La Mendieta Aqueduct	Drinking water coverage in rural areas
85	Jujuy UB-A	Expansion of secondary channel capacity SM8	Design of a project to increase energy production at Las Maderas hydroelectric plant. Possibility of providing water for human consumption to the San Pedro de Jujuy drinking water processing plant (60,000 people).
86	Jujuy UB-A	Manantiales plan, Phase II. Usage in irrigation in Lobatón, Lavayen, Arechal	Design and formulation of the 2nd phase of the project. 3rd study and design of how recovered water is to be channeled into the usage area
87	Jujuy UB-A	Assistance program for livestock drinking water	Providing drinking water for animal consumption in the high plateau, meeting conditions of sustainability and adequate sanitation
88	Jujuy UB-A	Irrigation board	Construction of the irrigation channel and improving the irrigation system to provide the zone's inhabitants with a greater water flow for animals, plants, crops, drinking water, and forage
89	Jujuy UB-A	Managing water and improving irrigation systems in the community of Maimará – Quebrada de Humahuaca	Reducing the degradation of the Río Grande basin through a more sustainable use and management of natural resources. Promoting the sustainable use of natural resources, water, and soils to increase the efficiency with which the irrigation system is used. Constructing physical and forestry defenses to protect water outlets and prevent subsidence and sediment deposits. Reducing water losses caused by leaks by channelization. Enabling producers to use water more rationally and efficiently on plowed fields
90	Salta UB-A	Colonia Santa Rosa outlet	Construction of 6 m <sup>3</sup> /sec outlet. 3 km of coated main channel
91	Salta UB-A	Colonia Santa Rosa drainage network	Construction of 20 km of drainage channels. Organization of irrigation and drainage consortia
92	Salta UB-A	Las Maravillas irrigation network	Construction of an outlet and 10 km of channels for distributing irrigation water
93	Salta UB-A	La Quena – Morillo outlet and channel	Construction of a 13 m <sup>3</sup> /sec outlet and 8 km of main channel for irrigation consortia
94	Salta UB-A	Orán drainage collectors	Construction of 22 km of drainage collection channels. Providing the city and its rural surroundings with the infrastructure necessary for rain drainage and the clean-up of 500 affected hectares
95	Salta UB-A	El Angosto – Río Mojotoro outlet and main channel	Increase and improve farm output in the area by between some 30 and 40%. Construction work and creation of the consortium
96	Salta UB-A	Repair of Campo Alegre dam	Repair of the Campo Alegre outlet, the dam that diverts the Río San Alejo and the Río Santa Rufina, which has been partially broken by flooding. If the repairs are not effected, there is a risk of total destruction, which would have major repercussions for the Gral. Güemes irrigation zone
97	Salta UB-A	Río Dorado unifying irrigation channel	Unifying the outlets (nine in total) and current precarious channels, to achieve greater efficiency in the collection and distribution of irrigation water in the Apolinario Saravia farming region
98	Salta UB-A	Urundel Río de las Piedras siphon and channel	Construction project to ensure equitable water distribution between the provinces of Salta and Jujuy
99	Salta UB-A	Water supply for small settlements	Providing water for human consumption and, possibly, for livestock
100	Salta UB-A	Making use of dry riverbeds and water-courses	Providing water for consumption by livestock
101	Salta UB-A	Improving irrigation systems in small settlements	Cladding of channels and construction of small siphons
102	Salta UB-A	Dry riverbeds and distribution by aquifers in the subsoil of the Río Bermejo Basin	Studying the provision of drinking water to remote communities and defining the water-bearing potential of the dry riverbed
103	Salta UB-A	Aguas Blancas channel	Studies and design of the outlet project and 20 km of main channel; socio-economic evaluation; organization of irrigation users
104	Salta UB-A	El Talar – AGAS channel (right bank of the Río San Francisco)	Project studies for the construction of a 3 m <sup>3</sup> /sec outlet. Main irrigation channel. Creating productive, self-sufficient farming areas in the Chaco of Salta, using some 6,000 ha that are currently unproductive
105	Salta UB-A	Banda Sur project	Preliminary studies and feasibility studies of the project to provide Banda Sur (Salta province) with water and to extend the Santiago del Estero channel

