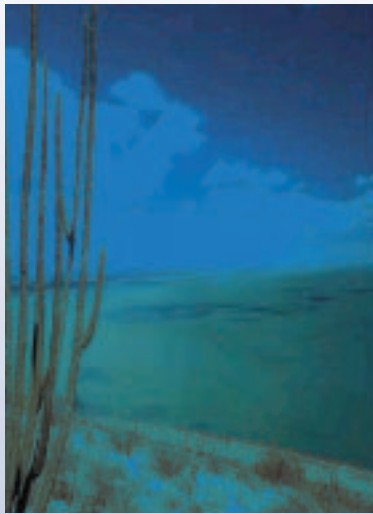


SÃO FRANCISCO RIVER BASIN

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

INTEGRATED MANAGEMENT OF LAND-BASED ACTIVITIES IN THE SÃO FRANCISCO RIVER BASIN PROJECT



COUNTRY: Brazil
IMPLEMENTING AGENCY: United Nations Environment Programme (UNEP)
REGIONAL EXECUTING AGENCY: Organization of American States/ Office for Sustainable Development and Environment (OAS/OSDE)
LOCAL EXECUTING AGENCY: National Water Agency of Brazil (ANA)
PROJECT DURATION: 2000-2005
WEBSITE: <http://www.ana.gov.br/gefsf>
GEF GRANT: 4.771 US\$ millions
GOV. OF BRAZIL: 17.168 US\$ millions
UNEP/OAS: 0.275 US\$ millions
PROJECT COST: 22.214 US\$ millions



INTRODUCTION

The São Francisco River Basin (SFRB) in Brazil covers an area of 636,920 km², draining areas of the States of Minas Gerais, Goiás, Bahia, Pernambuco, Alagoas, and Sergipe, as well as part of the Federal District. Along its nearly 2,900 km length, the River crosses a diverse region, both in terms of its climatic and physical characterization and in terms of its environmental and social diversity. A portion of the Basin is in the semi-arid Northeast Region of Brazil, where the São Francisco River, with an annual average flow of 2,850 m³/s, accounts for roughly two-thirds of the freshwater available.

The São Francisco River Basin and its Coastal Zone are areas of strategic importance to the development of a vast region, marked with by socio-economic disparities and environmental vulnerabilities. The optimization and harmonization of various types of water uses – generation of electricity, shipping, irrigation, fishing, tourism and leisure, dilution of wastes, house-

hold and industrial water supply, mining, and others, including ensuring adequate flows for environmental uses – has been a constant challenge for the basin stakeholders.

With a population of approximately 13.3 million inhabitants (year 2000), or about 7.5% of the Brazilian population, and encompassing important urban centers such as the metropolitan region of Belo Horizonte (with population of more than 3 million), the Basin has enormous potential for additional economic growth. This intense economic activity is exerting increased pressure on both its natural and water resources, particularly in areas of intensive irrigation (with more than 340 thousand ha of irrigated lands, and a potential estimated at 800 thousand ha) as well as areas affected by point- and diffuse-sourced pollution. Another area of great concern is the impact of river regulation (mainly for hydropower generation, with 10,300MW installed and 26,300MW potential capacity) on the hydrological processes and geomorphology of the

River – and the cascade of sedimentological, chemical, and biological consequences these changes have on the estuary, coastline, and the marine environment.

THE PROJECT

The main objective of the São Francisco project is to promote sustainable development of the SFRB and its coastal zone and address the physical, biological, chemical, and institutional root causes of progressive degradation affecting the basin, by developing a Strategic Action Program (SAP) for the integrated management of the São Francisco River Basin and its coastal zone. The project focuses on the identification and implementation of appropriate economic instruments and the incorporation of land-based environmental concerns affecting the coastal zone into the future federal and state development policies, plans, and programs. The project serves as a demonstration project for the implementation of the Global Plan of Action for the Protection Marine Environment from Land-Based Activities in Latin America.

