

Integrated Management of Land-Based Activities in the São Francisco River Basin

ANA/GEF/UNEP/OAS



Strategic Action Program for the Integrated Management of the São Francisco River Basin and its Coastal Zone – SAP

Executive Summary

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English Translation: George Piers Aune, RAPPORT traduções e interpretação Ltda.

Printing: Athalaia Gráfica e Editora

www.tdabrasil.com.br

Brazil. Organization of American States.

Integrated management project for land-based activities in the São Francisco River Basin : Strategic Action Program for the integrated management of the São Francisco River Basin and its coastal zone – SAP; GEF São Francisco : Summary / Organization of American States; Global Environment Facility; United Nations Environment Programme et al.. – Brasília : TDA Desenho & Arte Ltda., 2004.

48 p. ; il..

1. São Francisco River Basin Committee – CBHSF. 2. Environment. 3. São Francisco River Basin. 4. São Francisco River. 5. Sustainable Development. 6. Water Resources. I. Brazil's National Water Agency-ANA (Agência Nacional de Águas). Global Environment Facility. II. Brazil. United Nations Environment Programme. III. Strategic Action Program for the Integrated Management of the São Francisco River Basin and its coastal zone-SAP. IV. GEF São Francisco.

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August/2004



Source: National Water Agency – ANA

São Francisco River Basin
Mosaic of Landsat satellite images (1991-92)

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Introduction

The objective of the Strategic Action Program for the Integrated Management of the São Francisco River Basin and its Coastal Zone (SAP) is to propose an action program, covering a period of approximately four years, targeted at resolving conflicts and revitalizing the São Francisco River Basin and its coastal zone (Figure 1).

The SAP is the outcome of the first stage of the Project for the Integrated Management of Land-based Activities in the São Francisco River Basin, approved by the Global Environment Facility (GEF) in 1998. Known locally as the GEF São Francisco Project, the project was prepared between July and November 2003. It is based upon the Diagnostic Analysis of the Basin (DAB) and its preparation involved intense public participation and discussions within the scope of the São Francisco River Basin Committee (CBHSF), involving more than 12,000 people and 404 institutions.

Once the Plans and Programs Work Group (GT-CBHSF) had examined all the strategic actions proposed, the CBHSF voted unanimously at their plenary meeting, held on October 1st to 3rd, 2003, to support continuation of the SAP preparation and negotiation process, and to provide the technical and political support required for its consolidation.

Consequently, the SAP reflects the results of this consultative participation and stands as a major contribution to improving the process of environmental management in the São Francisco River Basin and its coastal zone, thus making it possible to conceive and implement an integrated management model, adjusted specifically to the context of the Basin.

In March 2004, a 336 page SAP Final Report was published, and this present 48 page Summary was issued in May 2004 for the convenience of authorities and decision makers.

The report is divided into eight chapters. Chapter 1 presents the background, preparation process and basic content of the SAP, including its national and international ramifications, and lessons learned during the course of project implementation.

The major geographic, environmental and socio-economic characteristics are presented in Chapter 2.

Chapter 3 deals with the institutional framework within which development of the Basin and its coastal zone is conducted.

Chapter 4 provides strategic guidelines for the management of the Basin and its coastal zone.

The Strategic Action Program, designed to be implemented over a four-year period, together with its principal components and activities, is described in Chapter 5.

Chapter 6 deals with issues of program implementation.

Chapters 7 and 8 comprise a selected bibliography and a listing of the major participants and collaborators involved in the Project.

The Annex presents a list of the locations of the activities carried out within the scope of the Program for the Integrated Management of the São Francisco River Basin and its Coastal Zone – (ANA/GEF/PNUMA/OEA).



Source: ANA/Codevasf.

Figure 1. State and municipal boundaries in the São Francisco River Basin

1 Background, content, process, scope and lessons learned from the SAP



The São Francisco River Basin and its Coastal Zone are areas of strategic importance to the development of a vast region of Brazil. Thus, these areas have been targeted for constant government attention and its natural resources are increasingly subject to demands on the part of local and regional society.

The various interventions to which the river and its most important tributaries have been subjected have generated complex alterations in its flow system, with repercussions on its coastal zone.

Studies and projects previously carried out in the Basin have never assumed an approach that encompasses the entire area, including the coastal zone, and neither has an integrated-management approach ever been applied.

A portion of the Basin is in the semi-arid region, extending into the northern part of Brazil's Northeast Region. The São Francisco River, with an annual average flow of 2,850m³/second, accounts for roughly two-thirds of the freshwater available in the entire Northeast Region. It is for this reason that the possibility of sharing this water, through an inter-basin transfer scheme, with other Northeastern states outside of the Basin has been a recurring theme since Imperial times.

The highly complex ramifications of the proposal for transfer of the São Francisco River's waters, the current situation in the Basin and its coastal zone, and the potential for conflict among states that share the Basin, have led to efforts that seek to prioritize measures for revitalizing the River so that future population-growth and socio-economic development demands will not result in the adoption of approaches that ultimately jeopardize the sustainability of the Basin and its coastal zone.

In 1996, the Brazilian Government requested that the Organization of American States (OAS), in collaboration with the United Nations Environment Programme (UNEP), prepare a request for funding from the GEF Project Development Facility. These funds were to be used for the preparation of a two-stage program for water-resources management and planning in the São Francisco River Basin. With the assistance of UNEP and OAS, a PDF/B¹ proposal was prepared and submitted in the amount of US\$ 341,000, and approved by the GEF Council.

It was proposed that UNEP perform the role of implementing agency, in view of the nature of the task that comprises initial strategic programming, whereas UNEP's partnership with the OAS flows from the latter's experience in carrying out similar work throughout Latin America. Initially, the Secretariat of Water Resources of Brazil's Ministry of Environment (SRH/MMA) was designated as the local executing agency. Subsequently, in 2001, in line with legislative changes in the framework of the National Water Resources Policy (PNRH), the newly-created National Water Agency (ANA) assumed the role of local executing agency.

In March 1997, the GEF Council approved the request submitted by the Brazilian Government. A grant under the

¹ PDF/B (Project Development Facility, Block B) is a preliminary request for a GEF grant and funding for preparation of a Cooperation Project.

PDF/B enabled preparation of a project known as Project GF/1.100/99-14 – Integrated Management of Land-based Activities in the São Francisco Basin – that was approved in July 1998, in the amount of US\$ 22.214 million. Of this amount, the GEF provided US\$ 4.771 million.

Execution of the project made it possible to develop a Diagnostic Analysis of the Basin (DAB), the first version of which was published in July 2003. Subsequently, a preliminary draft of the Strategic Action Program for the Integrated Management of the São Francisco Basin and its Coastal Zone (SAP) was completed in December 2003.

During the preparation of the SAP, an effort was made to encompass all aspects of actions for the integrated management of the Basin and its coastal zone and, to this end, a process of debate was launched, similar to that conducted during preparation of the DAB, involving ample public participation.

During execution of the Project, 217 public events were held, in the form of seminars, workshops, work meetings and plenary sessions.

Over 12,000 stakeholders, representing more than 400 organizations with interests in the Basin and its coastal zone, including federal, state and municipal governmental organizations, universities, non-governmental bodies, unions and associations, participated in these events.

The preparation the activities indicated in the Annex, the DAB and the SAP was carried out with the assistance of some two hundred consultants, who supplied documentation and debated proposals at the events, and consolidated information into final reports.

This entire process culminated in the Plenary Meeting of the São Francisco River Basin Committee (CBHSF) in Penedo, and the drafting of two documents: the Recommendations of the Plans and Programs Work Group in support of the SAP, and CBHSF Deliberation 03 that provides for the integration of the SAP into the São Francisco River Basin Plan.



The GEF São Francisco Website <http://www.ana.gov.br/gefsf/>

Information on over three years of research and demonstration projects carried out under the 29 Activities that comprise the project on the Integrated Management of Land Based Activities in the São Francisco River Basin (ANA/GEF/UNEP/OAS)—GEF São Francisco—is available over the Internet.

Executive Summaries of the Final Reports on the Activities, the Diagnostic Analysis of the São Francisco River Basin and its Coastal Zone (DAB), and the Strategic Action Program for the Integrated Management of the São Francisco River Basin and its Coastal Zone (SAP) are available in PDF format for download.

With a view to forming a borderless virtual community for the exchange of information on the São Francisco River Basin, the Website was developed with the following aspects in mind:

- Design: the layout of the site was designed for ease of navigability and adequate representation of GEF Projects;
- Content: within an information-technology architecture, the Website seeks to provide a comprehensive vision of the Project, including all of the Project's principal outputs, executive summaries of the major documents, and an overview of its stakeholders in order simultaneously to fulfill an array of institutional, technical, journalistic, educational, and communications needs, in both English and Portuguese;
- Technology: within a keyword-searchable database, the Website provides a management system for circulating the content in such a way as to allow an infinite number of people to publish reports directly onto the website from any part of the world;

The GEF São Francisco Website seeks to provide a simple system for the management and dissemination of knowledge on the São Francisco River Basin and its Coastal Zone.

2 Characteristics of the Basin and its coastal zone

Photo: Alain Dhomé



Aerial view of Sobradinho Dam

The São Francisco River Basin is a vast and complex system encompassing various Brazilian states. From the jurisdictional standpoint, the political-administrative organization of the São Francisco River Basin involves the federal government, state and Federal District authorities, and also municipal authorities, which, according to Brazil's Constitution, are autonomous within the Brazilian Federation. In order to harness synergies capable of contributing to Brazil's development on a sustainable basis, the management model for the São Francisco River Basin must entail intense interaction, integration and negotiation among all of these parties.

In addition to this decentralized and federative framework, under the terms of Law 9.433/97, the basic unit for water-resources management is the hydrographic basin, thus making negotiation and political integration across political boundaries imperative.

A setback challenging the implementation of this Law has been institutional weaknesses and fragmentation, with countless organizations dealing with development and water-resources issues, at the federal, state and municipal levels, with little coordination among them.

The creation and installation, at the end of 2002, of the São Francisco River Basin Committee (CBHSF) is a clear indication of the progress achieved in implementing a National Water Resources Management System. The establishment of the Basin Committee is evidence of a new form of State organization, in which elected government officials are not the only participants, since seats are also reserved for representatives of organized civil society.

Practically every imaginable type of water resources use can be found in the Basin. For this reason, the region provides an important focus for studies on how to optimize and harmonize various forms of water use, namely: generation of electricity, shipping, irrigation, fishing, tourism and leisure, dilution of wastes, household and industrial water supply, mining, and others. Moreover, aside from these disparate forms of use, it is necessary to ensure adequate flows for preservation of the environment.

The São Francisco River Basin is marked by socio-economic disparities and environmental vulnerabilities, in which wealthy areas with high population densities coexist alongside areas with severe poverty and low population densities.

The Metropolitan Region of Belo Horizonte (RMBH), located in the Upper São Francisco River Basin, is clustered around the capital of the State of Minas Gerais. With 26 municipalities and an area of 6,255 km², the portion of the basin located in Minas Gerais represents less than 1% of the entire São Francisco River Basin. However, its 3,900,000 inhabitants (according to the 2000 census) correspond to roughly 29.3% of the population in the entire Basin.

Among the studies carried out to provide the technical-scientific bases for preparation of the SAP was the delineation of a new physiographic division of the São Francisco River Basin. This coincided with the findings of the Final Report of the Federal Senate Monitoring Commission on the São Francisco River Revitalization Project, that concluded: "there is a need for broad discussion in academic and administrative circles with the aim of updating these limits."

The proposed new framework preserves the current four physiographic divisions (Upper, Middle, Lower-middle and Lower), but redefines the borders between the Lower-middle and Lower São Francisco River Basins following a line that passes close to the town of Belo Monte (AL). This boundary is based on geological, geomorphological, hydrographic, and climatic criteria that provide physiographic homogeneity that should be respected within the scope of the proposed Basin Plan.

Approximately 343,784 km² of the São Francisco River Basin, corresponding to 53.8% of its total area, are in the so-called

Drought Polygon. A total of 251 municipalities lie within this area, which has a population of more than 5,680,000.

Table 1 summarizes the main physical, natural and socio-economic characteristics of the Basin, by physiographic region.

Much research remains to be done to determine present and future demands for water, by region, by economic sector, and by water source. Assessments are needed of the potential of hydro-geological water sources and small tributaries, especially in areas where the greatest agricultural demands are concentrated, and particularly along very fragile watercourses.

Characteristic	Total or Average	Upper	Middle	Lower-middle	Lower and Adjacent Coastal Zone
Area, km ²	636,920	99,387	401,559	115,987	19,987
Area, %	100%	15.6%	63.1%	18.2%	3.1%
Length of main stem, km	2,863 km	1,003	1,152	568	140
States encompassed	Minas Gerais (MG), Federal District (DF), Goiás (GO), Bahia (BA), Pernambuco (PE), Alagoas (AL), and Sergipe (SE)	MG	MG, DF, GO, and BA	BA, PE, AL, and SE	PE, AL, and SE
Number of municipalities ¹	503	194	173	93	78
Population and (%)	13,297,955 (100)	6,489,402 (48,8)	3,364,383 (25,3)	2,021,289 (15,2)	1,422,881 (10,7)
Urbanization, %	100	93	57	54	51
Population density, population per km ²	20.1	62.9	8.0	16.8	68.7
Elevation, m	--	1,600 to 600	1,400 to 500	800 to 200	480 (sea level)
Slope of main stem, m/km	--	0.70 to 0.20	0.10	0.10 to 3.10	0.10
Prevailing climate	--	Tropical humid and temperate	Tropical semi-arid and subhumid dry	Semi-arid and arid	Sub-humid
Availability of water, m ³ /per person /year	7,024	6,003	15,167	899	1,172
Median annual rainfall, mm	1,036	2,000 to 1,100 (1,372)	1,400 to 600 (1,052)	800 to 350 (693)	350 to 1,500 (957)
Median temperature, °C	18 to 27	23	24	27	25
Median annual sunlight, hours	--	2,400	2,600 to 3,300	2,800	2,800
Median annual evaporation/ transpiration, mm	896	1,000	1,300	1,550	1,500
Contribution to the flow, %	100	41.7	54.6	1.9	1.8
Maximum median monthly flow, m ³ /s	--	Pirapora, 1,303 in February	Juazeiro, 4,393 in February	Pão de Açúcar, 4,660 in February	Foz, 4,680 in March
Minimum median monthly flow, m ³ /s	--	Pirapora, 637 in August	Juazeiro, 1,419 in September	Pão de Açúcar, 1,507 in September	Foz, 1,536 in September
Sediments, 106/t/yr, and (area, km ²)	9.8 (636,920)	Pirapora 8,3 (61,880)	Morpará 21,5 (344,800)	Juazeiro 12.9 (510,800)	Propriá 0,41 (620,170)
Predominant vegetation cover	--	Cerrado and forest remnant	Cerrado, "caatinga" and small, high altitude forest	"Caatinga"	Semi-deciduous seasonal forest, mangrove swamps and coastal vegetation

¹ The sum of 538 municipalities (rather than 503) results from some being counted twice, as they are located in 2 physiographic regions.

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Basic sanitation, % of homes					
- Water supply	--	90	43	37	33
- Sewers	--	71	13	22	9
- Sewage treatment	--	80%	1%	17%	1%
Navigable waterways, km	2,061	--	1,243 between Pirapora and Petrolina/Juazeiro, 104 in Paracatu, 155 in Corrente, and 351 in Grande	60 between Piranhas and Belo Monte	148 from Belo Monte to the mouth
Principal hydroelectric dams (power output potential, MW)	--	Três Marias (396), Rio das Pedras (9.3), Cajuru (7.2), Queimados (10.5), Parauna (4.1)	Sobradinho (1,050), Panderos (4.2), Correntina (9.0), Rio das Fêmeas (10.0)	Paulo Afonso I, II, III and IV (3,986), Moxotó (440), Itaparica (1,500), Xingo (3,000)	--
Irrigated area, ha and (%)	342,712 (100)	44,091 (12.9)	170,760 (49.8)	93,180 (27.2)	34,681 (10.1)

Table 2 summarizes information on the availability and demand for water in the São Francisco River Basin, and indicates that the total demand for water in the Basin corresponds to approximately 24% of the minimum (Q_{95}) flow.