<b>Participants</b>	<b>Progress Status</b>	<b>Total Amount</b>
DPRH	DP / F	17.800.000
DPRH	DP / F	18.000.000
Agua de los Andes SA	IMP	1.408.000
DPRH	PD / PF	5.300.000
DPRH	PD / PF	500.000
DPRH	AP/F	40.000
DPRH	IMP	10.000
CAM - CAUQueVa	FD / P	90.000
AGAS	FD / P	4.311.000
AGAS	FD / P	19.199.000
AGAS	FD / P	1.069.000
AGAS	FD / P	15.600.000
AGAS	FD / P	5.113.000
AGAS	FD / P	750.000
AGAS	IMP	400.000
AGAS	FD / P	2.400.000
AGAS	FD / P	400.000
DPMayRN	FD / P	170.000
DPMayRN	PD / PF	100.000
DPMayRN	PD / PF	85.000
DPMayRN	PD / PF	430.000
AGAS	IDEA	8.100.000
AGAS	IDEA	7.100.000
COREBE - UNPRE	IDEA	700.000

## Priority Actions - Continued

Num.	Location	STRATEGIC AREAS AND ACTIONS	
106	Salta UB-A	Improving the irrigation system in Gral. Güemes	Studies and designing projects to remodel 15 km of irrigation distribution channels, modifying part of their course and recladding them
107	Bermejo, Arce UB-B	Construction project for micro-irrigation systems in Bermejo: •Naranjitos •Talita •El Toro •La Florida •Barredero •Los Pozos •Colonia Linares •Campo Grande •Quebrada Chica	Providing irrigation infrastructure for existing farmed areas and others suitable for the purpose; diversifying production and improving agricultural yields. It involves the construction of outlets, channels, and ancillary equipment, such as siphons, sand removers, etc., and will provide 580 ha with irrigation, benefiting 420 families
108	Méndez UB-B	Construction project for micro-irrigation systems in San Lorenzo municipality: •Santa Bárbara •Erquis Sud •Tomatitas •Coimata •Sella	Providing irrigation infrastructure for existing farmed areas and others suitable for the purpose. Diversifying production and improving agricultural yields. The program will allow 155 ha to be irrigated, benefiting 185 families
109	Arce UB-B	Construction project for micro-irrigation systems in Padcaya municipality: •Padcaya •Extension work in Cañas Chaguaya •Abra La Cruz •El Carmen •La Merced	Providing irrigation infrastructure for existing farmed areas and others suitable for the purpose. Diversifying production and improving agricultural yields. The program will allow 130 ha to be irrigated, benefiting 195 families
110	Bermejo, Arce UB-B	Irrigation in the Bermejo triangle.	Promoting the development of irrigated agriculture in the Bermejo triangle, allowing the diversification of farming, improved production, increased incomes, and the creation of jobs. The goal is to provide 5,175 ha with irrigation, benefiting 4,500 families
111	O'Connor UB-B	El Pajonal irrigation system	Incrementing farmers' incomes by improving and expanding the irrigation system within a framework of sustainable development. The irrigation of 287 ha will be improved, and the area under irrigation will be expanded by 100 ha, benefiting 150 traditional farming families
112	O'Connor UB-B	Naranjo – Valle del Medio irrigation system, right bank	Increasing the output of farms under irrigation with high-yield crops and proper management of soil, water, and vegetation resources. The project involves the construction of an outlet facility, channels, and associated installations that will benefit 70 families and provide 120 ha with irrigation
113	O'Connor UB-B	Chiquiacá irrigation system	Expanding farming in the borderland with self-sustaining production systems to provide 500 ha with irrigation and benefit 150 families; supporting the correct and rational use of natural resources to enable increased agricultural production and productivity
114	Cercado UB-B	Construction project for micro-irrigation systems in Cercado province: •Tolomosa •San Andrés •Bella Vista •Yesera Sud •Pantipampa-Churquis	Establishing irrigation infrastructure for the rational use of natural resources, increasing agricultural production in the five communities, and introducing intensive production systems for the most profitable crops. The goal is to irrigate 300 ha, benefiting 200 low-income families
115	Avilés, Cercado UB-B	Systematization of land for agricultural purposes – Irrigated areas, San Jacinto project	Optimizing land and water use in the irrigated areas of the San Jacinto multiple project, in order to increase productivity, control rivulets near to farmed areas, and level out land along with the construction of the irrigation and drainage network
116	Méndez Cercado UB-B	Construction of the Sella dam	Agricultural development of 2,000 ha of irrigated land on the Sella and Carachimayo plateaus; Providing the city of Tarija with drinking water; Sediment control
117	Méndez UB-B	Construction of the Canasmoro dam.	Construction of a dam in order to irrigate 1,800 ha and involve them in agricultural development; Sediment control; Increased food supply
<b>c.5 Research for Natural resource Management and Use</b>			
118	Chaco LB-A	Soil study and inventory	A 1:50,000 scale inventory of the Río Bermejo basin in Chaco
119	Chaco LB-A	Forestry inventory	Identifying and assessing forestry resources to develop productive and environmental policies
120	Chaco LB-A	Evaluation of fishery resources	Updated knowledge about the resource for its management and conservation in light of changes in water quality and quantities
121	Chaco LB-A	Partial census of Chaco wildlife	Obtaining scientific information about species that have declined
122	Formosa LB-A	Soil study and survey. Soil management and conservation program	Drawing up 1:50,000 scale maps of the Río Bermejo basin region in Formosa
123	Formosa LB-A	Distribution of land holding and resource usage methods in the Lower Bermejo Basin	Conducting a survey of the distribution of land holding and productive economic units in the Lower Bermejo Basin (Formosa). Systematizing the information on the land holding distribution and on the regularization of the situations of Creoles and indigenous communities with precarious holding. Constructing a classification of types of usage made of the resources in the Lower Bermejo Basin part of the Chaco in accordance with specific indicators. Creating a database by computerizing this information