The project design, based on extensive public consultation carried out through regional planning workshops, comprises four components: (i) River basin and coastal zone environmental analysis; (ii) Public and stakeholder participation; (iii) Organizational structure development; and (iv) Watershed Management Program formulation. In addition, the following crosscutting issues permeate the project execution: information sharing and dissemination; quantification of water use, use conflicts, and hydrological management; and financial mechanisms. The project has been executed in direct partnership with 4 Federal institutions, 3 State bodies, 4 Universities, and 4 NGOs, in the context of institutional participation of more than 450 institutions.

IMPLEMENTATION STATUS

All demonstration projects and feasibility studies have been finalized, and the DAB/SAP process has been concluded, consolidating the results of almost 4 years of scientific research and technical studies and a broad public participation process, comprising a total of 217 public events with the participation of 197 consultants, 1,262 collaborators, and 12,097 participants, representing a total of 421 federal, state, and municipal institutions, NGOs, and private enterprises.

As the implementation of the project converged with the placing of the SFRB at the top priority governmental agenda, and the basin was confirmed as a pilot basin for the full

implementation of the instruments of the National Policy on Water Resources¹ and the DAB/SAP was adopted by the São Francisco River Basin Committee (CBH-SF), the National Water Agency (ANA) requested an extension of the project for six additional months in order to ensure continuity of the DAB/SAP process without losing momentum. During this period, the following additional activities were developed: (i) formulation of the Basin Plan for the SFRB as an implementation instrument for the CBH-SF; (ii) consolidation of the proposal for a new physiographic division of the basin; and (iii) consolidation of the institutional context for the Basin Plan implementation.

The Project was developed in 4 Components and 28 Activities, which provided scientific and technical background to the strategic environmental correction actions for the protection of the marine environment, community involvement, institutional strengthening, and human resources education and technical training and the basis for the formulation of the Strategic Action Program for the basin and its coastal zone. The complete collection of the Final Reports of all activities was published and donated to all federal universities in the riparian states and to federal reference libraries, including the Federal Senate documentation center. The executive summaries of the Final Reports of the DAB, the SAP, and the demonstration projects and studies are also available at: <http://www.ana.gov.br/gefsf>.

PROJECT RESULTS: TOWARDS THE INTEGRATED AND SUSTAINABLE MANAGEMENT OF THE SFRB

The project conducted planning and feasibility studies and identified specific strategies, investment projects, and activities which subsidized the development of the *Strategic Action Program for the Integrated Management of the São Francisco River Basin and its Coastal Zone (SAP-SF)*, completed in December 2003, and its further refinement in the *Decennial Water Resources Plan for the São Francisco River Basin (2004-2013)*, completed in August 2004. An important element under the Brazilian National Policy on Water Resources, the Basin Plan, in addition to setting forth a strategy for the holistic and integrated management of the Basin, develops an implementation program that includes investments and capital improvements necessary for achieving the integrated management and economic development of the Basin.

The project established the institutional cornerstone mechanism for the participative and integrated management of the basin,

1. The instruments of the NPRW are: (i) development of water resources master plans; (ii) establishing classes of water bodies according to preponderant uses; (iii) implementing water rights concessions; (iv) implementing water charge systems; (v) establishing compensation mechanisms to municipalities and; (vi) developing a water resources information system.

by actively supporting the creation and strengthening of the São Francisco River Basin Committee (CBH-SF), which was established by Presidential decree on June 5, 2001. The CBH-SF, charged under the National Policy on Water Resources (NPWR) with regulating water rights and water charges, currently represents the concerns and expectations of 503 municipalities of 7 states, with an approximate population of 13.3 million people.

The main project results and success indicators include:

(i) Enhanced public and scientific awareness and knowledge of the river basin and its coastal zone environment; (ii) Improved public and stakeholder participation through hands on-type involvement of communities in the remedial measures; (iii) Strengthened institutional framework and staffing capabilities needed to implement financial mechanisms for water rights and water charges, as provided for under federal law 9433/97; (iv) Improved implementation of economic instruments for rational and sustainable water resources management in the SFRB; (v) Improved integrated water resources management and environmentally sustainable development in the SFRB. These results are based on the integrated impact of the output and products of the activities carried out under the project components and issues, as described below.