Broken down by physiographic region, the major impacts related to interactions between water resources and the environment are as follows:

Upper: erosion, including that originating from rural roads, producing sediment loads that affect water courses creating water quality problems and silting of river beds; urban, industrial and mining activities, generating wastes, sewage and a variety of pollutants, jeopardizing water quality in streams and lakes that receive these discharges.

Middle: widespread pollution caused by agriculture and sewerage discharges, jeopardizing the quality of surface and ground waters; intensive use of surface and ground waters for irrigated farming.

Lower-middle: widespread pollution caused by agriculture and sewerage, including discharges into intermittent water courses; uncontrolled discharges and inadequate disposal of solid wastes; water shortages owing to the intermittent nature of tributaries.

Lower and coastal zone: physical impacts caused by upstream dams on the ichthyofauna, including loss of biodiversity owing to reduced nutrient concentrations and flood control structures that inhibit fish from going up river to spawn (piracema); erosion on the banks and bed of the São Francisco River; modification of the sediment balance and flooding patterns at the estuary.

Suspended sediment concentrations in the Basin are shown in Figure 1. Based on measurements made during the GEF São Francisco Project in 2001, the discharge of sediments at the mouth amounted to only 0.41 million tons/year, suggesting that there has been a reduction of 97% in these loads as compared to measurements effected by CODEVASF, between 1966 and 1968, that recorded loads of 12.5 million tons/ year.

Table 2. Availability and demand for water in the São Francisco River Basin (SAP – Reviewed).

Physiographic Region	Area (km ²)	Flow*		Demand (m ³ /s)						Demand Q_{95} (%)
		Q (m ³ /s)	Q_{95} (m ³ /s)	Urban	Rural	Livestock	Industry	Irrigation	Total	
Upper	99,387	1,189 (1,189)*	289 (289)*	26.8	2.2	2.5	11.4	14.4	57.3	19.8
Middle	401,559	1,522 (2,711)*	531 (820)*	4.6	2.8	3.2	0.8	58.8	70.2	13.2 (8.5)*
Lower-middle	115,987	111	25	2.8	2.3	1.4	0.4	50.5	57.4	229.6 (6.8)*
Lower	19,987	28 (2,850)*	8 (853)*	1.1	1.4	0.7	0.3	14.4	17.9	223.7 (2.1)*
Total	636,920	2,850	853	35.3	8.7	7.8	12.9	138.1	202.8	23.8*

Q: natural contribution of each stretch; Q_{95} : flow with 95% confidence of recurrence; *Availability is considered by physiographic region. Source: SRH/MMA and ANA, 2003

3

Institutional context



The fact that the Basin and its coastal zone encompass six states, 503 municipalities and part of the Federal District (Figure 1), and that its waters are subject to the jurisdiction of numerous federal and state institutions, justifies the complex and multidisciplinary nature of the institutional model adopted, which must seek to create synergies, rather than provoking divisions or antagonisms.

The principal regional institutions involved in the management of the Basin and its coastal zone, and their respective responsibilities for projects connected to the SAP, were ranked. Nineteen national and five regional bodies and companies were identified, of which 12 were from Minas Gerais, two from the Federal District, two from Goiás, four from Pernambuco, 11 from Bahia, seven from Sergipe, and five from Alagoas.

During the SAP formulation period, the institutional framework for managing land and water resources in the Basin was analyzed from the standpoint of the principal potential approaches to the management of water resources, with a view to integrating governmental and private initiatives and maximizing synergies.

The National Water Resources Management System was established by Law 9.433/97, and its administrative structure is shown in Figure 2, which also shows the scope of the activities and inter-relationships between the various bodies engaged in water-resources management activities, including the Basin Committee.

Federal level

- National Water Resources Council – CNRH
- National Water Agency – ANA

- Secretariat of Water Resources of the Ministry of Environment – SRH/MMA

State level

- State Water Resources Management Systems
- State Water Resources Councils – CERH
- State-level Public Water Resources Management Bodies

Basin level

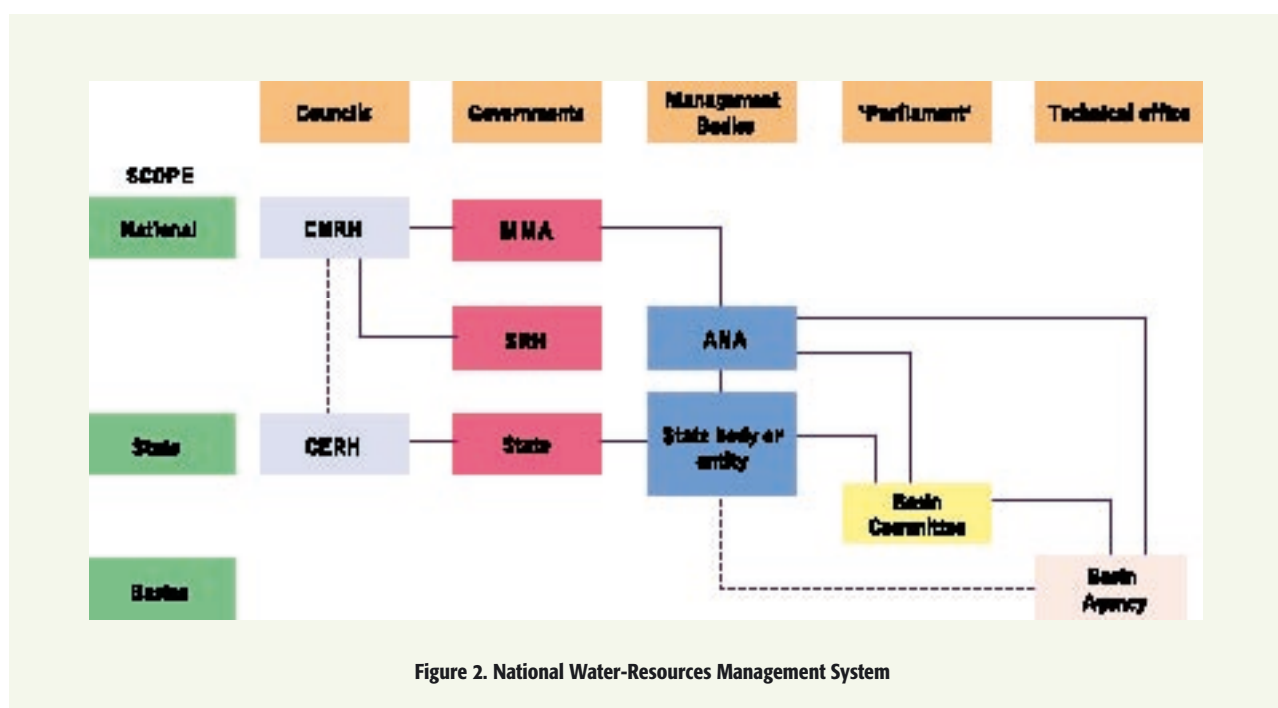
- Basin Committees
- Basin Water Agencies

Public participation in the management of water resources in Brazil has grown in recent years. Such participation is always more intense when there are conflicts of interest, either over quantities of available water or the conservation of water resources.

Decentralized decision making has proven an approach capable of legitimizing and strengthening the role of water-user organizations in river basins. The aim of decentralized decision making is to promote collective action and, thereby, generate joint responsibility on the part of the various agents involved.

To achieve effective public participation, it is essential to respect the specific characteristics of each region, in terms of both public participation in institutional management, and their approaches to water resources projects. Such characteristics are reflected in the institutional organization of each of Brazil's states, and in the levels of public and private participation achieved.

Such social participation, however, is still just beginning and is very fragile. More widespread participation of water users in



public decision-making requires integrated, decentralized and participatory action. This implies involving the entire institutional system for water-resources management in actions directed toward integrated river basin management, through the strengthening of participation in public initiatives, in line with concerns expressed by society.

The São Francisco Basin Committee, an innovative approach to effective water-resources management, has now been instituted. The Basin Committee acts as a veritable parliament for the deliberation of water-resources management issues, and has played a major role in assessing actions proposed in the SAP.

Its scope encompasses the entire length of the São Francisco River Basin, and its membership comprises representatives of organized civil society and water users, as well as representatives of Executive-Branch institutions from the three spheres of government which account for half of its total membership.

The principal objectives of the Basin Committee include: fostering integrated development of water-re-

sources management; securing the technical, economic and financial investment programs and projects to support integrated public and sectoral policies with the aim of fostering sustainable development in the São Francisco River Basin as a whole; and, promoting interfaces between national and state water resources-management systems, including the integration of municipal policies and regional proposals for plans, programs and projects into the directives and goals established for the São Francisco River Basin, with a view to ensuring the conservation and protection of water resources in the entire Basin.

The Basin Committee depends upon a Water Agency empowered to perform the functions of its Executive Secretariat.

The role of Regional Consultative Chambers in the Basin Committee also merits mention. These are boards, formed to reflect the physiographic divisions of the Basin, whose duties include: promotion of links between sub-basins committees; recommendation of requests from sub-basins committees; support for shared-management

initiatives within the scope of the Basin; discussion and presentation of suggestions relating to issues within their sphere of authority to the Basin Committee; promotion of actions carried out in the area of the Basin; coordination, within the scope of their activities, and mobilization for the renewal of the terms of office of Basin Committee members; and, preparation of public meetings approved by plenary sessions of the Basin Committee.

In parallel with the work of governmental institutions and the Basin Committee, there are a considerable number of Non-Governmental Organizations (NGOs) working in the Basin and its coastal zone. These are non-profit entities whose efforts are directed toward various aspects of environmental protection and community development, some of which are dedicated to aspects of water-resources management. Some of these NGOs are concerned with regional development, while others have a more strictly local role. These NGOs could be important partners in the implementation of the SAP, as they could potentially institute a model for private-state integration.

The National Water Agency (ANA), in the exercise of its technical and institutional role aimed at implementing integrated shared water-resources management strategies, has proposed that a Management Pact be formalized through an Integration Agreement between ANA, the States, and the Basin Committees. Figure 3 illustrates the potential interaction of the various participating institutions in river basin management under an Integration Agreement.

It should be noted that the São Francisco River Basin is located in sub-region 39C of the Global International Waters Assessment (GIWA) project that encompasses the coastal ocean waters of the eastern and southern coast of Brazil. This area comprises the South West Atlantic Large Marine Ecosystem, as defined by UNESCO, and includes all the inland waters that flow out to this coast. Within this coastal area, the National Coastal Management Program (GERCO) was instituted by Law 7.661/88 with a view to enabling implementation of the National Coastal Management Plan (PNGC).

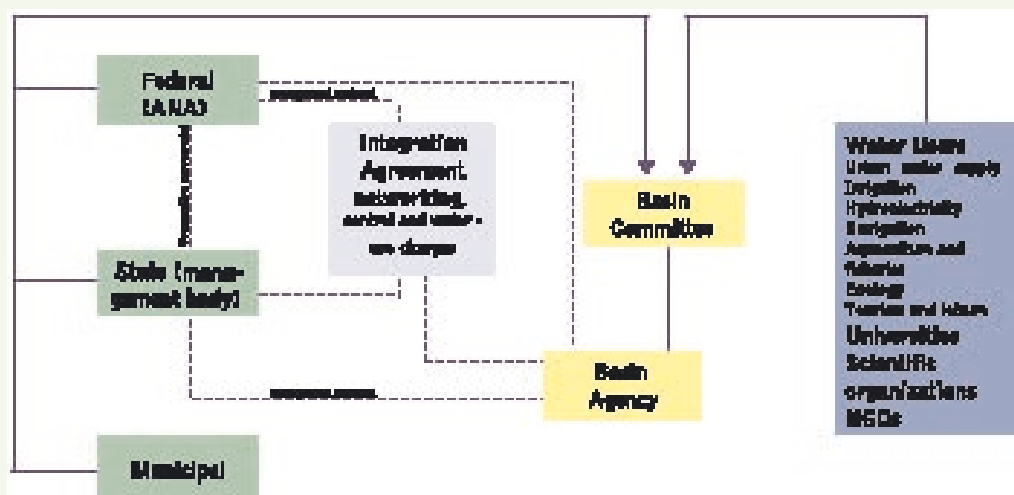


Figure 3. Organization of river basin management

4

Strategic guidelines for the management of the São Francisco River Basin and its coastal zone

Photo: Alain Dhomé

Canyon – Alagoas/ Sergipe

The Federal Government's Multi-Year Action Plan (PPA) for 2004-2007 is targeted at implementing the following long-term strategies: social inclusion and distribution of income through vigorous GDP and employment growth; environmentally-sustainable growth to reduce regional disparities, stimulated by expansion of the mass consumer market through investments and productivity gains; reduced vulnerability to external factors by expanding competitive activities which make such sustained growth achievable; and strengthening citizenship and democracy.

Investments in water-resources, sanitation and housing, provided for in the PPA, comprise a large portfolio of projects for the future.

In the light of a forecast Gross Domestic Product (GDP) growth of between 1% and 1.5% during 2003 and 3.5% during 2004, the Government is predicting longer-term growth in GDP of about 4% in 2005, 4.5% in 2006, and 5% in 2007. From a regional standpoint, the growth forecasts for the Northeast (a region in which the São Francisco River Basin makes a significant contribution) would thus be significantly affected, as would its share in national GDP.

It is, however, unlikely that these forecasts will materialize in a uniform manner throughout the Basin. Attainment of such goals is more achievable in the Middle São Francisco River Basin, where projects currently underway point toward their fulfillment.

In the western part of the Middle São Francisco River Basin, in both Minas Gerais (in the Sub-basin of the Para-

catu River) and Bahia (in the Sub-basins of the Corrente and Grande Rivers), the expansion of intensive farming, principally for grain production, will continue. In the Lower São Francisco River Basin, sustainable development will continue to rely on tourism and aquaculture, the latter including restoration of local fisheries where possible, since prospects for other economic alternatives in this region are very limited.

Even in a less adverse scenario, serious doubts persist as to how sustained growth in the Basin can be financed, and there is a preeminent need to attract private investment capital. Regardless of the scenario, it is clear that agribusiness will remain a major economic activity and a driving force behind development in the area.

It is important to bear in mind that immense areas of land in the São Francisco River Basin have not as yet been utilized, and that, as in many areas currently being used, methods applied in their exploitation may not always be the most sustainable or orthodox. This underscores the importance of understanding that sustainable development in the São Francisco River Basin needs to be based on the three-pronged model: "water – land – energy."

Water is the most critical limiting factor to long-term sustainability and, for this reason, it will be necessary to conduct a careful assessment of the role of water-resources management in the sustainable development of the Basin, as conceptualized in the São Francisco GEF Project.

The major challenge facing the São Francisco River Basin Committee will be that of consolidating its position as the

forum for determining a strategic program for the Basin with the aim of guaranteeing revitalization of the river and optimization of its multiple uses, in an efficient and democratic manner.

Consequently, the most urgent challenges facing the São Francisco River Basin Committee are issues of an operational nature, including determination of operational mechanisms to ensure its sustainability; to provide for its technical, financial and administrative support; to confirm its assignment of responsibilities; to provide a framework for its decision-making procedures; and to accommodate the structuring of its technical councils and regional advisory bodies.

To this end, strategies for the decentralized implementation of these management tools are urgently needed to enable the Committee, on the basis of technical information and with legal support, to address these issues and make decisions that will determine the destiny of the Basin.

However, in view of the size and complexity of the São Francisco River Basin and its coastal zone, there is a need to stimulate and strengthen intermediary channels of exchange between society and the Basin Committee, in line with the realities of each region, and to ensure that the views of bodies such as the tributary committees and the regional advisory councils are heard by the Basin Committee. The strengthening of such channels would assist in enabling the Committee's decision-making agenda, incorporating relevant issues of concern in the Basin, and ensuring that decisions made when the Committee is in session are preceded by ample discussion within the affected regions and sub-basins, thereby guaranteeing that the views of all of the various stakeholders are effectively represented.

The principal actions foreseen are:

- Review and adjustment of the legal framework to ensure sustainability of the São Francisco River Basin Committee
- Establishment and functions of the Technical Office
- Creation of Regional Advisory Councils
- Creation of Technical Councils
- Creation of a Basin Water Agency, including:
 - *Definition of the legal responsibilities of the Basin Water Agency*

- *Creation of the Basin Water Agency*
- *Provision for the budget of the Basin Water Agency*
- *Implementation of the Basin Water Agency*
- *Preparation of a Strategic Plan for the Basin Water Agency*

According to Law 9.433/97, the management instruments established under the National Water Resources Policy are classified as technical, economic and strategic.