<b>Participants</b>	<b>Progress Status</b>	
AGAS	IDEA	1.600.000
Prefecture, Municipality of Bermejo	DP / F	1.185.000
Municipality of San Lorenzo, Prefecture of Tarija	FD / P	385.000
Municipality of Padcaya, Prefecture of Tarija	DP / F	325.000
Prefecture of Tarija	DP / F	13.000.000
Prefecture of Tarija	FD / P	1.500.000
Prefecture, Municipality of Entre Rios	FD / P	250.000
Prefecture, Municipality of Entre Rios	PD / PF	2.000.000
Prefecture, Municipality of Cercado	DP / F	750.000
San Jacinto Association	DP / F	450.000
Prefecture of Tarija Dept	FD / P	17.200.000
Prefecture of Tarija Dept	DP / F	7.500.000
INTA - Dir. Soils	IMP	250.000
Dir. Soils	IMP	100.000
Directorate of Wildlife – SRN	IMP	350.000
Dir. of Wildlife	IMP	120.000
Dir. Water & Soils	PD / PF	600.000
ACON, UBA	PD / PF	100.000

## Priority Actions - Continued

Num.	Location		STRATEGIC AREAS AND ACTIONS
124	Salta UB-A	Geological risks and man-made influences	Studies for identifying, assessing, and describing the natural geological and man-made processes that affect the natural environment
125	C e r c a d o UB-B	Adaptation of the studies of the Río Santa Ana irrigation system and dam	Taking the JICA's existing studies into the construction of the Santa Ana irrigation system and dam to the level of a final design
<b>D. PUBLIC PARTICIPATION AND AWARENESS</b>			
<b>d.1 Strengthening Public Participation in Action Planning and Implementation</b>			
126	Basin	Public participation program	Promoting local awareness of environmental decay; Encouraging the population's active involvement in planning and implementing projects for the management and rational use of natural resources; Incorporating public participation as a work method within the SAP's projects
127	Basin	Assessment and control mechanisms involving civil society and the State	Exploring implementation strategies for the incorporation of the organized community in the assessment and control of management. Developing pilot project
128	Jujuy UB-A	Thematic discussion and cooperation workshops	Raising awareness of the importance of making rational use of the environment through workshops and participatory instruments
<b>d.2 Environmental Education and Training Programs for Civil Society</b>			
129	Basin	Promotion of environmental education activities in the basin	Promoting the training of human resources in environmental management and ecologically rational practices; Dissemination of knowledge on environmental issues and provisions; Promoting a multisectoral approach to training; Encouraging awareness of environmental issues
130	F o r m o s a LB-A	Forestry awareness in schools and indigenous communities	Promoting awareness of the environment and forestry among school teachers and pupils and in indigenous communities
131	Basin LB-A	Training environmental operators	Training an interdisciplinary group to help preserve the ecosystem and work for sustainable development
132	Chaco LB-A	Let's Plant the Future	Raising awareness about the value of natural resources, particularly trees
<b>d.3 Dissemination of Sustainable Technologies for Production</b>			
133	Salta UB-A	Rural development of Creole and indigenous communities	Raising awareness among producers regarding the importance of managing agricultural land, forests, and pastureland
134	Chaco LB-A	Training in soil management and conservation	Training teachers, technicians, and producers about the sustainable use of natural resources
135	Jujuy UB-A	Education and soil conservation	Training producers in conservationist practices
<b>d.4 Public Access and Dissemination of Information for Supporting Decision-Making Processes</b>			
136	Basin	Access to information for participation	Identifying appropriate mechanisms for access to information by interested members of the community. Development of a pilot project