I. RIVER BASIN AND COASTAL ZONE ENVIRONMENTAL ANALYSIS: SCIENCE AND TECHNOLOGY FOR PUBLIC POLICY

The project activities provided a comprehensive river basin and coastal zone diagnostic study, consolidated in the Diagnostic Analysis of the São Francisco Basin (DAB-SF), producing new scientific and technical knowledge as well as challenging established “myths” related to the SFRB. Based on the results of the river basin and coastal zone environmental analysis, the Federal Senate made the recommendation to revise the current physiographic division of the SFRB and establish a new limit between the Lower-middle and the Lower São Francisco regions. The main contributions of the project in this respect include:

- The detailed knowledge of the sedimentation, margin erosion, and sediment and nutrient transport and the quantification of the impact of the São Francisco River on the levels of nutrient concentration in the adjacent oceanic environment resulted in recommendation of actions to minimize erosion effects and negative impacts on fish species and coastal zone ecosystems and documented analysis of the use of artificial floods as water management tools.
- The analysis of the impacts of dams’ construction on the river morphology proved erroneous the theory stating that the saline intrusion in the Lower São Francisco had increased after the construction of the Xingó dam. The Federal Universities of

Alagoas and Sergipe demonstrated that the dam, providing an average flow of 2.000 m³/s, has reduced the saline intrusion from 13 km upstream to the much lower level of 3 km.

- The methodology for the quantitative evaluation of the impact of mining activities on the water quality and availability in the Das Velhas River (Metropolitan area of Belo Horizonte) has been used as a model for environment protection initiatives at the State level and was awarded a special prize by the Brazilian Association of Geology and Engineering.
- The geo-referenced mapping of the Lower São Francisco showed no evidences of desertification in Cabrobó, in the semi-arid region of Pernambuco. This conclusion is changing the approach of the Ministry of Environment in relation to desertification.

II. PUBLIC AND STAKEHOLDER PARTICIPATION: MOBILIZATION FOR A SUSTAINABLE FUTURE

The public participation process has been the single biggest success story of the project. Starting from the project design phase, through the execution of the demonstration projects and studies, up to the DAB/SAP formulation and validation process, the constant and enthusiastic involvement of the broadest range of basin stakeholders has assured the consistency, continuity, and legitimacy of the process, the broad acceptance of its final results, and the high probability of a successful and sustainable implementation of the SAP.



Moreover, the crosscutting bottom-up process of river basin planning and management provided an opportunity for the creation and implementation of effective structures, legal controls, and fiscal instruments to mitigate land and water management practices that degrade water quality, modify the hydrological and hydraulic characteristics of the basin, and/or adversely affect the water resources of the Basin and its coastal zone. Furthermore, by creating the CBH-SF, also called *Water Parliament*, the project supported the establishment of a permanent mechanism for public participation in the basin.

More than 6,600 stakeholders were directly involved in the mobilization process leading to the establishment of the CBH-SF. The main achievements and success indicators in this respect also include:

- Participation of more than 12,000 people and 483 organizations in the events of public participation during the execution of the activities and the development of the DAB and the SAP, revealing the high interest of the public and stakeholders in issues related to the Basin.
- Participation of 594 representatives from 191 organizations concerned with the development of the Basin, distributed as follows: 15 federal, 40 state, 36 municipal and 80 non-governmental organizations, and 20 private companies in the process of SAP validation and adoption.
- Comprehensive thematic mapping of the Lower, Lower-middle, and Upper São Francisco, providing detailed knowledge of the land-use structure in the area and its relation to the classes of vegetation cover and the state of the environment.
- Establishment of a dialogue process between the government, the agricultural sector, and the organized civil society in the Rio das Fêmeas sub-basin on the issues of water rights and conjunctive use of underground and superficial water resources and in order to facilitate implementation of water use charges.
- Development and implementation of a partnership between the community and the government for the design and implementation of economic reforestation projects and promotion of soil conservation practices in the pilot-area of the Municipality of Luz.
- Training of more than 4,000 people throughout the basin on different water resources issues, including the support to the effort of ANA to prepare the basin population and the organized civil society for the establishment of the Basin Committee and the election of its members.