- The principal technical instruments are:
 - *Basin Water Resources Plans or Basin Plans*
 - *Classification of bodies of water*
 - *Licenses*
 - *Information Systems*
- Economic instruments consisting of water use charges
- Strategic instruments consisting of inspection and enforcement measures

Although they contain some similar elements, the SAP and the Basin Plan have quite distinct objectives, content and execution schedules. The SAP is a document containing a set of strategic actions designed to address priority concerns, prepared with support from the Global Environment Facility to the National Water Agency (ANA). The activities and analyses of causal chains, and the identification of proposed courses of action to be pursued are targeted at correcting or mitigating these critical problems. Its scope, however, encompasses integrated management actions applied throughout the entire São Francisco River Basin. Moreover, in order to be eligible for GEF funding, such actions must be in compliance with the GEF's criteria.

The São Francisco River Basin Plan, in its full final version, will be a much more comprehensive document. Indeed, basin water resources plans need to be conceived as continuous and dynamic processes, subject to periodic review, and focused on long-term horizons, expressed through scenario analyses that examine future conditions for the development within their respective river basins. The drafting of such plans will involve a complex participative process under the coordination of the River Basin Committee.

Components of an investment program, to be pursued under the Basin Plan, could be grouped into two major categories: management, relating mainly to actions of a 'non-structural' nature, and services and works, relating to actions of a 'structural' nature, comprising the more direct corrective interventions to be effected in the River Basin.

The contribution of the SAP, within the scope of the Basin Plan, is more closely related to the lines of action envisioned under the management component, in view

of the eligibility criteria emanating from the GEF itself, which is its financial agent. In view of this, and with a view to providing greater clarity for the purposes of the preliminary draft of the Basin Plan, it is suggested that the management component be covered by actions encompassed by the SAP whereas actions under the services and works component be left for subsequent definition. Under such an arrangement, aspects relating to services and works in an investment program to be executed under the Basin Plan could be structured as shown in Figure 4.

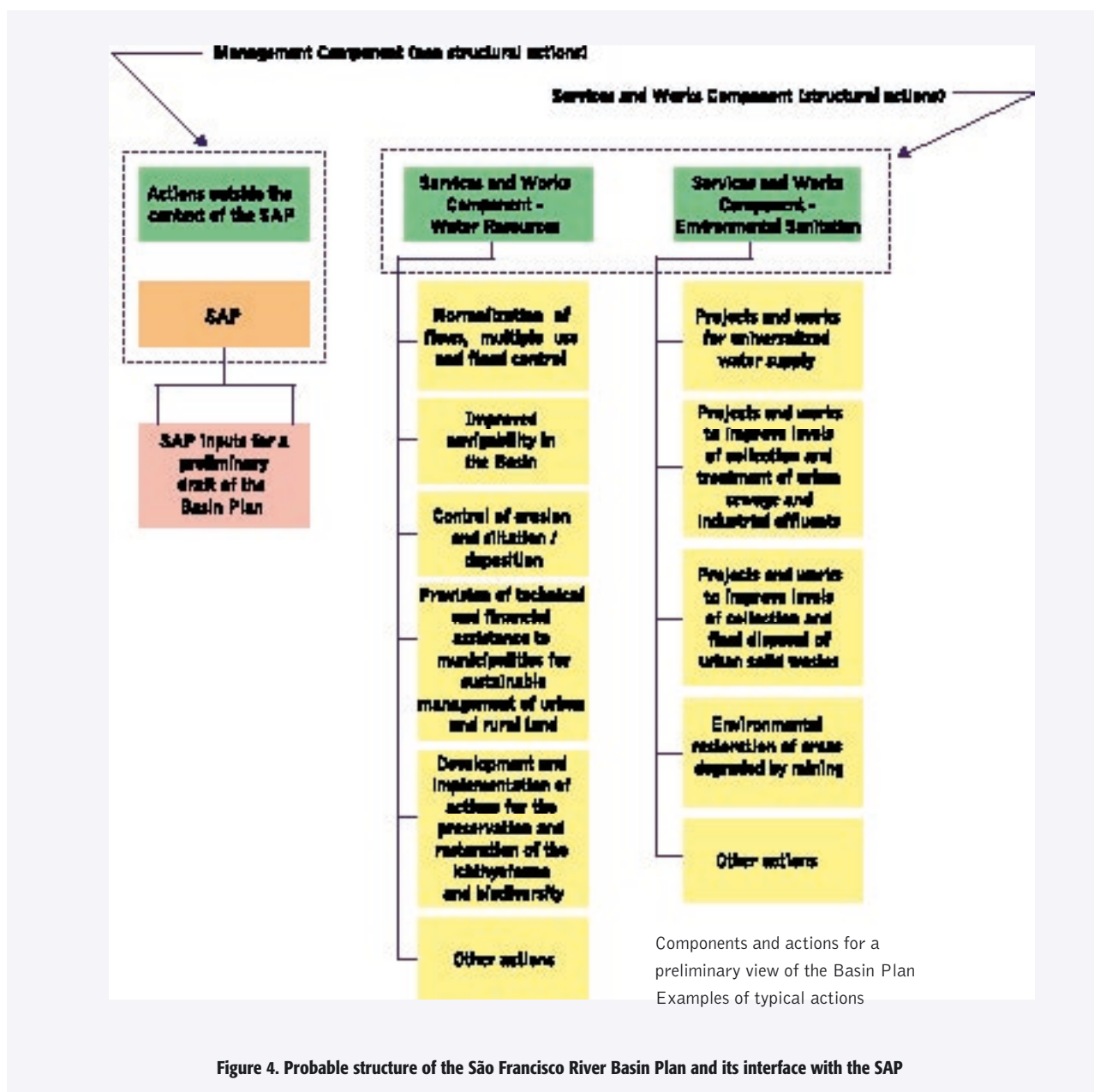


Figure 4. Probable structure of the São Francisco River Basin Plan and its interface with the SAP

5

Strategic actions and selected activities

Photo: Alain Dhomé



View of the city of Penedo-AL

In the development of the GEF São Francisco Project, two types of actions were prioritized: actions that seek to minimize the principal negative aspects diagnosed; and actions that aim to establish a sound technical and management base for carrying out the work and for decision-making, with intense public involvement, on the part of Basin institutions.

With respect to actions of the first type, the size, heterogeneity and complexity of the São Francisco River Basin means that it is impossible to treat the full scope of all of the problems facing the Basin at the same time. For this reason, the strategy adopted was to select areas for intervention and priority action under the SAP through the development of integrated activities that could not only lead to rapid and favorable outcomes in resolving the problems identified at specific locations where the direct interventions were carried out, but could also constitute easily replicated or adapted models for adoption in other areas.

The strategic actions foreseen in the SAP aim to make a lasting contribution to the integrated management of the São Francisco River Basin and its coastal zone, in accordance with the general guidelines of the National Water Resources Policy (PNRH) as expressed in Law 9.433/97.

The structure of the SAP and its basic components, in order to fulfill the goals set under the National Water Resources Policy and the GEF São Francisco Project, focused on the promotion of technical-institutional strengthening and participation of society as a whole. This could be consolidated through the implementation of a participative and stable water-resources management sys-

tem, to which the SAP contributes. This system is the Integrated Water Resources Management System for the São Francisco Basin and its coastal zone, hereinafter referred to as Integrated Basin Management System (SIGRHI).

The SAP's contribution consists of the development and adaptation of the regulatory framework and technical and institutional instruments. This framework and these instruments have aided in developing a management database, in implementing the institutional instruments required under the Integrated Basin Management System, and in reinforcing institutional links, while also fulfilling the socio-institutional role of providing environmental training and education for its members and other parties involved.

At the same time, steps should be taken to ensure progress toward universal access to water supplies, sewage collection and treatment, and final disposal of solid waste with a view to fulfilling social-inclusion goals enunciated under the Multi-year Plan of Action (PPA) for 2004-2007. In addition, the critical decision making instruments to be deployed in the event of emergencies, with a view to protecting and defending local communities and users in emergencies, should be adopted in consonance with the aims of the National Water Resources Policy and the provisions of Law 9.433/97.

Another pressing issue is the potential for sustainable use of groundwater resources, found particularly in the Middle and Lower-middle São Francisco River Basin, through an assessment of their volume and quality, and of the knowledge available with respect to their potential for exploitation.

Figure 5 shows the links between the SAP and the Basin Plan.

The SAP was structured with two major components, namely: contributions to the introduction of an Integrated Basin Management System and its array of management instruments; and contributions to the sustainable use of water resources and the restoration of environmental quality, as shown in Figure 6.

Strategic Actions under Component I – Implementation of the Integrated Water Resource Management System for the Basin and its Coastal Zone.

Strengthening of institutional relationships (I.1)

This Strategic Action is divided in two main activities:

I.1.1 Links between programs run by federal-bodies and the water-resource and environmental management systems of federal, state and municipal governments, and other stakeholders in the Basin

This activity seeks to promote coordination between SAP activities and the actions of government and stakeholders involved in the São Francisco River Basin and its coastal zone, with a view to promoting the convergence of efforts and multiplication of results.

As an activity targeted at promoting integration and joint actions among federal, state and municipal programs, the expected actions and outcomes include:

- integration agreements between the states and the federal government to standardize management instruments;

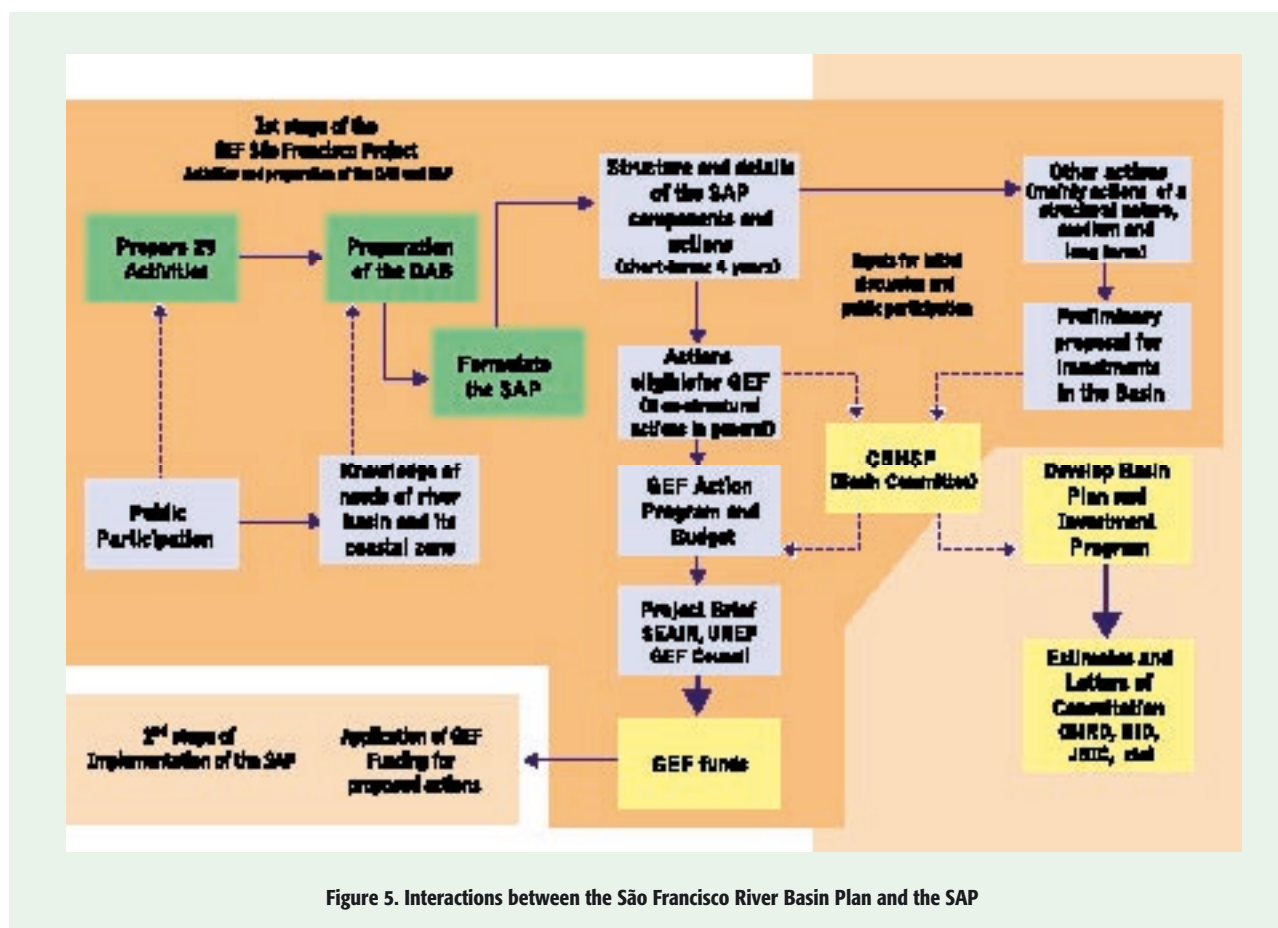


Figure 5. Interactions between the São Francisco River Basin Plan and the SAP

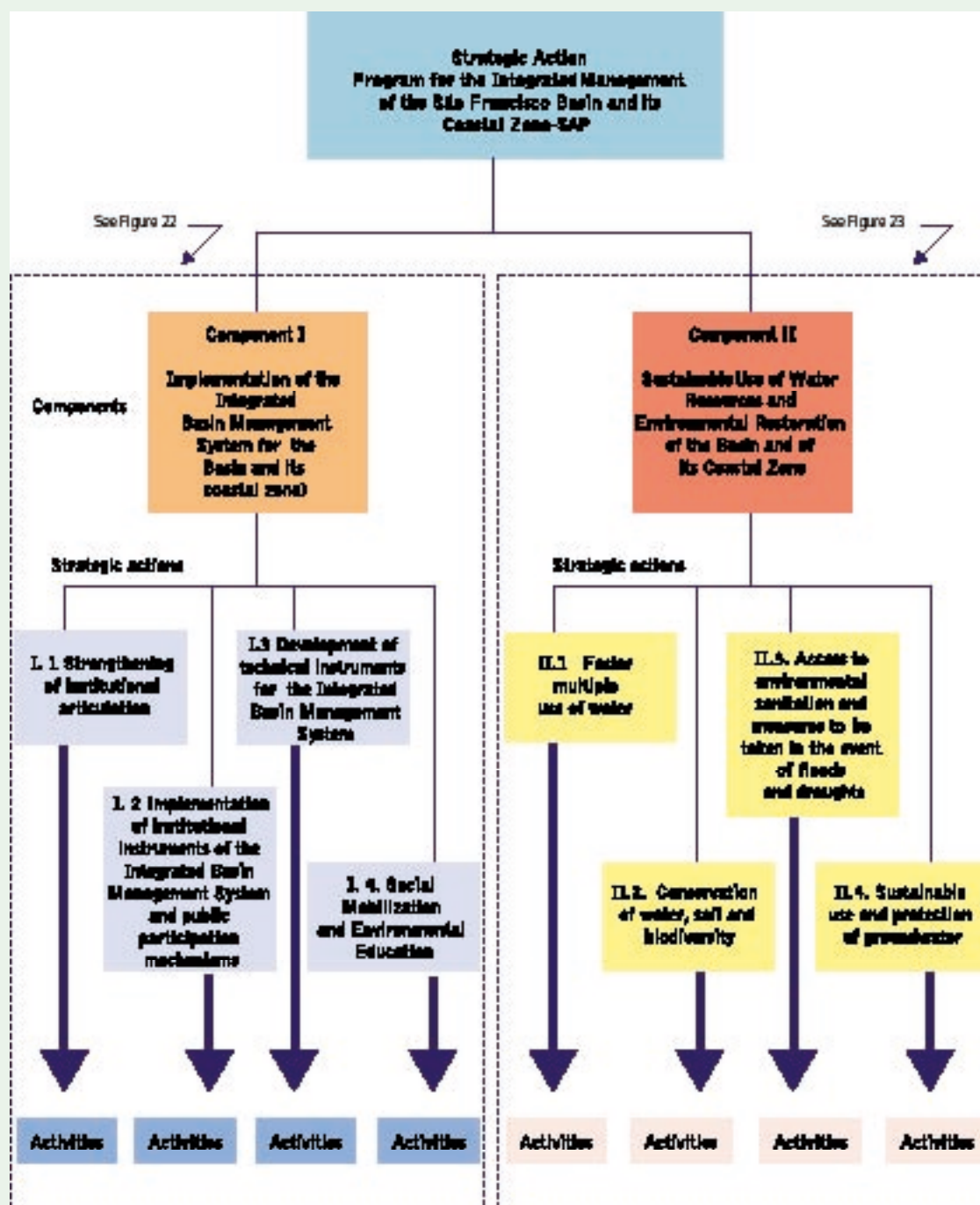


Figure 6. Structure of the SAP

- events to promote integration and coordination, involving those responsible for planned and ongoing initiatives, through discussions entailing participation from local and regional planners and parties responsible for preparing estimates, with scrutiny of the various components and outcomes carried out by each institution, and with emphasis on promoting convergence among the various proposals;
- preparation of an 'annual agenda of intentions,' encompassing the plans and targets of each institution for subsequent periods, and the drafting of a framework for identifying potential conflicts and points of convergence;
- setting of criteria and procedures to harmonize and match budgets and timelines for action among the various federal and state government institutions.