### Location:

UB-A: Upper Basin, Argentina

UB-B: Upper Basin, Bolivia

LB-A: Lower Basin, Argentina

### Progress Status:

IDEA: IDEA PROPOSED

PD / PF: PRELIMINARY DESIGN / PRE-FEASIBILITY

DP / F: DRAFT PROJECT / FEASIBILITY

PROFILE: PROJECT PROFILE

FD / P: FINAL DESIGN / PROJECT

IMP: IMPLEMENTATION / CONSTRUCTION

<b>Participants</b>	<b>Progress Status</b>	
Nat. Univ. Salta	PD / PF	10.000
BC**	PD / PF	500.000
BC**, Provinces, Municipalities, NGOs	PROFILE	850.000
BC**, Provinces, Selected municipality	FD / P	250.000
CRVP	PROFILE	90.000
BC**, NR, Educ. Orgs., Civ. Soc. Orgs. from provinces and Tarija	PROFILE	800.000
Dir. Forests	PROFILE	290.000
FUNAT	IDEA	60.000
Dir. Soils	IMP	10.000
Tech. Sch. 5127	PROFILE	60.000
Dir. Soils	IMP	10.000
DGRNR	IDEA	900.000
BC**, Provinces	PROFILE	150.000



## FIGURE INDEX

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**Figure 4** Priority Actions. Location and Scope

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

**Priority Actions  
Location and Scope**  
Bermejo River Basin

**Figure N° 4**

**EXPLANATION**

- Capital Cities
- Metropolitan Development Projects
- Priority Actions
- River network (reference to IFA documents)
- △ Temporary Watercourses
- △ Individual Boundary
- District Boundary - Agribios
- District Boundary - Salinas
- District Boundary - Agribios
- District Boundary - Salinas
- District Boundary - Salinas
- District Boundary - Salinas



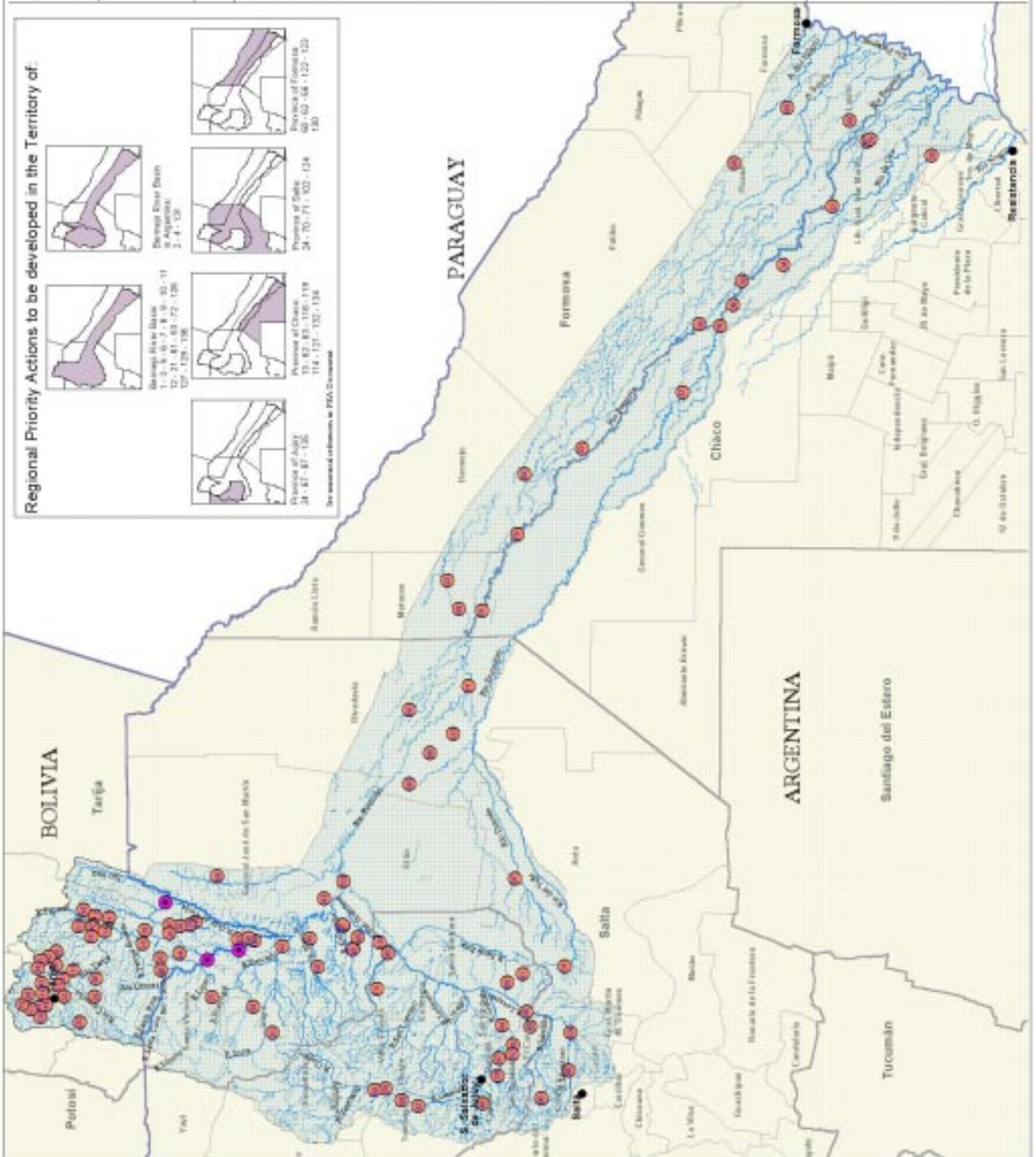
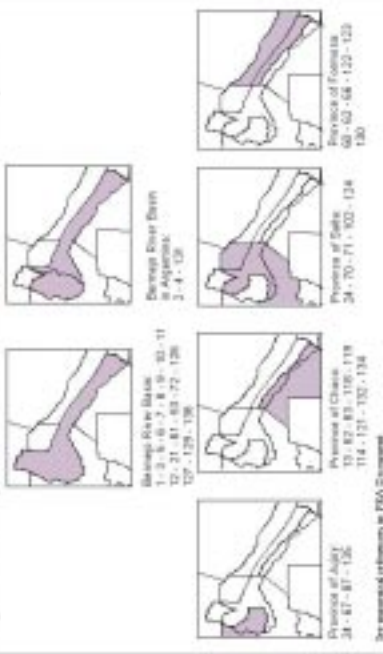
Graphic Scale