III. ORGANIZATIONAL STRUCTURE DEVELOPMENT: CREATING THE FRAMEWORK FOR AN INTEGRATED AND PARTICIPATIVE MANAGEMENT OF THE SFRB AND ITS COASTAL ZONE

The project strengthened and improved the institutional framework and its capacity to implement new legislation, regulation, and procedures and evaluated the effectiveness of several policy instruments, thus actively supporting the implementation of the National Policy on Water Resources and its corresponding state legislation in the SFRB.

In this respect, the milestone of the project was the creation and consolidation of the São Francisco River Basin Committee (CBH-SF), inaugurated in June 2001. The CBH-SF incorporates the integrated management vision of the basin and its natural resources and the decentralized and participative

management as a means to ensure the rational and sustainable development of the land and water resources of the SFRB and its coastal zone. The establishment of the Committee also put into place the basis for the implementation of water rights and water use payment systems within the basin. The main outputs of the project in this realm also include:

- Implementation, in partnership with the SRH/PE, of the Jazigo Reservoir and Pontal Creek Perennial System Water Users Councils for the participative management of reservoirs and their multiple and rational use and conservation, in the semi-arid region of the State of Pernambuco. The training of multiplier agents for environmental education activities and farmers, for correct soil management, as well as the elaboration of water users' register also contributed to the conservation of water resources.
- Development of a feasibility study and program for the establishment of a financially-sustainable Water Agency in the Rio Maranhão sub-basin as an operational mechanism for executing the policies and decisions of the Paraopeba Basin Committee, including water rights and water charges, in partnership with IGAM/MG.
- Elaboration and implementation of the Integrated Management Plan for the Salitre River Basin as well as support to the establishment of the Salitre River Basin Users Association and guidelines for the implementation of water rights and charges, in partnership with SRH/BA.
- Preparation of a documented proposal for the conjunctive surface and underground water management in the Rio das Fêmeas Basin (BA), including implementation of water rights and charges both for surface and groundwater users and an administrative structure and monitoring system. The activity defined a new approach of extending the economic instruments for water management to the groundwater resources.
- Implementation of automatic and geo-referenced environmental databases for the water concession pilot-basin of Paraopeba, its collection, environmental education, and environmental monitoring systems.



Installation of the São Francisco River Basin Committee

IV. ECONOMIC INSTRUMENTS FOR RATIONAL AND SUSTAINABLE WATER USE

The project developed the first basin-wide documented proposal for the implementation of the system of water charges, as provided under federal law 9433/97, in the main sub-basins

of the SFRB. The proposal presents, *inter alia*, a quantitative basis for the calculation of water charges for each water user sector and sub-basin, an institutional arrangement and a social and economic strategy for the implementation of this economic instrument as well as recommendations of actions for the harmonization and optimization of the legislation in the Basin. The document was enthusiastically adopted by ANA and the CBH-SF and will serve as a basis for the implementation of water use charges in the basin. In support to the process of implementation of economic instruments for the rational and sustainable use of the water resources in the SFRB and its coastal zone, the project also delivered the following products:

- Revision of the operational policies for the main reservoirs in the SFRB and elaboration of a multiple-purpose reservoirs operation model, based on the Tennessee Valley Authority's experience, seeking rational water use and the minimization of environmental impacts on the estuary.
- Detailed quantification of the water used by irrigated agriculture in the SFRB and measure to improve water use efficiency in the agriculture sector. The study, carried out by the University of Viçosa, also estimates the volume of water exported out of Basin through agriculture products and is the first of this kind in Brazil.
- Detailed proposals for the complementation of the hydro-meteorological and hydro-geological information collection networks in the SFRB and a proposal for a monitoring piezometric network and a hydro-geological data collection system in the Rio Verde Grande pilot sub-basin.
- Installation of the pilot São Francisco River Basin Information System (RISF), based on metadata and available on-line, as part of the water resources information system coordinated by the Superintendency of Hydrological Information/ANA. Technical training to the ANA staff and wide range of users was also provided.