I.1.2. Support for the setting of licensing criteria, water-use charges, guidelines for management of conflicts, and definition of monitoring strategies.

This activity will support research designed to improve the regulatory framework in the São Francisco River Basin and its coastal zone.

The expected outcomes of this activity are:

- Establishment of licensing criteria;
- Establishment of conflict management strategies;
- Criteria for charges on the use of water resources.

Implementation of the Integrated Water Resources Management System's institutional instruments, training programs and public participation mechanisms (I.2)

This Strategic Action comprises two principal activities:

I.2.1. Support for the São Francisco River Basin Committee through implementation of the Basin Water Agency, and the establishment of an inter-institutional research network, state water-resource management systems, and provision of training for members of the Integrated Basin Management System

This activity will follow up on the establishment of the Basin Committee by supporting the implementation of the Basin Water Agency as the executive body that will guarantee successful and effective functioning of the Committee, and by providing support for state water-resources management systems.

Expected outputs of this activity are:

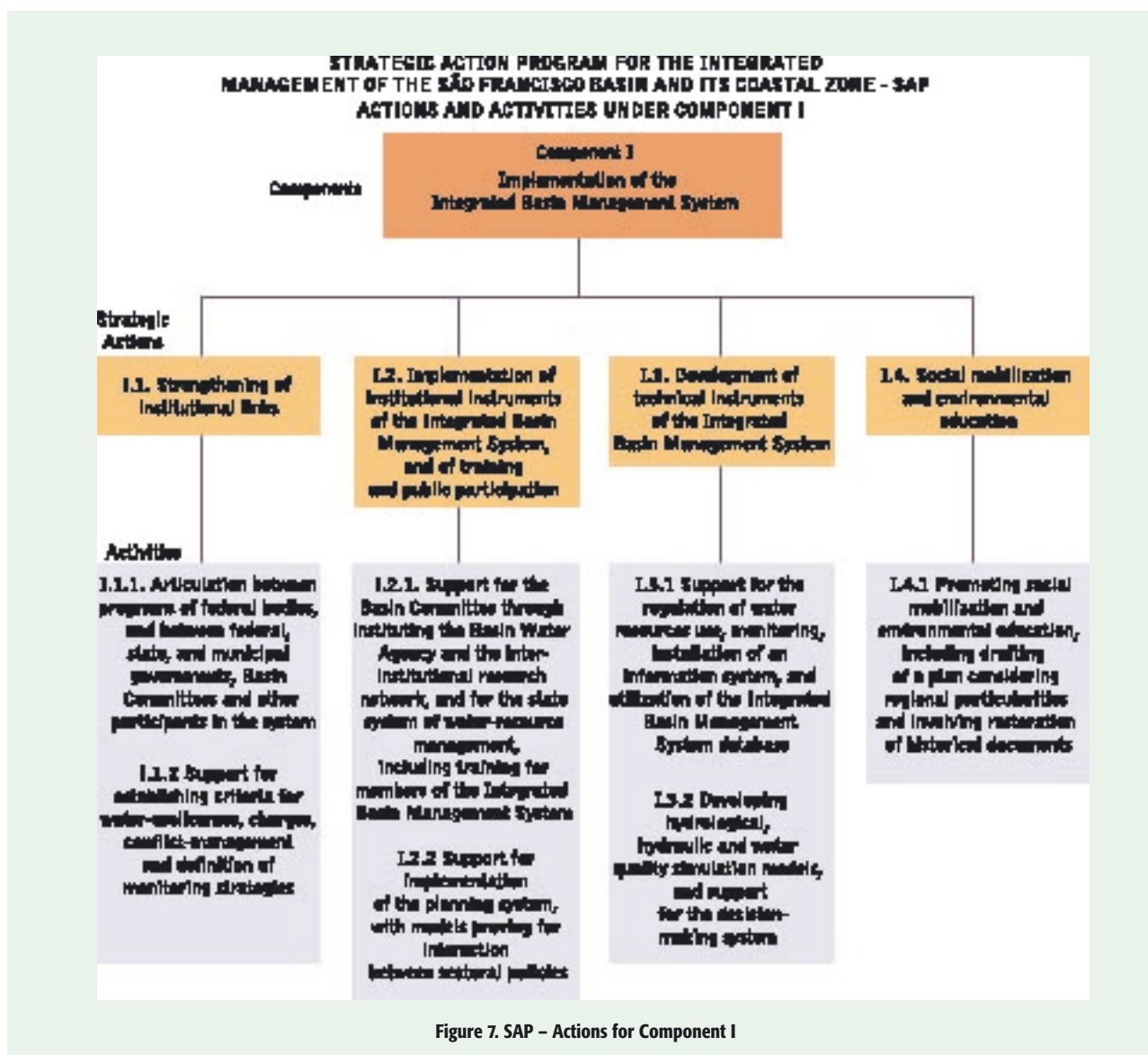
- The Basin Agency
- Operational state water-resources management systems
- Operational reservoir (açudes) users associations
- An inter-institutional research network
- Trained members of the Integrated Basin Management System

I.2.2. Support for the implementation of a planning system based on models providing for interaction between sectoral policies

One of the first activities will be the formulation of a Basin Plan, with a view to establishing procedures for the implementation of a planning system in the Basin, targeted at promoting interaction between sectoral investment policies for quantitative and qualitative water management in the São Francisco River Basin and its coastal zone. Periodic evaluations of development scenarios and proposals for measures for fostering development should be undertaken as an additional element of this process, with the aim of stimulating the conservation, preservation and sustainable utilization of water resources.

The expected outputs are:

- Integration agreements between the different governmental bodies, taking into account their roles and expected contributions to the functioning of the planning system;
- Strategies for a transition from the current situation in which Basin Plans are prepared under the direction of the National Water Agency (ANA) and the Basin Committee, to the establishment of the Basin Water Agency, and a review of the long-term investment goals presented in the SAP, since this is the best path to strengthening the Agency and enabling it to participate in the drafting



of state and federal Multi-year Action Plans (PPAs) and annual budgets;

- Amendments to the Bylaws of the Basin Water Agency, relating to aspects pertaining to its role in the planning area;
- A flow chart, illustrating linkages between sectoral plans and the Basin Plan, with a view to consolidating institutional coordination;
- An established planning horizon, stipulating execution schedules, periodic reviews and work methodologies, including the use of Strategic Environmental Evaluations applicable to policies, plans, programs and works in the São Francisco River Basin.

Development of technical instruments for the Integrated Basin Management System (I.3)

Two principal activities are recommended:

I.3.1. Support for the regularization of water-resource use, for monitoring and registering users, for implementation of an information system for the São Francisco River Basin and its coastal zone, and for the establishment of a database for the Integrated Basin Management System

Among the objectives of this Activity are the registration of water-users in the Basin, with a view to regulating water-resource supply and demand, and preparing users for the eventual implementation of charging mechanisms, thereby aiding in the elaboration of water-resources management guidelines and licensing procedures, particularly in areas of real or potential conflict.

Expected outcomes include:

- **Regularization of water-resource use**

Evaluation of the current status of knowledge regarding water demand in the Basin (available registers) and the

sizing/planning of campaigns to ensure complete user registers, including: satellite imaging of irrigated areas; drafting of a manual defining a registration campaign methodology (based upon user declarations and/or census-based); standardizing registration procedures and data requirements for licensing and billing purposes in conjunction with other management bodies in the Basin; identifying partners, from both governmental and private entities, for mounting registration campaigns; creating a user registration system (customization of software, database and hardware); and drafting a personnel training program for user support.

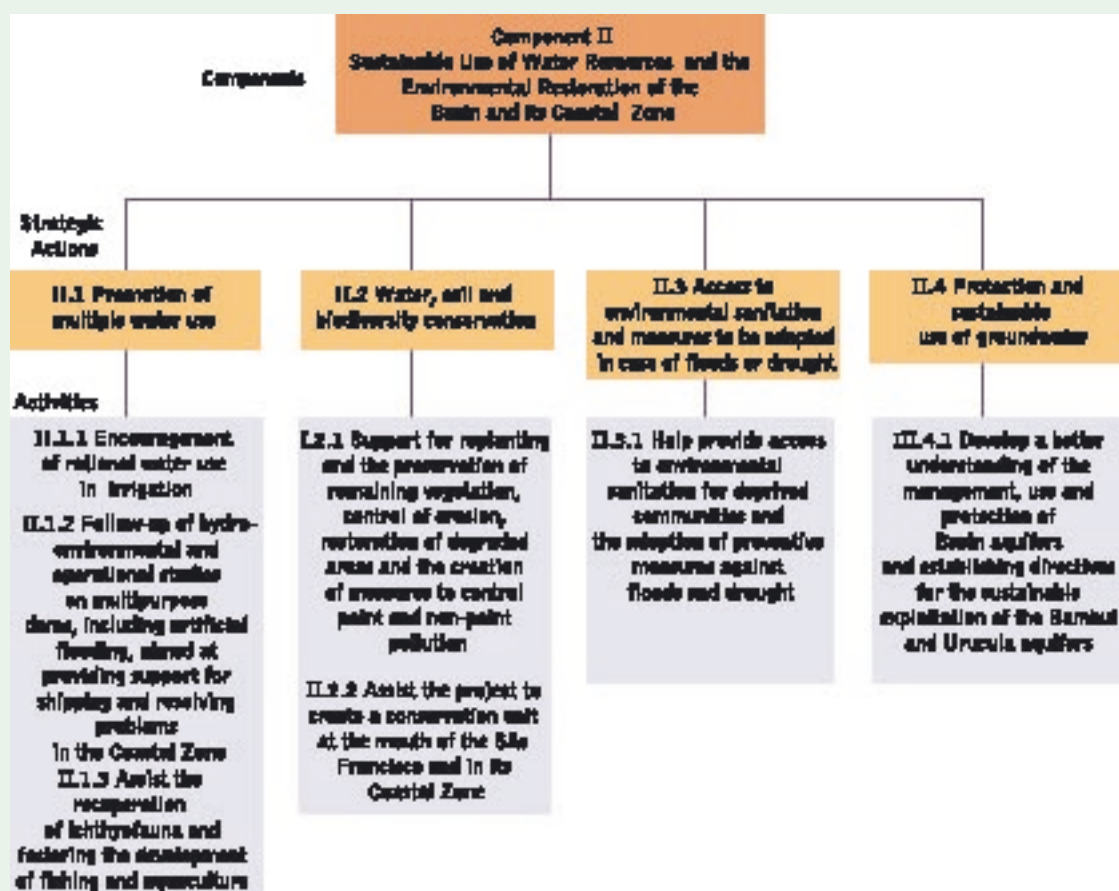


Figure 8. SAP – Actions for Component II

- **Monitoring of water uses and users**

Identification of water users in the Basin, quantifying water demand and availability to assist with decision making and the implementation of new undertakings; compiling a register of laboratories equipped to perform tests; analyzing the quality of river water; and disseminating the resulting information.

- **The information system on water resources in the São Francisco River Basin and its coastal zone**

Consolidation and operationalization of a geo-referenced database, making information on water resources available using, inter alia, the Internet.

- **The Integrated Basin Management System database**

- Land Use Mapping of the Upper and Middle São Francisco River Basins: completing the map of land use and settlement patterns in the entire São Francisco River Basin, in ArcView® format; and,
- Rehabilitating and upgrading of the hydrometric and water-quality monitoring networks, resizing a joint network for the collection of hydrometeorologic and water-quality data: rescaling of a mixed system for the collection of hydrometeorologic and water-quality data in line with specifications for

manned and automated measuring stations within an optimized operational capabilities of the network, and recording changes to be effected in the source program, written in Delphi, to adapt it for electronic-data reception and enable it to perform data-consistency analyses using an Oracle database. The resulting computer program will comprise the National Water Resource Information System, run by the National Water Agency (ANA), and interface with the ANA Geographical Information System (GIS). Finally, a third element will support implementation of a piezometric monitoring network, designed to provide more detailed knowledge on groundwater resources in the Verde Grande River Sub-basin (in Minas Gerais and Bahia) and expand the existing network in the Verde/Jacaré River Sub-basin.

I.3.2. Development of hydrologic, hydraulic and water-quality simulation models and of a decision-making support system

This activity entails the development of a support system for decision-making, including development



Grapes – São Francisco Valley

Photo: Eraldo Peres

of simulation models for quantitative and qualitative analysis of the Basin's hydrologic condition and hydraulic structures (dams, canals, catchments, pumping facilities, diversions, etc.).

The following instruments should be drafted:

- Technical specifications, comprising the following simulation-model modules: (i) Database Module, (ii) Model Module, and (iii) Dialog Module;
- Manuals, including (i) User Manual, and (ii) Model Reference Manual, with numeric solutions and frameworks;
- A computer program for the Decision-making Support System (DSS).

Public Involvement and Environmental Education (I.4)

This Strategic Action is comprised of one principal activity:

I.4.1. Promotion of social mobilization and environmental education, including the drafting of a plan that respects regional differences, and the restoration of historical documents

Social mobilization occurs only when a group of individuals seeks to achieve common objectives. This, in turn, depends upon an awareness of the importance and public-spiritedness of the objectives. In order to mobilize public support for integrated and sustainable water-resource management, therefore, planned and coordinated public involvement must be promoted.

The envisaged outputs of this activity are:

- An Environmental Educational Plan for the São Francisco River Basin and its coastal zone;
- Courses, field days, and seminars, and the drafting of primers;
- Educational events, including convening a public water and environment week.

Promoting multiple forms of water use (II.1)

Three main activities are foreseen under this strategic action:

II.1.1. Support for rational water use in irrigation

This activity aims to promote the economic, social and environmental sustainability of irrigation systems by reducing water and energy losses, seeking to achieve maximum crop yields per unit of area based upon optimizing water use, and allowing the integration of irrigation technology and water-management instruments. To this end, it will be necessary to study replacement of existing irrigation methods, adoption of more water-efficient crops, and use of improved piping and distribution efficiency in irrigation districts.

The products envisaged are:

- A model and software for calculating water and irrigation needs, making use of regional and local data;
- A database on soils, climate, crops and irrigation-management, and detailing parameters for orienting licensing procedures;
- Courses disseminating information by means of workshops, seminars and technical publications.

II.1.2. Follow-up of hydro-environmental and operational studies on multipurpose utilization of dams, including the generation of artificial floods, with the aim of providing support for shipping and resolving problems in the Coastal Zone

This activity will keep members of the Integrated Basin Management System informed on the progress and partial results of inventory studies, economic-feasibility analyses and environmental studies on all dams under consideration, and assessments of their impacts on the Basin and its coastal zone, always from the standpoint of multiple water uses. The dams in question are those being considered by CHESF, CEMIG, CODEVASF and others, for specific or multiple uses, on the das Velhas, Paracatu, Urucuaia, Jequitai and São Francisco rivers.

The products to be prepared to support the multi-purpose operation of dams and the occasional generation of artificial floods are:

- Compendia of dam studies for decision-making purposes;
- Reports on the technical, economic and environmental feasibility of instigating artificial floods downstream from the Xingó Dam, considering aspects relating to their impact on the riparian population and the inter-connected power system;
- Compendia of strategies for restoring shipping on the river.