50000 0 50000 METERS  
GAUSS KRÜGER PROJECTION ZONE 4  
SCALE 1:500000

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**Regional Priority Actions to be developed in the Territory of:**





## **ANNEX V**

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**OFFICIAL INSTITUTIONS OF ARGENTINA AND BOLIVIA TO BE INVOLVED IN SAP STRATEGIC ACTIONS**

**NONGOVERNMENTAL ORGANIZATIONS THAT COULD CARRY OUT SAP ACTIONS**

**PRINCIPAL ORGANIZATIONS OF INDUSTRIES AND WATER RESOURCE USERS IN THE BERMEJO RIVER BASIN THAT COULD PARTICIPATE IN EXECUTING THE SAP**

**INDICATORS OF PUBLIC PARTICIPATION DURING FORMULATION OF THE SAP**



**Table 6.1: OFFICIAL INSTITUTIONS OF ARGENTINA AND BOLIVIA TO BE INVOLVED IN SAP STRATEGIC ACTIONS**

<b>Agency, Institution</b>	<b>Area</b>	<b>Institutional Strengthening and Development</b>	<b>Environmental Prevention, Protection, and Rehabilitation</b>	<b>Sustainable Development of Natural Resources</b>	<b>Public Participation and Awareness</b>
Binational Commission for the Development of the Bermejo Basin	Basin	X	X	X	X
Secretariat of Sustainable Development and Environmental Policy	RBB Arg	X	X	X	X
Regional Commission for the Río Bermejo COREBE	RBB Arg	X	X	X	X
National Agricultural Technology Institute – INTA	RBB Arg		X	X	X
National Parks Administration	RBB Arg		X		X
Argentine National Gendarmes	RBB Arg		X		X
National Water and Environment Institute – INA	RBB Arg	X	X		X
National Science and Technology System	RBB Arg	X			X
Provincial Settlement Institute, Chaco	Chaco	X			X
National University of the Northeast– UNNE	Chaco	X	X	X	X
Provincial Water Administration – Chaco	Chaco	X	X	X	X
Under Secretariat of Natural Resources and the Environment	Chaco	X	X	X	X
Water Maintenance Service SAMEEP – Chaco	Chaco		X	X	X
Ministry of Education	Chaco	X			X
Under Secretariat of Natural Resources and Ecology	Formosa	X	X	X	X
Directorate of Water Resources	Formosa	X	X	X	X
Provincial Drinking Water Service of Formosa	Formosa	X	X	X	X
Ministry of Education	Formosa	X			X
Secretariat for Renewable Natural Resources	Jujuy	X	X	X	X
Provincial Directorate of Water Resources of Jujuy	Jujuy	X	X	X	X
Agua de los Andes S.A.	Jujuy	X		X	X
Superintendency of Public Services – SUSEPU	Jujuy	X	X	X	X
National University of Jujuy	Jujuy	X	X	X	X
Ministry of Education	Jujuy	X			X
National University of Salta	Salta	X	X	X	X
Secretariat of Tourism of Salta	Salta			X	X
Secretariat of Environment and Sustainable Development	Salta	X	X	X	X
Infrastructure Development Unit	Salta	X	X	X	X