V. THE PROCESS OF DAB/SAP FORMULATION: A VEHICLE FOR THE IMPLEMENTATION OF THE NATIONAL POLICY ON WATER RESOURCES IN THE SFRB

Through the completion of the DAB/SAP process and its principal output – the *Strategic Actions Program for the Integrated Management of the São Francisco River Basin and its Coastal Zone (SAP-SF)*, the GEF São Francisco project provided the framework for ANA and the CBH-SF to develop the *Decennial Basin Plan* necessary for the full implementation

and operationalization of the instruments of the National Policy on Water Resources in the SFRB and its coastal zone. At the same time, the SAP-SF strengthened and consolidated the recently created Basin Committee by providing its first comprehensive agenda for the integrated, sustainable, and participative management of the basin and its environmental revitalization, in accordance with the provisions under the Brazilian Water Law. Furthermore, the process of SAP formulation and validation, based on the mobilization of all main basin stakeholders and the compatibilization of proposed strategic actions with the Federal and State Pluriannual Action Plans (PPA) related to the basin and its coastal zone, culminated in an agreed and consolidated common agenda with an unprecedented integrated approach for the São Francisco Basin management and a strong social and institutional commitment for its full implementation.

The main contributions of the project to the implementation of the instruments of the National Policy on Water Resources (NPWR) include:

- Implementation and consolidation of the five basic principles of the NPWR in the context of the SFRB, including: a) adoption of the São Francisco Basin as a planning unit, including superficial and groundwater resources, as well as colliding watersheds; b) adoption of the concept of multiple water uses as a basis for rational and equitable water use and allocation and for the solution of water use conflicts; c) recognition of water as limited and vulnerable resource; d) adoption of the concept of economic value of water; and e) implementation of structures and stakeholders education for the decentralized and participatory management of the basin and its natural resources.
- Implementation and/or creation of conditions for the implementation of the five political instruments for water use management in the context of the SFRB, specifically: a) creation of the institutional and planning framework for the *São Francisco Water Resources Basin Plan (2004-2013)*; b) strengthening of the institutional and public participation context supporting the process of *division of water bodies in classes of predominant uses*; c) support to the further implementation of the *water use rights system* in the SFRB, by providing comprehensive basin diagnostic analysis; d) formulation of a documented proposal for the implementation of the *system of water charges* in the main sub-basins of the SFRB; and e) adoption of documented proposal for the complementation and expansion of the data collection networks in the



SFRB and installation of SFRB Information System, in support to the *National Water Resources Information System*.

- Support to the establishment and consolidation of the new institutional arrangement for the implementation of the NPWR both at the national and the basin levels, including: a) support to the establishment and strengthening of the *Basin Committee for the SFRB*; b) training and institutional strengthening of *State institutions* responsible for the implementation of the NPWR at the state level; c) support to the creation of *inter-institutional arrangements* and partnerships for the integrated water management in the SFRB; d) support to the process of establishment of a *Water Agency* in the context of the SFRB, as an executive arm of the Basin Committee; and last, but not least e) institutional and operational strengthening of the newly-created National Water Agency (ANA), in charge of the overall implementation of the National Policy on Water Resources in Brazil.

The implementation of the *Integrated System for the Management of Water Resources in the Sao Francisco River Basin and Its Coastal Zone (SIGRHI)* as defined in the Strategic Action Program -including control and reduction

of contamination and pollution, operation of a management system for multiple use of water resources, and control and mitigation of erosion and land degradation-will allow for the full implementation of the National Policy on Water Resources in the São Francisco River Basin and provide global benefit by reducing contaminant flows into the South West Atlantic Large Marine Ecosystem and the Brazil Current, preventing the degradation of the marine environment. In addition, the implementation of measures to manage the competing uses of the River system will provide a model for the management of other large river systems in semi-arid and arid regions.



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This document has been prepared by the Office for Sustainable Development and Environment of the General Secretariat of the Organization of American States, as the regional executing agency for the San Francisco Project, in collaboration with the United Nations Environment Programme (implementing agency for the Global Environment Facility), and the National Water Agency of Brazil (ANA). The document is intended to provide general information on the status, preliminary results and follow-up activities regarding project implementation, and do not necessarily reflect the opinion of ANA, the United Nations Environment Programme, the Organization of American States, or the GEF.