II.1.3. Support for the rehabilitation of the ichthyofauna and fostering the development of fisheries and aquaculture

The outputs envisaged are:

- A database, continually updated, containing details on, inter alia, aquaculturists/fish-farmers, reservoirs [açudes], dams, water sources [aguadas] and suppliers of basic aquaculture inputs;
- Short courses on fish-breeding for fish-farmers and extension workers;
- Manuals for extension workers, covering such issues as fish breeding systems and processing techniques;
- Facilities for the production and distribution of fry, and the setting up of experimental facilities to investigate the reproduction of native fish species, larval fish rearing and fry rearing;
- Training schemes for fish-breeding in net tanks and in irrigation channels, using improved technologies.

Water, soil and biodiversity conservation (II.2)

Two main activities are recommended:

II.2.1. Support for the restoration and preservation of the remaining vegetation, control of erosion, restoration of degraded areas and measures to control specific sources of point and non-point pollution

The aim of this activity is to promote measures to assist organizations that seek to restore and/or preserve the Basin's representative ecosystems, including the Atlantic Forest. The activity will provide support to federal, state and municipal government actions targeted at the restoration of native vegetation around headwaters, in aquifer recharge areas and around springs, and along river banks.

The envisaged outputs are:

- Maps of critical areas of deforestation and soil-loss in the São Francisco River Basin, at an appropriate scale;
- Land use, land management and remedial practices capable of stemming erosion, along with their proven socio-economic and environmental effectiveness;
- A workshop on legislation and erosion controls, including replanting and sustainable management of riparian vegetation and protection of areas identified for permanent preservation, involving organizations and stakeholders from the most critically affected regions;
- Primers on replanting and sustainable management of riparian vegetation and management of permanent preservation areas;
- A pilot project on sustainable agricultural and urban stormwater management practices, undertaking socio-economic and environmental monitoring of the feasibility and replicability of the projects;
- An evaluation of critical areas of the Basin subject to nitrate- and phosphate-induced eutrophication;

II.2.2. Support to the creation of a conservation unit at the mouth of the São Francisco River and in its Coastal Zone

This activity will support the creation of a conservation unit characteristic of the region's bio-ecological system, while, at the same time, permitting identification and delineation of areas requiring permanent environmental protection and determination of the levels of protection needed. It will also permit assessment of water-exchange mechanisms, tidal-prisms and seawater intrusion volume

ratios, estuarine sedimentation and sediment transport mechanisms, and nutrient concentrations and cycling in estuarine mangrove swamps, and identification of the distribution and yield of phytoplankton, zooplankton and mangrove species.

The envisaged outputs are:

- Demarcation of the Conservation Unit;
- Workshops for presentation of interim results and a seminar for dissemination of the final results, and a proposal for the implementation of a Conservation Unit at the mouth of the São Francisco River;
- A Management Plan for the Conservation Unit at the mouth the São Francisco River and in the coastal zone, including empirical estimates of sediment and nutrient loads and cycles;
- A proposal for the creation of an ecological corridor from the mouth of the São Francisco River to the Xingó Dam.

Access to environmental sanitation and measures to be taken in the event of floods or droughts (II.3)

This Strategic Activity is comprised of one main activity:

II.3.1. Cooperation for improving access to environmental sanitation for poor communities and the adoption of measures to manage floods and droughts

This activity will stimulate provision of environmental sanitation in municipalities in the São Francisco River Basin with less than 5,000 population, providing substantial economic, environmental and social benefits for the greater part of the population of the Basin.

The envisaged outputs are:

- A seminar, attended by representatives of government and of organized civil society, to establish criteria for the proposed actions and identify priority areas for their implementation;

- A diagnostic analysis, including economic evaluations and conceptual studies, on water-supply, sewage and solid-waste collection and disposal systems in the São Francisco River Basin;
- Improvements in environmental sanitation systems in priority municipalities;
- Action Plans for Drought and Flood Relief, entailing a series of workshops and seminars, with participation of the various stakeholders.

Sustainable use and protection of groundwater (II.4)

This strategic action envisages one principal activity:

II.4.1. Dissemination of knowledge on the management, utilization and protection of aquifers in the Basin, and establishment of guidelines for sustainable exploitation of the Bambuí and Urucuia aquifers

This activity aims to improve the knowledge base on the aquifers in the Basin, including the isolated sedimentary aquifers in the Lower-middle São Francisco River Basin. It also will result in preparation of guidelines for the integrated management, utilization and protection of groundwater resources of the Bambuí and Urucuia aquifers.

The envisaged outputs are:

- A diagnostic analysis of the current state of knowledge on the lithological and structural framework of the Basin's existing aquifers and the storage, circulation, extraction, quality and utilization of their waters;
- Delineated pilot areas, including the physical and geometric characterization of the aquifers, their hydraulic and hydrodynamic features, water uses and exploitation characteristics, and water-quality;
- A comprehensive evaluation and consolidation of knowledge and the establishment of guidelines for the sustainable use and protection of groundwater, especially from the Bambuí and Urucuia aquifers.

6

Implementation of the SAP

Photo: Alain Dhomé

Grapes – Petrolina-PE

The purpose of the strategic actions planned under the Strategic Action Program (SAP) is to foster environmentally sustainable development within the São Francisco River Basin and its coastal zone. In order to implement such actions, investment programs of the Brazilian Federal Government and of the States that share the Basin should be taken into consideration.

Significant investments have been made and/or are scheduled to be made in this part of Brazil. Some of these projects are financed by such national agencies as CHESF and CODEVASF, whereas others may be co-financed by multinational agencies.

The alternative scenario consists of implementation of other actions needed to concomitantly usher in sustainable development in the São Francisco River Basin. These are the SAP activities that are crucial for achieving the global environmental benefits stemming from the mitigation of transboundary environmental problems that affect the coastal waters of the South West Atlantic Large Marine Ecosystem.

The costs of these actions include those related to sustainable development projects within the Basin and its coastal zone, over and above those identified in the routine environmental impact assessments and mitigation measures required to comply with federal and state environmental laws and regulations in Brazil.

These incremental implementation costs of the eight strategic actions encompassed within the SAP amount

to US\$ 9 million, proposed to be funded through future GEF investment, split into US\$ 4.3 million under Component I, and US\$ 4.7 million under Component II, in accordance with the allocation for each strategic action, as presented in Table 3. This amount is associated with the above-mentioned Brazilian investment of some US\$ 29.5 million over the four-year period. This raises the investment allocated to related activities in the Basin to US\$ 38.5 million over four years, as shown in Table 3.

The implementation period for all actions planned under the SAP is approximately four years, although not all individual activities begin or end at the same time. Each is to have its own schedule, depending upon their component actions, as shown in Tables 3 (Dates) and 4 (Disbursements).

Table 3 shows the investments in each of the seven principal activities that comprise the Strategic Actions under Component I, and in each of the seven principal activities of Component II.

The numbers of stakeholders and the intense public participation involved in the preparation of the GEF São Francisco Project were undoubtedly of great importance and, to a great extent, explain why the project was successful in reflecting a consensus as to the various concerns and needs of stakeholders throughout the Basin.

The partnerships for implementing SAP actions will be essentially the same as those involved in its formulation, with only a few slight variations in emphasis.

Table 3. Implementation schedule, monitoring and evaluation of the SAP

Strategic Actions	Main Activities	Year				Cost in US\$	Indicative Cost GEF US\$	Total Cost US\$	
		Year 1	Year 2	Year 3	Year 4				
I. Implementation of the Integrated Basin Management System (SIGRHI)							4,300,000	4,570,000	
I.1. Strengthening institutional networking	I.1.1. Networking among programs managed by federal agencies and among entities responsible for water-resources and environment systems: the federal, state, and municipal governments and other stakeholders in the Basin.						100,000	200,000	250,000
	I.1.2. Establishing licensing criteria, water use charges, protocols for managing disputes and definition of monitoring strategies.						100,000		
I.2. Introduction of Integrated Basin Management System institutional instruments, public participation and capacity-building mechanisms	I.2.1. Supporting the Basin Committee through the institution of the Basin Water Agency, establishing an inter-institutional research network and state water resource management systems, training and capacity-building for the members of the Integrated Basin Management System.						1,100,000	1,500,000	1,570,000
	I.2.2. Implementing a planning system with modeling that allows for interaction among sectoral policies.						400,000		
I.3. Development of Integrated Basin Management System technical instruments	I.3.1. Regularizing and monitoring water-resources uses and users, implementing an information system for the São Francisco River Basin and its coastal zone, and developing the Integrated Basin Management System database.						2,000,000	2,200,000	2,275,000
	I.3.2. Developing hydrologic, hydraulic and water quality simulation models, and a decision-making support system.						200,000		
I.4. Social mobilization and environmental education	I.4.1. Fostering social mobilization, public involvement and environmental education, including the preparation of a Plan that takes regional characteristics into account and includes the restoration of historical documents.						400,000	400,000	475,000
II. Sustainable Use of Water Resources and Environment Rehabilitation in the Basin							4,700,000	33,930,000	
II.1. Promotion of multiple water usage	II.1.1. Fostering policies for rational use of irrigation water.						900,000	2,200,000	7,430,000
	II.1.2. Overseeing hydro-environmental studies for multiple use dams and their operations in order to provide support for shipping and mitigation of problems in the coastal zone, including the generation of artificial floods.						900,000		
	II.1.3. Supporting the recovery of the ichthyofauna and the development of fisheries and aquaculture.						400,000		
II.2. Conservation of water, soil and biodiversity	II.2.1. Supporting reforestation and preservation of remaining vegetation, erosion control, recovery of degraded areas and measures for point and non-point pollution control.						500,000	700,000	13,700,000
	II.2.2. Establishing a conservation unit at the mouth of the São Francisco River, in its coastal zone.						200,000		
II.3. Access to environmental sanitation and measures for dealing with floods and droughts	II.3.1. Providing access to environmental sanitation in poor communities, and preventive flooding and drought control measures						1,150,000	1,150,000	11,150,000
II.4. Sustainable use and protection of groundwater	II.4.1. Fostering adequate knowledge for the management, use and protection of aquifers in the Basin, and establishing guidelines for the sustainable utilization of the Bambuí and Urucuia aquifers.						650,000	650,000	1,650,000
Total (I + II), US\$							9,000,000	38,500,000	

Table 4. Annual disbursement schedule for financial resources

Components	Annual Expenditures Distribution (US\$ x 1,000)				
	Year 1	Year 2	Year 3	Year 4	Total
Component I	670	2,325	1,155	150	4,300
Component II	430	2,160	1,650	460	4,700
Overall Total	1,100	4,485	2,805	610	9,000
%	12.2%	49.8%	31.2%	6.8%	100%

When identifying partners, the need to harmonize very diverse interests and public policies must be taken into consideration. There is also a need to incorporate the technical and managerial skills of entities that have data and information available, or the technical capacity to obtain them.

The scope of activities covered by the SAP is huge, and the number of Government actions and programs that may potentially relate to actions under the SAP is also extensive, involving various ministries and state-level entities that offer prospects for significant synergies with the SAP.

A more detailed examination of the PPA indicates that some 154 federal programs or actions have some form of interface with proposed SAP actions. These amount to a total of R\$ 9,166,824,860 (US\$ 3.06 billion) over four years. Some of this funding is earmarked for more general and comprehensive programs and actions to be undertaken throughout Brazil. Though at least a part of this funding will be targeted toward the São Francisco River Basin, on the basis of currently available data, the amounts of allocations associated with these programs to be targeted specifically toward the Basin can not be determined.

Of these 154 PPA programs and actions, 67 can be categorized as clearly applicable to the São Francisco River Basin. These 67 programs and actions total R\$ 2,866,218,563 (US\$ 955.4 million) over four years. However, of this funding, a major portion is earmarked for implementation or management transfers of irrigation projects (R\$ 333,040,734 or US\$ 111 million), and for studies, projects and engineering works associated with integrating the São Francisco River with other river basins in Northeast Brazil (R\$ 1,928,000,000

or US\$ 642.7 million). There are 23 actions that are more directly related to the revitalization of the Basin and water supply, totaling R\$ 605.2 million (US\$ 201.7 million) over a four-year period.

The Brazilian projects identified by the National Water Agency (ANA) as being most directly in line with GEF goals (Table 5) are selected from this set of 23 programs, and account for R\$ 88.5 million (US\$ 29.5 million), representing an average of R\$ 22.1 million (US\$ 7.37 million) per year, to be disbursed under the 2004-2007 Multi-year Action Plan.

In parallel, CHESF expects to make major investments in the São Francisco River Basin over the four-year period. Indeed, its plans to make use of hydroelectric potential at Sobradinho-Itaparica, alone, amount to some R\$ 3,000,000,000 (US\$ 1 billion).

Other proposals, put forth by CHESF, amounting to R\$ 12,000,000 (US\$ 4 million), merit mention:

- Implementation of a real-time geo-referenced water resources-system between Morpará and the São Francisco River mouth;
- Restoration of riparian areas degraded by urban settlement or alterations in the flow of the São Francisco River;
- Survey of water uses and registration of water users between Morpará and the river mouth;
- Expansion and adaptation of sewage treatment systems in towns relocated after displacement by the creation of reservoirs;
- Feasibility studies on the generation of artificial floods designed to restore morphological and environmental conditions within the main river channel;

Table 5. Selected PPA Programs with links to the SAP

PPA Program 2004-2007	Action	In Charge	Value 2004-2007
1305. Revitalization of river basins in vulnerable situations and subject to environmental degradation	3429. Revitalization and rehabilitation of the São Francisco River	MI	R\$ 289.5 million US\$ 96.5 million
	101P. Rehabilitation and preservation of the São Francisco River Basin	MMA	R\$ 10.3 million US\$ 3.4 million
	5472. Rehabilitation of soils and control of erosion in the São Francisco River Basin	CODEVASF	R\$ 70.0 million US\$ 23.3 million
0229. São Francisco Corridor	5859. Restoration of the shipping channel on the São Francisco River Waterway	MT	R\$ 25.0 million US\$ 8.3 million
1304. Water conservation, rational use and quality	3042. Integrated Management of onshore activities in the São Francisco River Basin (in partnership with GEF)	MMA/ANA	R\$ 0.8 million* US\$ 0.27 million

* Includes only GEF São Francisco Project coordination spending.

- Reforestation of degraded areas and restoration of riparian forests;
- Restoration of ichthyofauna in the Lower-middle and Lower São Francisco River, including expansion of the capacity of the Fisheries Station at Paulo Afonso for producing fry of native-species for repopulating the river and reservoirs.

In the area of research and development, during 2004, CHESF is obliged by law to disburse some R\$ 40,000,000 (US\$ 13.3 million), of which half is to be invested directly by the company, and the other half credited to the Ministry of Science and Technology's National Science and Technology Development Fund (FDNCT/MCT). A significant proportion of these funds may be allocated to projects in the São Francisco River Basin.

The states that share the São Francisco River Basin also organize a series of programs. Although no definitive version of the state-level PPAs for the 2004-2007 period had been published or approved by their respective Legislative Assemblies at the time of publication, a summary of available information from states whose jurisdictions include lands within the São Francisco River Basin is presented in Table 6.

In terms of the amounts proposed in the state PPAs, it should be noted that a significant portion of these funds stems from federal transfers and, consequently, is already

accounted for under the federal government programs. However, because the data supplied by most of the states do not stipulate the sources of this funding, it is difficult to correctly estimate the allocation of state-funded investments planned for the Basin. Moreover, substantial proportions of the investments are earmarked for water-resources infrastructure that may not necessarily directly relate to the revitalization of the Basin or, consequently, be convergent with the actions set forth in the SAP. Notwithstanding, Table 6 indicates that sizable investments are planned for the Basin by the riparian States.

• PPA 2004-2007 – State of Minas Gerais

Information provided by the Minas Gerais State Planning and Management Information System presents a range of actions which interface with the implementa-

Table 6. Investments foreseen in the São Francisco River Basin, by state, 2004-2007 State PPAs *

STATE	R\$	US\$ (approximate)
Alagoas	477,758,000	159,252,667
Bahia	213,538,000	71,179,333
Federal District	264,074,000	88,024,667
Minas Gerais	563,231,000	187,743,667
Pernambuco	9,070,000	3,023,333
Sergipe	219,668,000	73,222,667
Goiás	(**)	(**)
Total	1,747,339,000	582,446,333

(*) = In most cases, these sums include Federal transfers of funds.