**Table 6.1: Continued**

<b>Agency, Institution</b>	<b>Area</b>	<b>Institutional Strengthening and Development</b>	<b>Environmental Prevention, Protection, and Rehabilitation</b>	<b>Sustainable Development of Natural Resources</b>	<b>Public Participation and Awareness</b>
Ministry of Education	Salta	X			X
Laboratory of Yungas Ecology Research - University of Tucumán – LIEY	Salta		X	X	X
National Commission of the Pilcomayo and Bermejo Rivers (CONAPIBE)	RBB Bolivia	X	X	X	X
General Directorate of Forestry Development	RBB Bolivia		X	X	
General Directorate of Biodiversity	RBB Bolivia		X	X	
General Directorate of the Environment	RBB Bolivia		X	X	X
Bolivian Agricultural Technology Institute (IBTA)	Tarija			X	
Tarija Executive Program for Land Recovery (PERTT)	Tarija	X	X	X	X
Prefecture of Tarija Department	Tarija	X	X	X	X
Directorate of Sustainable Development – Tarija Prefecture	Tarija		X	X	X
Juan Misael Saracho Autonomous University	Tarija	X	X		
Departmental Directorate of Education – Tarija Prefecture	Tarija				X
Peasant Development Fund (FDC)	RBB Bolivia		X	X	
Social Investment Fund (FIS)	RBB Bolivia		X	X	
National Regional Development Fund (FNDR)	RBB Bolivia		X	X	
Popular Participation Unit – Tarija Prefecture	Tarija	X			X
National Irrigation Program – PRONARD	RBB Bolivia			X	
San Jacinto Multiple Project	Tarija		X	X	X
INIBREH	Tarija	X	X	X	
National Meteorology and Hydrology Service – SENAMHI	RBB Bolivia	X	X		
ZONISIG Project	RBB Bolivia	X	X		
Municipalities in the basin	Basin	X	X	X	X

**Table 6.2: NONGOVERNMENTAL ORGANIZATIONS THAT COULD CARRY OUT SAP ACTIONS**

<b>ORGANIZATION</b>	<b>Institutional Strengthening and Development</b>	<b>Environmental Prevention, Protection, and Rehabilitation</b>	<b>Sustainable Development of Natural Resources</b>	<b>Public Participation and Awareness</b>
<b>NGOs IN ARGENTINA</b>				
Association of Friends of the Aborigine (ASAMAB)		X	X	
Association of the Anglican Church (ASOCIANA)		X	X	
Agricultural Producer Defense Association				X
Association for the Promotion of Culture and Development (APCD)		X	X	X
Association for the Promotion and Defense of the Environment (APROMA)	X	X		
Chaco Association of Promoters (APROCH)		X		
Cáritas		X	X	
Ce.Ca.Zo. (Zone Training Center)		X		
Palo Santo Agricultural Education Center		X	X	
Research Center for the Reconversion of the North (CIRENOR)	X	X		X
Center of the Old People of the Chaco				X
Rio Negro Recovery Commission	X			
ENDEPA		X	X	
EMPRENDER		X		X
Argentine Federation of Evangelical Churches (FAIE)			X	
FUDECHA (Chaco Ecological Foundation)	X			
Total Environment Foundation	X	X		X
Geopuna Foundation	X	X		
Kallpa Foundation for Integrated Forest Management	X	X		X
Big North Foundation	X	X		X
PACHA MAMA Foundation	X			
S.O.S Foundation	X			
Argentine Wildlife Foundation	X	X		X
FUNDALES				X
FUNDAPAZ (Foundation for Development in Justice and Peace)		X	X	
GREENPEACE	X	X		
Chaco Ecologist Group	X			
INDES		X	X	
Institute of Popular Culture (INCUPO)		X	X	
United Committee of Missions (JUM)			X	
KHANANYE	X			
Yaguarete	X			
Argentine Ecologist Movement	X			
PIRCA	X			
UNAMBI	X			X
<b>NGOs IN BOLIVIA</b>				
Loyola Cultural Action (ACLO)		X	X	X
Tarija Regional Study Center (CERDET)		X	X	X
Cooperative for Foreign Remittances (CARE)			X	
Cáritas, Tarija Diocese			X	
Peasant Research and Support Center (CIAC)		X	X	
Peasant Research and Training Institute (IICCA)		X	X	X
Tarija Social Pastoral		X	X	
Church Social Assistance Office (OASI)			X	X
Intercommune Peasant Organization		X	X	
Tarija Environmental Protection (PROMETA)	X	X	X	X
Vida Verde Association		X	X	X
Tarija International Plan		X	X	



**Table 6.3: PRINCIPAL ORGANIZATIONS OF INDUSTRIES AND WATER RESOURCE USERS IN THE BERMEJO RIVER BASIN THAT COULD PARTICIPATE IN EXECUTING THE SAP**

<b>INDUSTRIES AND USERS</b>	<b>Institutional Strengthening and Development</b>	<b>Environmental Prevention, Protection, and Rehabilitation</b>	<b>Sustainable Development of Natural Resources</b>	<b>Public Participation and Awareness</b>
<b>ORGANIZATIONS IN ARGENTINA</b>				
Sugar mills (Ledesma, Tabacal, etc.)			X	X
Tobacco farms			X	X
Citrus fruit companies			X	X
Cotton companies			X	X
Rice companies			X	X
Yuto irrigation consortium			X	X
Irrigation board – Juella	X		X	X
Valle de los Pericos Irrigation Consortium	X		X	X
Trópico de Capricornio – Huacalera Irrigation board	X		X	X
Arroyo Santa Rita irrigation consortium	X		X	X
Tannin companies		X	X	X
Chaco Rural Society	X		X	X
Formosa Rural Society	X		X	X
Jujuy Rural Society	X		X	X
Salta Rural Society	X		X	X
ADOPTAS			X	X
<b>ORGANIZATIONS IN BOLIVIA</b>				
Base Territorial Organizations (OTBs)		X	X	X
Association of milk producers			X	
Bermejo sugar-cane associations		X	X	X
Vine-growers' association			X	
Tarija Agricultural Chamber (CAT)	X	X	X	X
Tarija Federation of Cattlemen (FEGATAR)		X	X	
Chamber of industry		X	X	
Forestry chamber		X	X	
Bermejo agricultural industries		X	X	
Vintners		X	X	
Tarija Drinking Water and Sewerage Cooperative	X	X	X	X
Bermejo Drinking Water and Sewerage Cooperative	X	X	X	X
Fruit-growers' association (AFRUTAR)			X	

**Table 7.1: INDICATORS OF PUBLIC PARTICIPATION DURING FORMULATION OF THE SAP**

INDICATOR DESCRIPTION AND CONTENT		VALUE
First regional working meeting, Argentina, December 1995	Participants	176
Second working meeting, Bolivia, 1996	Participants	84
First regional workshop, Chocloca, Bolivia, August 1997	Participants	23
First regional workshop on the SAP, Salta, Argentina, December 1997	Participants	178
	Documents and discussion materials handed out to each participant	14
	Assessment forms filled out by participants	82
Regional seminar-workshop for the formulation of the SAP, Tarija, Bolivia, May 1998	Participants	132
Second regional workshop on the SAP, Formosa, Argentina, May 1998	Participants	75
	Documents and discussion materials handed out to each participant	10
	Assessment forms filled out by participants	41
Seminar-workshop on environmental law, Tarija, Bolivia, September 1998	Participants	60
Third regional workshop on the SAP, Jujuy, Argentina, November 1998	Participants	102
	Documents and discussion materials handed out to each participant	13
	Assessment forms filled out by participants	65
Seminar-workshop on erosion control experiences, Tarija, Bolivia, December 1998	Participants	52
IV regional seminar-workshop for the formulation of the SAP, Tarija, Bolivia, May 1999	Participants	79
V regional seminar-workshop for the formulation of the SAP, Tarija, Bolivia, June 1999	Participants	80
VI regional seminar-workshop for the formulation of the SAP, Tarija, Bolivia, July 1999	Participants	28
Contracts executed	Experts/consultants	80
	Institutions	20
	Contracted construction companies	4
	Orders for major equipment	10
Compilation of plans, programs, projects, and initiatives	Project description files distributed	700
	Projects and initiatives compiled	250
	Plans and programs compiled	103
Preliminary compilation document of distributed projects and initiatives	Printed format	45
	Diskette	120
Public communication	Electronic addresses	172
	Registered with SAP-NET as of 6/99	31
	Visits to website since 6/99	130
	Active records in the mailing	731
Institutions participating in program elements		
Specialists and technicians participating in the SAP	Individual and institutional contracts included (approx.)	30
Reports produced	Final reports and progress reports submitted by consultants and executing agencies in charge of program elements	260
		46
	Terms of Reference	60