(**) = No sizable investments planned for the Basin.

tion of the SAP in the São Francisco River Basin. Its principal component, Code 0172, is: Revitalization and sustainable development program for the São Francisco River Basin, targeted at ensuring the sustainability of anthropogenic activities in the Basin, listing high-priority actions designed to restore, conserve and preserve the environment, as well as enhance the qual-

ity and quantity of water supplies, and upgrade quality of life in the region.

Actions under this program, that have an interface with the SAP, are listed in Table 7, and total R\$ 58,386,661 (US\$ 19.5 million) for 2004, and R\$ 563,231,000 (US\$ 187.7 million) for the 2004-2007 period.

Table 7. PPA 2004-2007 for Minas Gerais		
Actions planned under the Revitalization and Sustainable Development Program of the São Francisco River Basin (0172)	R\$	US\$ (approximate)
(P261) Technical and economic feasibility studies for implementation of a waterway in the São Francisco River Basin and its tributaries, in Minas Gerais.	30,000,000	10,000,000
(P338) Environmental education.	4,000,000	1,333,333
(P345) Generation, dissemination and transfer of knowledge and technology.	21,247,000	7,082,333
(P449) Implementation of engineering works.	210,000,000	70,000,000
(P577) Management of biodiversity and expansion of forestry in the São Francisco River Basin.	7,000,000	2,333,333
(P632) Land management.	10,250,000	3,416,667
(P659) Water quality management and monitoring of water pollution.	63,360,000	21,120,000
(P661) Water resource management.	30,030,000	10,010,000
(P718) Integrated sub-basin management.	40,000,000	13,333,333
(P904) Control of sales and use of pesticides.	3,900,000	1,300,000
(P910) Building of biodigesters.	3,000,000	1,000,000
(P932) Treatment of urban effluents.	48,000,000	16,000,000
(P941) Handling solid and liquid wastes produced by farming and livestock.	8,100,000	2,700,000
(P445) Restoration of vegetation cover.	50,000,000	16,666,667
(P664) Support for the establishment of Basin Committees and Basin Agencies.	28,444,000	9,481,333
(P672) Expansion of the forestry base in the São Francisco River Basin.	4,500,000	1,500,000
(P733) Consulting services for the River Basin Technical Councils.	1,400,000	466,667
Total	563,231,000	187,743,667



Aerial view of the Xingó Dam

Table 8. PPA 2004-2007 for Alagoas

Planned Actions (Implementing Agency)	R\$	US\$ (approximate)
Strengthening of the São Francisco River Basin Committee (SEMA-RHN).	120,000	40,000
Environmental prevention, protection and restoration (SEMARHN/IMA).	90,000	30,000
Environmental education and capacity-building (SEMARHN).	161,000	53.667
Sertão canal (SEINFRA).	312,037,000	104,012,333
Small water-conservation projects in the semi-arid area and Sertão drylands (SEMARHN).	1,750,000	583,333
Drawing up of soil, water and vegetation management and conservation plans (SEMARHN).	1,000	333
Training of technical staff for combating desertification (SEMARHN).	26,000	8,667
Installation of sewage collection systems - São Francisco River Basin (SEINFRA).	163,573,000	54,524,333
Total	477,758,000	159,252,667

- **PPA 2004-2007 for Alagoas**

The principal programs of the State of Alagoas are listed in Table 8, and amount to R\$ 477,758,000 (US\$ 159.2 million) for the 2004-2007 period.

- **PPA 2004-2007 for Pernambuco**

The principal programs of the State of Pernambuco are listed in Table 9, and amount to R\$ 2,830,000 million

(US\$ 0.94 million) for 2004 and R\$ 9,070,000 (US\$ 3.0 million) for the 2004-2007 period.

- **PPA 2004-2007 for Bahia**

The principal water resources development programs for the State of Bahia are related to expanding the water supply systems and building of water mains to service the semi-arid region. These projects and actions comprise invest-

Table 9. PPA 2004-2007 for Pernambuco

Planned Actions (Implementing Agency)	R\$	US\$
Review/update Water-Resource Master Plans for tributary river basins of the São Francisco River.	2,400,000	800,000
Prepare an integrated water resource usage plan for tributary river basins of the São Francisco River (PARH, São Francisco).	1,300,000	433,333
Integrated hydro-meteorological network project for tributary river basins of the São Francisco River.	900,000	300,000
Support for the establishment of the Pontal, Garças, Brígida and Terra Nova River Basin Committees, restructuring of the Moxotó and Pajeú River Basin Committees, and establishing Water Users Associations.	1,970,000	656,667
Hydro-geological studies of the Araripe, Jatobá, Cedro, Mirandiba and Tupanaci sedimentary basins.	2,500,000	833,333
Total	9,070,000	3,023,333

ments of some \$ 73,198,000 (US\$ 24.4 million) for 2004 and R\$ 213,538,000 (US\$ 71.2 million) for the 2004-2007 period, as shown in Table 10 below.

• PPA 2004–2007 for Sergipe

Similar to Bahia, the principal water resource programs of the State of Sergipe relate to water supply, and the

Table 10. PPA 2004–2007 for Bahia

Planned Actions (Implementing Agency)	R\$	US\$ (approximate)
Program 204: 'Sanitation is Life': expansion and upgrading of the quality of service; Project 3919: Expansion of water supplies to the semi-arid region; Proágua/Activity 1529: Expanding water supply systems in the Northeast.	114,700,000	38,233,333
Idem, Activity 1758: Building water mains.	50,000,000	16,666,667
Idem, Activity 1844: Development of institutional programs.	800,000	266,667
Program 223: 'Look to nature'; Project 3505: Water resources management (PGRH).	19,600,000	6,533,333
Program 218: 'Fruits of the Earth'; Project 3917: Water Resources Management Infrastructure (PGRH) PGRH/Activity 2109: Dam operations in the Northeast.	1,400,000	466,667
Program 222: 'Reviving our Waters' and 'Renaissance of Earth'; Project 3363: Replanting riparian forests; Activity 1655: Technical Assistance for farmers on planting riparian forests.	235,000	78,333
Idem, Activity 2178: Replanting riparian forests (SFC).	1,321,000	440,333
Idem, Project 3629: Environmental sanitation of river basins; Activity 2552: Recovery of degraded areas in river basin in the Northeast.	3,679,000	1,226,333
Idem, Activity 2552: Restoring degraded areas in river basins.	3,681,000	1,227,000
Idem, Project 3646: Sustainable, integrated development of lands around the Sobradinho Lake; Activity 1871: Preparation of a study and project for the lands surrounding Sobradinho Lake.	2,860,000	953,333
Idem, Activity 2093: Environmental monitoring around the Sobradinho Lake.	4,840,000	1,613,333
Idem, Activity 2472: Community development for environmental and health education.	4,230,000	1,410,000
Idem, Project 3743: Revitalization of the São Francisco River Basin; Activity 1829: Development of educational activities through community mobilization.	286,000	95,333
Idem, Activity 2171: Drawing up an agreement on the restoration of riparian forests (SFC).	286,000	95,333
Idem, Activity 2178: Restoration of riparian forests (SFC).	2,010,000	670,000
Idem, Project 3896: Combating desertification; Activity 1873: Drawing up a plan for preventing and combating desertification in the Northeast region (SPA).	660,000	220,000
Idem, Activity 3896: Preparation of a plan for preventing and combating desertification in the Lower-middle São Francisco River region (SPA).	440,000	146,667
Program 226: Environmental awareness; Project 3654: Environmental Education; Activity 2171: Agreement on capacity-building for extension agents in the São Francisco River Basin.	1,830,000	610,000
Program 234: Public administration models; Project 3656: Institutional strengthening for entities within the State Environment and Water Resources System; Activity 1565: Support for the Water Resources and Environment Councils with a view to strengthening these bodies.	680,000	226,667
Total	213,538,000	71,179,333

building of water mains and irrigation projects in the semi-arid region. Together, these programs amount to R\$

219,668,000 million (US\$ 73.2 million) for the 2004-2007 period, as shown in Table 11.

Table 11. PPA 2004-2007 for Sergipe		
Planned Actions	R\$	US\$ (approximate)
Integrated Solid Waste Systems for the Districts in the Costa dos Coqueirais Complex	11,928,000	3,976,000
Urbanization of the Salomé Lagoon, Cedro de São João	1,325,000	441,667
Jacaré-Curituba Project	22,000,000	7,333,333
Xingó Canal	90,000,000	30,000,000
Supplementary studies of water availability in river basins in Sergipe	6,000*	2,000
Support for organization of bulk water users in the river basins of the State	6,000*	2,000
Revitalization of river basins	100,000*	33,333
Support for River Basin Committees	6,000*	2,000
'Our Rivers Program': São Francisco	200,000	66,667
Preparation of a Master Plan for the São Francisco River Basin, Sergipe Section	40,000	13,333
Supplementary social and economic feasibility studies for upgrading, automating and extending the integrated water mains systems at Alto Sertão and Sertaneja	50,000	16,667
Preparation of the State water infrastructure rehabilitation plan	6,000*	2,000
State water resource management capacity-building plan	50,000*	16,667
Implementation of the State water resources information system	50,000*	16,667
Decentralized action in support of water resources management by citizens	50,000*	16,667
Implementation of the water-quality and hydro-meteorological network in Sergipe	84,000*	28,000
Updating and supplementing the Sergipe State Cartographic Base at a scale of 1:100,000	84,000*	28,000
Preparation of the Digital Atlas on Water Resources	9,000*	3,000
Upgrading, automating and expanding integrated water mains systems at Alto Sertão and Sertaneja	75,000,000	25,000,000
Preparation of Ecological and Economic Zoning for Sergipe	30,000*	10,000
Recovery of degraded areas and riparian forests in the Jacaré and Cadoz River sub-basins	632,000	210,667
Expanding integrated water mains systems at Alto Sertão and Sertaneja	8,637,000	2,879,000
Replacing the water mains system of the São Francisco River	7,621,000	2,540,333
Purchase of equipment for operating system automation	656,000*	218,667
Boring and establishing wells	123,000*	41,000
Establishing irrigation perimeters	500,000*	166,667
Maintaining irrigation perimeters	475,000*	158,333
Total	219,668,000	73,222,667

(*) sums estimated for investment in the São Francisco River Basin.

• PPA 2004–2007 for the Federal District

The principal PPA programs for the Federal District are listed in Table 12. These programs amount to some R\$ 264,074,000 million (US\$ 88 million) for the 2004–2007 period.

• PPA 2004–2007 for Goiás

There are no significant investments planned in Goiás for the areas within the São Francisco River Basin.

All planning must be accompanied by caveats since forecasting the future is fraught with hazards. In the face of such uncertainties, planners must be bold in their reliance upon projections, while having the prudence to monitor the results over time so as to enable adjustments to be made as the course of events may justify over time.

There follows a list of the **major threats to the sustainability of the SAP:**

• Inter-institutional competition;

- Dependence upon sector-specific economic performance;
- Poorly defined institutional and legal frameworks in the sanitation sector;
- Awakening environmental awareness;
- Insufficient resources;
- Dispersion of actions;
- Cultural resistance to water-resource policy instruments.

The Sustainability of the Project, however, is to be ensured by means of:

- Public Involvement;
- A sound legal and institutional framework;
- The Basin Committee.

To this end, specific actions are envisioned to achieve this sustainability:

- **Technical aspects**, such as the information systems, licensing criteria, billing systems and the classifica-

Table 12. PPA 2004–2007 for the Federal District

Planned Actions	R\$	US\$ (approximate)
Water Resource Management	265,000	88,333
City 21 Program	50,000	16,667
Establishment of the District Water Agency	375,000	125,000
Restoration of degraded areas	246,750,000	82,250,000
District Environmental Protection Plan	8,625,000	2,875,000
Federal District Ecotourism Project	30,000	10,000
Procurement of equipment for strengthening water resource and environmental licensing, oversight and inspections	100,000	33,333
Strengthening of the Water Resource Management Policy	6,625,000	2,208,333
Strengthening and restructuring of the water resource and environmental licensing, oversight and inspection systems	100,000	33,333
Implementation of the water source protection program	150,000	50,000
Implementation of the River Basin Restoration and Stewardship Program	50,000	16,667
Reforestation with native plants	7,000	2,333
Modernization of the hydro-meteorological network in the Federal District	255,000	85,000
Mapping of ecosystems	7,000	2,333
Environmental Information System	525,000	175,000
Maintenance of the Water Resources and Environmental Information System, and the geo-referenced database	60,000	20,000
Ecological and economic zoning	100,000	33,333
Total	264,074,000	88,024,667

tion, planning and priority ratings for actions and investments.

- **Environmental aspects**, such as the adoption of rational water use; the recovery of degraded areas; the development of sustainable models for utilizing the natural resources of the Basin; establishment of legally protected areas; pollution controls; consolidation of public awareness of environmental issues relating to water resources; and the rational use of estuarine water resources with a view to improving living conditions of the population.
- **Economic aspects**, such as proposed actions to ensure more efficient water use; implementation of instruments designed to heighten awareness of the economic value of water; adoption of licensing criteria that prioritize the most efficient allocations; improved conditions for the subsistence farmers and inclusion of remote populations in the economy by providing them with opportunities to market their produce; reduced shipping costs through development of waterways, thereby making products originating in the Basin more competitive; and creation of new income generation

opportunities through the development of ecotourism.

- **Social aspects**, such as upgrading the living standards of urban and rural communities, and ensuring improvements in health and income; enhancing the ability of remote communities to survive droughts; assuring the population's safety in relation to floods; and promoting grassroots participation in the decisions on investment priorities in the Basin.
- **Financial aspects**, such as the multiplying effect expected to be achieved through the development of production models tailored to the Basin, increasing production of goods, services and income.

For monitoring and evaluation, it should be born in mind that, in Brazil, the National Water Agency (ANA) is to be the national executing agency for the SAP and is responsible for its technical quality and, alongside other national institutions, is responsible for ensuring that its objectives are attained. At the multilateral level, UNEP, as the GEF implementing agency, in cooperation with the OAS, as UNEP's executing agency, is responsible for ensuring the development of the Project in line with GEF requirements.



Aerial View of Irrigation in the São Francisco Valley

Photo: Codevasf

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Photo: Codevasf



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8

Principal players in preparation of the SAP

Photo: Alain Dhomé



São Francisco River – Pirapora-MG

Below is a listing of institutions that participated in public events during the SAP preparation process.

8.1. Organismos governamentais e não governamentais envolvidos no Projeto			
8.1.1. Federal Government Bodies			
ANA	National Water Agency	ME	Ministry of Education
ANEEL	National Electric Energy Agency	MI	Ministry of National Integration
CEEIVASF	Executive Committee for Integrated Studies of the São Francisco Valley	MMA	Ministry of Environment
CEFET	Federal Center for Technological Education	MME	Ministry of Mines and Energy
CHESF	Hydroelectric Company of the São Francisco	MP	Office of the Public Prosecutor
CNRH	National Water Resources Council	MPOG	Ministry of Planning, Budget and Management
CODEVASF	São Francisco and Parnaíba Valley Development Company	MT	Ministry of Transport
CPATSA	Tropical Semi-arid Farming and Livestock Research Center	ONS	National Operator of the Electric System
CPRM	Mineral Resources Research Company	PROÁGUA	Program for Sustainable Development of Brazil's Semi-arid areas
DNIT	National Department of Transport Infrastructure	SRH-MMA	Secretariat of Water Resources of the Ministry of Environment
DNOCS	National Department of Works for Combating Drought	SUDENE	Superintendency for Development of the Northeast
EB	Brazilian Army	UFAL	Federal University of Alagoas
EMBRAPA	Brazilian Agricultural Research Corporation	UFBA	Federal University of Bahia
FNMA	National Environment Fund	UFF	Fluminense Federal University
FNS	National Health Foundation	UFG	Federal University of Goiás
FUNAI	National Indian Foundation	UFMG	Federal University of Minas Gerais
FURNAS	Furnas Centrais Elétricas S.A.	UFOP	Federal University of Ouro Preto
GERCO	Coastal Management	UFPB	Federal University of Paraíba
IBAMA	Brazilian Institute of Environment and Renewable Natural Resources	UFPE	Federal University of Pernambuco
INCRA	National Institute of Colonization and Land Reform	UFRN	Federal University of Rio Grande do Norte
INMET	National Meteorology Institute	UFS	Federal University of Sergipe
JF	Federal Courts	UFV	Federal University of Viçosa
MA	Ministry of the Air Force	UnB	University of Brasília
MAPA	Ministry of Agriculture, Livestock and Supply	UNICAMP	University of Campinas
8.1.2. State Bodies			
Alagoas			
Ass. Leg. Alagoas	Legislature of Alagoas	NMRH	Center for Meteorology and Water Resources
CASAL	Water Supply and Sanitation Company of Alagoas	PM	Military Police of Alagoas
CEAL	Energy Company of Alagoas	SAAE	Autonomous Water and Sewage Services of Alagoas
DHM	Hydrometeorology Board of Alagoas	SAI	Secretariat of Agriculture and Irrigation of Alagoas
EPEAL	Farming and Livestock Research Enterprise of Alagoas	SEMARHN	Executive Secretariat of Environment, Water and Natural Resources
IMA	Environment Institute of Alagoas	SPDA	Secretariat of Planning and Development of Alagoas

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Bahia			
ADAB	State Agricultural Defense Agency	SAAE	Autonomous Water and Sewage Services of Bahia
Bahia Legislature		SEAGRI	Secretariat of Agriculture, Irrigation and Land Reform of Bahia
CERB	Rural Engineering Company of Bahia	SEFAZ	State Secretariat of Finance of Bahia
CODEBA	Bahia State Docks Company	SEIBA	Superintendency of Economic and Social Studies of Bahia
COELBA	Electricity Company of Bahia	SEINFRA	State Secretariat of Infrastructure of Bahia
CRA	Environmental Resources Center of Bahia	SEMARH	Secretariat of Environment and Water Resources of Bahia
CRB	Regional Council of Biology	SEPLANTEC	Secretariat of Planning Science and Technology of Bahia
DERBA	Highway Department of Bahia	SESAB	Secretariat of Health of Bahia
DIB	Irrigation District of Bahia	SFEBA	State Secretariat of Finance of Bahia
EBDA	Bahia Agricultural Development Company	SIRBA	Superintendency of Irrigation of Bahia
EMBASA	Bahia Water and Sanitation Company	SRH	Secretariat of Water Resources of Bahia
FAMESF	Faculty of Agronomy of the Middle São Francisco	UEB	State University of Bahia
ICA	Cocoa Institute of Bahia	UEFS	State University of Feira de Santana
PA	Environmental Police of Bahia	UNEB	University of the State of Bahia
PM	Military Police of Bahia		
Distrito Federal			
CAESB	Brasília Sanitation Company	SEMARH	Secretariat of Environment and Water Resources of the Federal District
DLFMA	Environmental Licensing Control and Monitoring Board of the Federal District		
Goiás			
SEMARH	Secretariat of Environment and Water Resources of Goiás	SRH	Secretariat of Water Resources of Goiás
Minas Gerais			
CEMIG	Minas Gerais Energy Company	IGAM	Minas Gerais Water Management Institute
CEPEMG	Center for Education Studies and Research of Minas Gerais	INDI	Minas Gerais Industrial Development Institute
CERH	State Water Resources Committee of Minas Gerais	INESP	Minas Gerais Higher Learning and Research Institute
CETEC	Technological Center Foundation of Minas Gerais	PMMA	Military Environmental Police
COPAM	State Council of Environmental Policy of Minas Gerais	PM	Military Police of Minas Gerais
COPASA	Minas Gerais Sanitation Company	PPNL	Office of the Public Prosecutor of Nova Lima
CREDINOR	Rural Credit Cooperative of the North of Minas Gerais	PPOP	Office of the Public Prosecutor of Ouro Preto
CRH	Minas Gerais State Water Resources Council	PRODEMGE	State Data Processing of Minas Gerais
EMATER	Rural Technical Assistance Company of Minas Gerais	RURALMINAS	Minas Gerais Rural Foundation for Colonization Agrarian Development
EPAMIG	Minas Gerais Agricultural Research Company	SAAE	Autonomous Water and Sewage Services of Minas Gerais
FASF	Faculty of Philosophy, Sciences and Letters of the Upper São Francisco	SEEF	State Superintendency of Finance of Minas Gerais
FEAM	State Environment Foundation of Minas Gerais	SEMAD	Secretariat of Environment and Sustainable Development of Minas Gerais
FEP	Polytechnic School Foundation	SETASCAD	Secretariat of Labor, Association for Children and Adolescents
FRANAVE	São Francisco Navigation Company	SUDECOOP	Superintendence of Development and Cooperation
IEF-MG	State Forests Institute of Minas Gerais	UEMG	State University of Minas Gerais
Pernambuco			
COMPESA	Pernambuco Sanitation Company	ITEP	Technological Institute of Pernambuco
COMTRAP	Airport Operations Company	SECTMA	Secretariat of Sciences, Technology and Environment of Pernambuco
CPRH	Pernambuco Water Resources Company	SRH-PE	Secretariat of Water Resources of Pernambuco
EBAPE	Supply and Development Company of Pernambuco		
São Paulo			
USP	University of São Paulo		

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Sergipe			
ADEMA	State Environment Administration of Sergipe	MEB	Grassroots Education Movement of Sergipe
CEDA	Environmental Law Committee of Aracaju	SEDU	Secretariat of Education of Sergipe
CEFET	Federal Center for Technological Education of Sergipe	SEES	State Secretariat of Education of Sergipe
CREA	Regional Council of Engineering, Architecture and Agronomy of Sergipe	SEMA	Special Secretariat of Environment of Sergipe
DESO	Sanitation Company of Sergipe	SEPLANTEC	Secretariat of Planning, Science and Technology of Sergipe
ENERGIPE	Energy Company of Sergipe	SRH-SE	Superintendence of Water Resources of Sergipe
FAPESE	Support for Research and Extension Foundation of Sergipe	TAMAR	Tamar Project
FS	Faculty of Sergipe	UNIT	Tiradentes University
8.1.3 Municipal Bodies			
Alagoas			
PM-AL	Military Police of Alagoas	Municipal Administration of Penedo	
Municipal Administration of Belo Monte		Municipal Administration of Piaçabuçu	
Municipal Administration of Feliz Deserto		Municipal Administration of Piranhas	
Municipal Administration of Pão de Açúcar		SAAEPA	Autonomuos Water and Sewage Services of Pão de Açúcar
Bahia			
Municipal Chamber of Codijipe		Municipal Administration of Luiz Eduardo Magalhães	
DIBS	Distribuition of Irrigation Barreiras do Sul	Municipal Administration of Miguel Calmon	
EAC	Agricultural School of Correntina	Municipal Administration of Mirangaba	
EAM	Agricultural School of Macaúbas	Municipal Administration of Morro do Chapéu	
EFAJ	Family Farming School of Jaboticaba	Municipal Administration of Niansivão	
Municipal Administration of Ariranha Azul		Municipal Administration of Ourolândia	
Municipal Administration of Campo Formoso		Municipal Administration of Paulo Afonso	
Municipal Administration of Carmo do Cajurú		Municipal Administration of Piratinga	
Municipal Administration of Correntina		Municipal Administration of Rio Pires	
Municipal Administration of Cristópolis		Municipal Administration of Santa Brígida	
Municipal Administration of Curaçá		Municipal Administration of São Desidério	
Municipal Administration of Ibotirama		Municipal Administration of Sento Sé	
Municipal Administration of Itacarambi		Municipal Administration of Umburanas	
Municipal Administration of Jacobina		Municipal Administration of Várzea Nova	
Municipal Administration of Jaguarari		SAAEJ	Autonomous Water and Sewage Services of Juazeiro
Municipal Administration of Juazeiro			
Minas Gerais			
ADLUZ	Development Agency of Luz	Municipal Administration of Luz	
CCRG	Rural Community Councils of Guarita and Teixeira	Municipal Administration of Montes Claros	
CDAR	Regional Action and Development Company	Municipal Administration of Ouro Branco	
CEPALUZ	Agricultural Production Cooperative of Luz	Municipal Administration of Pará de Minas	
CIBAPAR	Inter-municipal Consortium of the Paraopeba River Basin	Municipal Administration of Pirapora	
CMDR	Municipal Rural Development Council of São Sebastião do Oeste	Municipal Administration of Pitangui	
CMI	Municipal Chamber of Itabirito	Municipal Administration of São Gonçalo do Abaeté	
CMNL	Municipal Chamber of Nova Lima	Municipal Administration of São João Lagoa	
CMR	Municipal Chamber of Raposos	Municipal Administration of São Roque of Minas	
CMRA	Municipal Chamber of Rio Acima	Municipal Administration of São S. do Oeste	
CODEMA	Municipal Council for Environmental Defense and Development	Municipal Administration of Serra Talhada	
COPASA	Luz Office	Municipal Administration of Tiradentes	
DIJ	Jaiba Irrigation District	Municipal Administration of Três Marias	
DIPCP	Contiguiba/Pindoba Irrigation District	RET	Tripuí Ecological Reserve
FMMA	Municipal Environment Foundation	SAAEB	Autonomous Water and Sewage Services of Bocaiúva

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FUNEDI	Education Foundation of Divinópolis	SAAEIT	Autonomous Water and Sewage Services of Itabirito
FUTAG	Municipal Foundation for Cultural Action and Training	SAAEP	Autonomous Water and Sewage Services of Pirapora
PFNL	Forestry Police of Nova Lima	SMDEI	Municipal Secretariat of Economic Development of Itabirito
Municipal Administration of Bom Despacho		SMMA	Municipal Secretariat of Environment of Ouro Preto
Municipal Administration of Capitão Enéas		SMMAI	Municipal Secretariat of Environment of Itabirito
Municipal Administration of Congonhas		SMMALUZ	Municipal Secretariat of Environment of Luz
Municipal Administration of Conselheiro Lafaiete		SMMANL	Municipal Secretariat of Environment of Nova Lima
Municipal Administration of Divinópolis		SMMAR	Municipal Secretariat of Environment of Raposos
Municipal Administration of Itaúna		SMMARA	Municipal Secretariat of Environment of Rio Acima
Municipal Administration of Janaúba		SODAEOP	Secretariat of Works/Department of Water and Sewage of Ouro Preto
Municipal Administration of Lagoa da Prata		SODAERA	Secretariat of Works/Department of Water and Sewage of Rio Acima
Municipal Administration of Lagoa Grande			
Pernambuco			
AEDA	Education Bureau do Araripe		Municipal Administration of Poço Redondo
CPP	Peoples Council of Petrolina		Municipal Administration of Porto da Folha
Municipal Administration of Orocó			Municipal Administration of Salgueiro
Municipal Administration of Petrolina			Municipal Administration of Santa Maria da Boa Vista
Sergipe			
EMURB	Municipal Urbanization Company		Municipal Administration of Neópolis
Municipal Administration of Aracaju			Municipal Administration of Poço Redondo
Municipal Administration of Brejo Grande			Municipal Administration of Porto da Folha
Municipal Administration of Capela			Municipal Administration of São Francisco
Municipal Administration of Ilha das Flores		SAAEAP	Autonomous Water and Sewage Services of Capela
8.1.4. Non-governmental bodies and professional associations			
International			
TNC	The Nature Conservancy	WFT	World Fisheries Trust
National			
ABAS	Brazilian Groundwater Association	FUNCATE	Science Foundation, Applications and Special Technologies
ABID	Brazilian Irrigation and Drainage Association	FUNDIFRAN	Foundation for the Integrated Development of the São Francisco
ABRH	Brazilian Water Resources Association		
Alagoas			
AC	Community Association of Capela	CPAL	Fishing Colonies of Alagoas
ACPM	Association of Concessionaires of the Marituba Project	CPRP	Farmers Cooperative of Penedo
ACSSL	Community Association of Sítio Salgado do Lino	FPAL	Federation of Fishermen of the State of Alagoas
ÁGUA E VIDA Association		FTV	Fundação Teotônio Vilela
AMBSB	Neighborhood Association of Senhor do Bonfim	FUNDEPES	Extension Research and Development Foundation
AMPM	Neighborhood Association of Ponta Morfina		Instituto Acauã
AMVB	Neighborhood Association of Vale do Boaca		Marina Velho Chico
APAL	Fisherman's Associations of Alagoas		OLHA O CHICO Association
ASCAP	Resources Training Association	STRPA	Union of Rural Workers of Pão de Açúcar
ASCOC	Farmers Association		Z19 Fishing Colony
ATRM	Association of Rural Workers of Marizeiro		Z2 Fishing Colony
CEAPA	State Center of Associations of Settlers and Small Farmers of Alagoas		Z27 Fishing Colony
COPPABACS	Small Farmers Cooperative Community Seed Banks		Z41 Fishing Colony
CP	Casa de Penedo		
Bahia			
ABCR	Street Sprinters Association of Barreiras		Association of Canaã
ABIR	Boatmen's Association Ilha do Rodeador		Association of Iguarape
ACA	Agricultural Commercial Association of Xique-Xique		Association of Mexedeira

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ACAFLC	Community Association of Farmers and Families of Lagoa Clara	Association of Nonacolonha	
ACRF	Community Association for Land Reform of Serra Azul	Association of Serra Dourada	
AIA	Industry and Agronomy Association of Xique-Xique	Association of Utinga	
AIBA	Irrigated Farming Association of Western Bahia	AUSO	United Association of Santo Onofre
AJEB	Young Entrepreneurs Association of Barreiras	CAB	Center for Associations of Barreiras
AMINA	Friends of Nature Association of Barreiras and the surrounding Region	CDL	Shop Managers Chamber
AMPPRVI	Association of Mini and Small Farmers of Vale do Itaguari	CPBA	Fishing Colonies of Bahia
AMVBE	Neighborhood Association of Vila Boa Esperança	FUNDIFRAN	Integrated Development Foundation of the São Francisco
APLB	Retired Teachers Association of Bahia	FONASC	National Forum of Civil Society Committees of Bahia
APMSF	Fishermen's Association of Muquem do São Francisco	PT Worker's Party – Bahia	
APRSS	Farmer's Association of Sento Sé	SEMMARH	Municipal Secretariat of Environment and Water Resources
APSB	Fishermen's Association of Saco de Boi	SPR	Union of Farmers
AQMBV	Quilomba Association of Mangal Barro Vermelho	STC	Union of Workers of Coríbe
ASPAVARG	Professional Fishermen's Association of Friends of the Rio Grande Valley	STR	Union of Rural Workers
Minas Gerais			
AAASF	Environmental Association of the Upper São Francisco	FAEMG	State Federation of Agriculture of Minas Gerais
ABANORTE	Central Fruit Farmers Association of the North of Minas Gerais	FETAEMG	Federation of Agricultural Workers of Minas Gerais
ABESA-MG	Brazilian Association of Sanitation and Environmental Engineering of Minas Gerais	FIEMG	Federation of Industries of the State of Minas Gerais
ABID	Brazilian Irrigation and Drainage Association	FJP	Fundação João Pinheiro
ABMG	Biologists Association of Minas Gerais	FOBES	Ouro Preto Social Welfare Foundation
ACAL	Community Association of Water Limpa	FPA	Federation of Traditional Fishermen
ACBOV	Community Association of Bairro Ouro Velho	FPEMG	State Federation of Fishermen of Minas Gerais
ACJC	Community Association of Jardim Canadá	FPP	Federation of Professional Fishermen of Minas Gerais
ACSB	Community Association of São Bartolomeu	Fundação Biodiversitas	
ACT	Tangará Condominium Association	Fundação Gorceix	
ADESA	Environmental Development Association	GARRA	Environmental Movement
AEAP	Agronomists Association of Paracatu	IMAN	Instituto Manoel Novaes
AMAMC	Association of Friends of the Environment of Morro do Chapéu	Instituto Guaicuy – SOS Rio das Velhas	
AMDA	Minas Gerais Association for Defense of the Environment	IRPAA	Regional Institute for Appropriate Small Farming Techniques
AMMVI	Municipal Association of the Vale do Itaparica Micro Region	MANUELZÃO Projeto	
AMOVILE	Neighborhood Association of Ville de Montagne	MCA	Movement for Citizenship and Waters
AMPA	Environmental Preservation Association of Mingú	MEL	Free Ecological Movement
ASF	São Francisco Association	MEST	Seiva da Terra Ecological Movement
ASSEMAE	National Association of Municipal Sanitation Services	MSA	Alternative Society Movement
ATPPRBG	Small Farmers and Rural Workers Association of Buriti Grande	MVP	Paracatu Green Movement
BE	Ecological Brigade	OAB-MG	Brazilian Bar Association – Ouro Branco-MG
CBHPA	Pará River Basin Committee	PROMUTUCA	Association for Environmental Preservation of Vale do Mutuca
CBHRS	Salitre River Basin Committee	SIGMNM	Union of Gypsum and Non-Metallic Materials Industries
CBHVG	Verde Grande River Basin Committee	SINDIEXTRA	Union Extractive Industries
CCA	Canto das Waters Condominium	SINDRP	Rural Union of Pirapora
CODEMA	Municipal Council for Environmental Conservation and Defense	SPRLUZ	Sindicato Patronal Rural de Luz