**ANNEX VI**

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**MULTI PURPOSE DEVELOPMENT PROJECT  
LAS PAVAS, ARRAZAYAL Y CAMBARI**



## MULTIPLE DEVELOPMENT PROJECT LAS PAVAS, ARRAZAYAL AND CAMBARI DAMS

This program consists in the implementation of three multi-purpose water development projects, mainly aimed at regulating water flows, located in the Upper Basin border sector in the international stretch of the Bermejo river and in the Tarija river in Bolivia. Within the framework of the Orán Agreement of 1995 and its complementary Protocols, the Binational Commission for the Development of the Upper Bermejo River and Grande de Tarija River Basins is charged with the construction, operation, maintenance, utilization and administration of the "Las Pavas", "Arrazayal" and "Cambari" dams.

The "Las Pavas" and "Arrazayal" dams are located in the course of the Bermejo River in the contiguous stretch 50 kilometers from the "Juntas de San Antonio", and the "Cambari" dam is located on the course of the Tarija river, in Bolivian territory, approximately 5 kilometers from the border. Table VI-1 summarizes the main technical characteristics of these projects.

The above-mentioned projects will act as a major stimulus to the development of the border area, with the resulting binational integration; in addition, the projects will together help to promote the development process in the Chaco region of Argentina, and southern Bolivia.

The project will provide Bolivia with access to electric energy in the southern region of the country. By regulating the Bermejo River, these projects will basically allow Argentina to promote agricultural development in areas of the provinces of Salta, Chaco, Formosa and Santiago del Estero, via the introduction of irrigation systems in extensive areas.

In 1997, via the Binational Commission, both governments initiated an international public tender process using the "data room" format to grant a concession for the construction and operation of the development project to a private operator.

### Characteristics of the Binational Projects

DESCRIPTION	LAS PAVAS	ARRAZAYAL	CAMBARI
<b>Location</b>			
Site	Las Pavas	Arrazayal	Cambarí
Province (Argentina)	Salta	Salta	_____
Department (Bolivia)	Tarija	Tarija	Tarija
River	Bermejo	Bermejo	Tarija
Priority use of the resource	Energy and Irrigation	Energy and Irrigation	Energy and Irrigation
<b>Dam</b>			
Type	Concrete RCC gravity	Concrete RCC gravity	Concrete RCC gravity
Dam height	105 m	100 m	140 m
Gated spillway	4.500 m /s	4.500 m /s	4.500 m /s
<b>Hydrologic and operational characteristics</b>			
Maximum operating level	680 meters above sea level.	555 meters above sea level.	650 meters above sea level.
Minimum operating level	656 meters above sea level.	530 meters above sea level.	615 meters above sea level.
Reservoir area	2.074 ha	2.776 ha	3.800 ha
Reservoir capacity	589 Hm	696 Hm	1.675 Hm
Average annual flow	75 m /s	82 m /s	86 m /s
Project flood level	6.000 m /s	6600 m /s	8000 m /s
Basin Area	4.050 km	4.414 km	8.067 km
<b>Production characteristics</b>			
Installed power	86 MW	86 MW	102 MW
Average annual energy	372 GWh/year	423 GWh/year	543 GWh/year
<b>Cost</b>	US\$180.000.000	US\$140.000.000	US\$200.000.000



## **ACKNOWLEDGMENT**

The development of this Project has been possible due to the collaboration of a large number of professionals and specialists who have contributed to it through the compilation of information, studies and analysis, elaboration and edition, geographic information systems development, public participation activities, dissemination of the information, etc.

Many of them are stated as authors in the final reports elaborated along the Project, but unfortunately not all. Therefore, the Execution Unit members would like express through the following names, their acknowledgment to all who have contributed to the success of the Project.

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