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COMPCANA	Cana Protection Committee	UAI	Environmental Union of Itabirito
CPMG	Fishing Colonies of Minas Gerais	UAVS	United Associations of Irrigation Users of Vale do Salitre
CPTM	Fishing Colony of Três Marias		
Pernambuco			
ABRH-PE	Brazilian Water Resources Association of Pernambuco	DSCAS	Diaconia Civil Society and Social Action
ACPRJ	Commercial Farmers Association of Jiló	FPP	Federation of Fishermen of Pernambuco
ADMA	Association for Defense of the Environment	PCH	Association of Representatives of Small Hydroelectric Plants
ADSQ	Development Association of Santa Quitéria	PV	Green Party – Petrolina
WATERVALE	Environmental Guardians Association of the São Francisco Valley	STRJ	Union of Rural Workers of Juazeiro
ARFB	Barra Rural Finance Association	UAMP	United Municipal Associations of Pernambuco
CBG	Garça River Basin Committee		
Sergipe			
AGROECO	Agro-ecological	Xingó	Institute Scientific and Technological Development Institute of Xingo
APS	Fishermen's Association of Saúde	LCI	Lions Club International
Comunidade Saramem		MOPEC	Popular Ecological Movement
CPMAB	Fishing Colony of the Municipality of Areia Branca	MPV	Movimento Pensar Verde
FDRSF	Forum for Defense of the São Francisco	OAB-SE	Bar Association Brazil – Sergipe
FJN	Fundação Joaquim Nabuco	SSBSFCT	Socio-Environmental Society of the Lower São Francisco – Canoa da Tolda
8.1.5. Private and State Companies			
State Companies			
PETROBRAS	Petróleo Brasileiro S.A.	VALE	Companhia Vale do Rio Doce
Bahia			
AGENCY 5	Agency 5 Arte and Multimídia	HIDROBASA	Hydrometric Institute of Bahia
AGOL	Agropecuaria Grande Oeste Ltda.	HIDROCON	Hidrogeólogos Consultores
Ibotirama Fishermen's Cooperative		HIDROLOG	Serviços de Perfilagem Ltda.
CURTUME	Curtume Moderno S.A.	MAUERBERG	Poços Artesianos Ltda. – Tube Wells
DR	Diário da Região	TCF	Turismo Campo Formoso
Federal District			
DM	Diário dos Municípios	JFMA	Jornal Folha do Meio Ambiente
GNL	Administração de Negócios Ltda.	TDA	TDA Desenho e Arte
IKHON	Administração e Tecnologia		
Minas Gerais			
ACA	Água Consultores Associados	FRUTIVALE	Frutivale
AÇOMINAS	Aços Minas Gerais	FTN	Fazenda Terra Nova
AFA	América Frutas e Alimentos S.A.	GA	Golder Associates
AHRSF	Administration da Hidrovia do Rio São Francisco	GAIA	Consultoria Ambiental
ANGLOGOLD	Mineration Morro Velho Ltda.	IMNE	Italmagnésio – Nordeste
BB	Balsa Britânica	LEME	Engineering Ltda.
BEMIL Ltda.	Bemil Ltda.	LIASA	Ligas de Alumínio S.A.
CAD	Cooperativa Agropecuária de Divinópolis	MAGNESITA	Magnesita S.A.
CC	Curtume Campelo	MBR	Minerações Brasileiras Reunidas
CI	Chuvatel Irrigação	MORGAN	Cerâmica Morgan
CM	Curtume Moderno	MPMM	Minas Pérola Mármore de Minas Ltda.
CMM	Companhia Mineira of Metais	MRV	Mineração Rio Verde
CNC	Casa Nobre Consultoria	PCEAI	Pedras Congonhas Exportação Arte e Indústria Ltda.
CONEMAL	Conemal Ltda.	PEDOGEO	Empresa Pedogeo de Consultores Associados Ltda.
CONSUB	Consub SG	PROPEL	Propel Ltda.
COOPADAP	Cooperativa Agropecuária do Alto Parnaíba	TIMCI	Topázio Imperial Mineração Comércio e Indústria Ltda.
COOPERC	Cooperativa Agrícola de Irrigação e do Projeto de Ceraíma	TRANZDUARTE	Empresa Tranzduarte Ltda.
ECONSULT	Empresa Consult de Engenharia Ambiental Ltda.	TV CEMIG	TV Cemig

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ECOPLAN/ MAGMA/CAB	Consórcio ECOPLAN/MAGMA/CAB	UL	Usina Luciana
EHIL	Estância Hidromineral Itabirito Ltda.	VALEÉ S.A.	Valeé S.A.
FAHMA	Planejamento e Engenharia Agrícola Ltda.	VM	Visão Mundial
FORTECO	Forteco S.A.	VOTORANTIM	Grupo Votorantim Metais
Pernambuco			
VE	Vale Export		
Sergipe			
ODEBRECHT	Construtora Odebrecht		
8.2. São Francisco River Basin Participative Water Resources Management Board			
CBHSF	São Francisco River Basin Committee		
8.3. Overseas Institutions			
LAVAL	University – Canada	Universidad Jaume I – Spain	
UCAL	University of California -USA	Universidad del País Basco – Spain	
8.4. International Institutions and Agencies			
GEF	Global Environmental Facility	PNUMA – UNEP	United Nations Environment Programme
OAS	Organization of American States	IWRN/RIRH	Inter-American Water Resources Network
Project coordination and management			
Agência Nacional de Águas – ANA – National Water Agency. http://www.ana.gov.br			
Jerson Kelman. Managing Director of ANA Phone: (55-61) 445.5441, Fax: (55-61) 445.5404. E-mail: kelman@ana.gov.br		Benedito Braga. Director of ANA. Phone: (55-61) 445.5431, Fax: (55-61) 445.5415. E-mail: benbraga@ana.gov.br	
Paulo Lopes Varella Neto. Superintendent of Programs and Projects. National Coordinator of the GEF São Francisco and GEF Pantanal/Alto Paraguai Projects. Phone: (55-61) 445.5221. Fax (55-61) 445-5296. E-mail: paulovarella@ana.gov.br			
GEF – Global Environmental Facility. http://www.gefweb.org			
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UNEP – United Nations Environment Programme. http://www.unep.org/			
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OAS – Organization of American States. http://www.oas.org			
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Jorge Rucks.Head of Geographic Area II, Latin America. Phone: (54-11) 4803.7606; Fax: (54-11) 4801.6092. E-mail: oea@oea.com.ar		Maria Apostolova. Specialist of the Unit for Sustainable Development and Environment.Phone: (5255) 5280-1208. E-mail: mstesanova@prodigy.net.mx	
Members of Executive Board of the São Francisco River Basin Committee – CBHSF			
José Carlos Carvalho. President. Phone: (31) 3298.6581; (31) 3298.6351. E-mail: presidente@cbhsaofrancisco.org.br		Cláudio Roberto Oliveira de Vasconcellos – Bahia. Phone: (77) 613.2022; (77) 9971.0394. Coordinator of the Consultative Chamber of the Middle São Francisco Region. E-mail: camaradomedio@cbhsaofrancisco.org.br	
Jorge Khoury Hedaye. Vice-President. Phone: (71) 370.3804; (71) 370.3805. E-mail: vicepresidente@cbhsaofrancisco.org.br		José Almir Cirilo – Recife, Pernambuco. Coordinator of the Consultative Chamber of the Lower-middle São Francisco Region. Phone: (81) 3271.8223 . E-mail: camaradosubmedio@cbhsaofrancisco.org.br	
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Annex

Photo: Alain Dhomé



ACTIVITIES

In preparing the proposal for the Project for Integrated Management of Land-based Activities in the São Francisco River Basin, the Secretariat Water Resources of the Ministry of Environment (SRH/MMA), the Organization of American States (OAS) and the United Nations Environment Programme (UNEP) conducted broad-based public consultations to identify the principal problems of the Basin and its coastal zone, and to solicit proposals for project activities.

Various proposals were presented, debated and classified into four components. The various activities listed in the table below were carried out in the 2000-2003 period.

Executive Summaries of the Final Reports of the GEF São Francisco Project Activities are available in Portuguese and English on the site of the National Water Agency – ANA: <http://www.ana.gov.br/gefsf/>.

Photo: Alain Dhomé



Headwaters of the São Francisco River

Table 13. Activities of the Project Components**Component I. Environmental Assessment of the São Francisco River Basin and its Coastal Zone****Upper São Francisco**

- Environmental Effects of Mining Activities on the Water Resources of the Upper das Velhas River Basin-MG (Activity 1.2)
- Determination of Land Use in the Upper São Francisco River Basin (Activity 2.1)

Middle São Francisco

- Multi-temporal Analysis of Riverbed Shape Alteration Dynamics in the Middle São Francisco -BA (Activity 2.2C)
- Conjunctive Use of Surface and Ground Waters in the Fêmeas River Basin-BA (Activity 3.2)

Lower-middle São Francisco

- Determination of Land Use in the Lower-middle São Francisco River Basin (Activity 2.1)
- Development of a Water Quality Monitoring System in the Lower-middle São Francisco -BA/PE (Activity 1.4)
- Impact of Agriculture on Groundwater Resources in the Verde/Jacaré River Basins-BA (Activity 1.5)

Lower São Francisco and its Coastal Zone

- Hydrodynamic and Sediment Studies of the Lower São Francisco, its Estuary and Adjacent Coastal Zone-AL/SE (Activity 1.1A)
- Riverbank Erosion Evaluation Studies and the Effects of Riverbank Erosion on Sedimentation Dynamics-AL/SE (Activity 2.4)
- Determination of Estuarine Nutrient and Sediment Loads in the Region of the Mouth of the São Francisco River (Activity 1.1B)
- Restoration of Rheophilic Ichthyofauna of the Lower São Francisco-AL/SE (Activity 1.3)
- Determination of Land Use in the Lower São Francisco (Activity 2.1)

Component II – Public and Stakeholder Participation

- Fostering Public Participation in the São Francisco River Basin (Activity 4.1)
- Partnership for Improvement of Water Quality in São Pedro Stream-MG (Activity 2.2A)
- Recovering Our Forests – A Pilot Project in the Municipality of Luz-MG (Activity 2.2B)
- Training for the Participatory Management of Water Resources and Environmental Education –PE (Activity 3.3A)

Component III – Development of the Organizational Framework

- Support for the Creation of the São Francisco River Basin Committee (Activity 3.4) and Support to the Strengthening of the São Francisco River Basin Integration Committee (Activity 3.5)
- Pilot Study for the Implementation of a Basin Water Agency in the Sub-basin of the Maranhão River -MG (Activity 3.1)
- Integrated Management Plan for the Salitre River Basin -BA (Activity 3.3B)

Component IV – Formulation of the Strategic Action Program for the Integrated Management of the São Francisco River Basin (SAP)

- Evaluation of the Contribution of Shipping to the Competitiveness of Agriculture in the São Francisco River Basin (Activity 1.1C)
- Evaluation of Economic Instruments for the Sustainable Management of Water Resources in the Verde Grande Sub-basin -MG/BA (Activity 4.2A)
- Quantification and Assessment of the Efficiency of Agricultural Water Use in the São Francisco River Basin (Activity 4.3)
- Formulation of Operational Policies for the Principal Reservoirs of the São Francisco River Basin (Activity 4.4)
- Diagnostic Analysis and Proposal for Expanding the Hydro-Meteorological Network of São Francisco River Basin (Activity 4.7A)
- Proposal for a Piezometric Monitoring Network in the Verde Grande River Sub-basin -MG (Activity 4.7B)
- Development of a Metadata-based Reference Information System (Activity 4.7C)

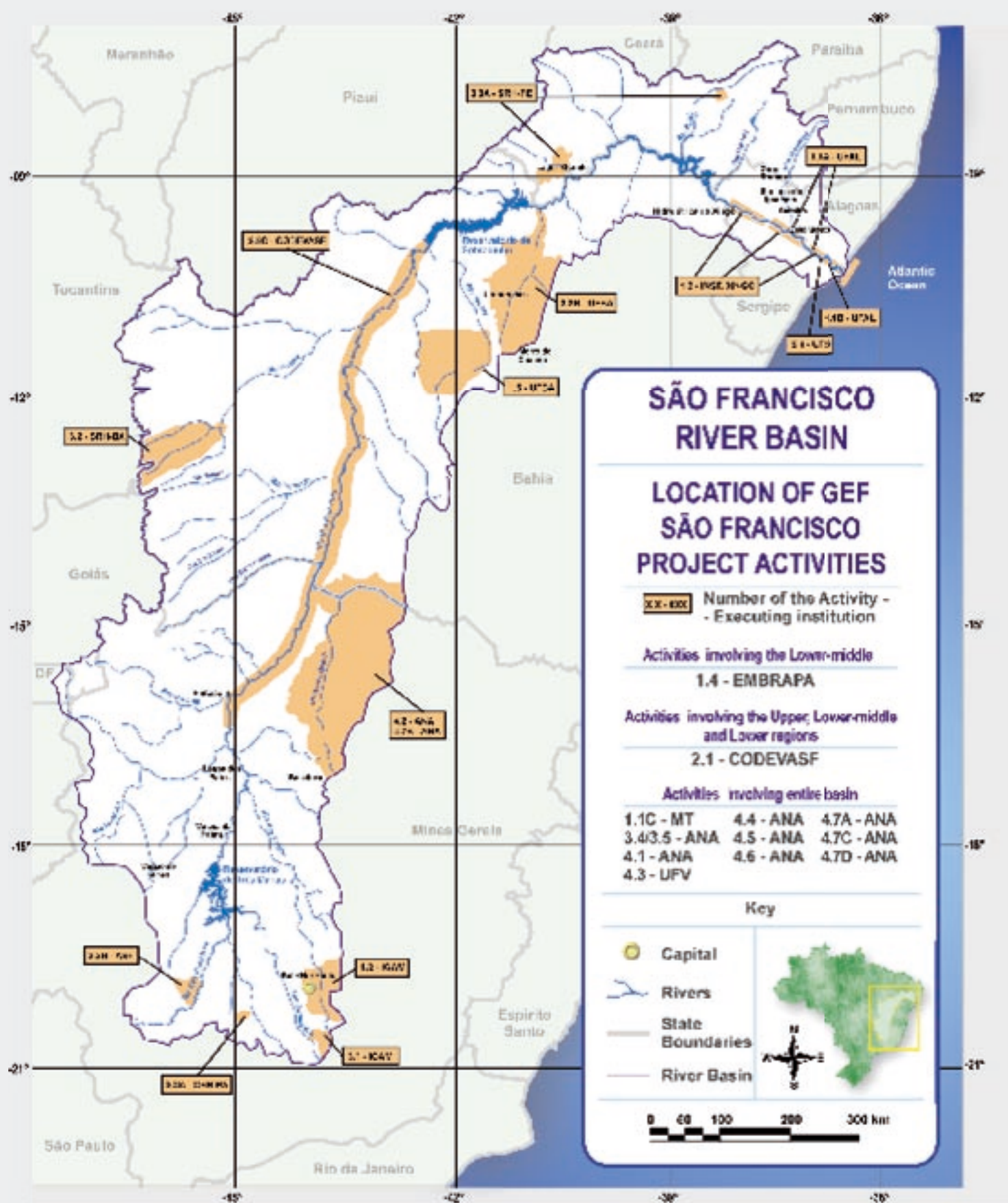


Figure 9. Location of GEF-São Francisco activities