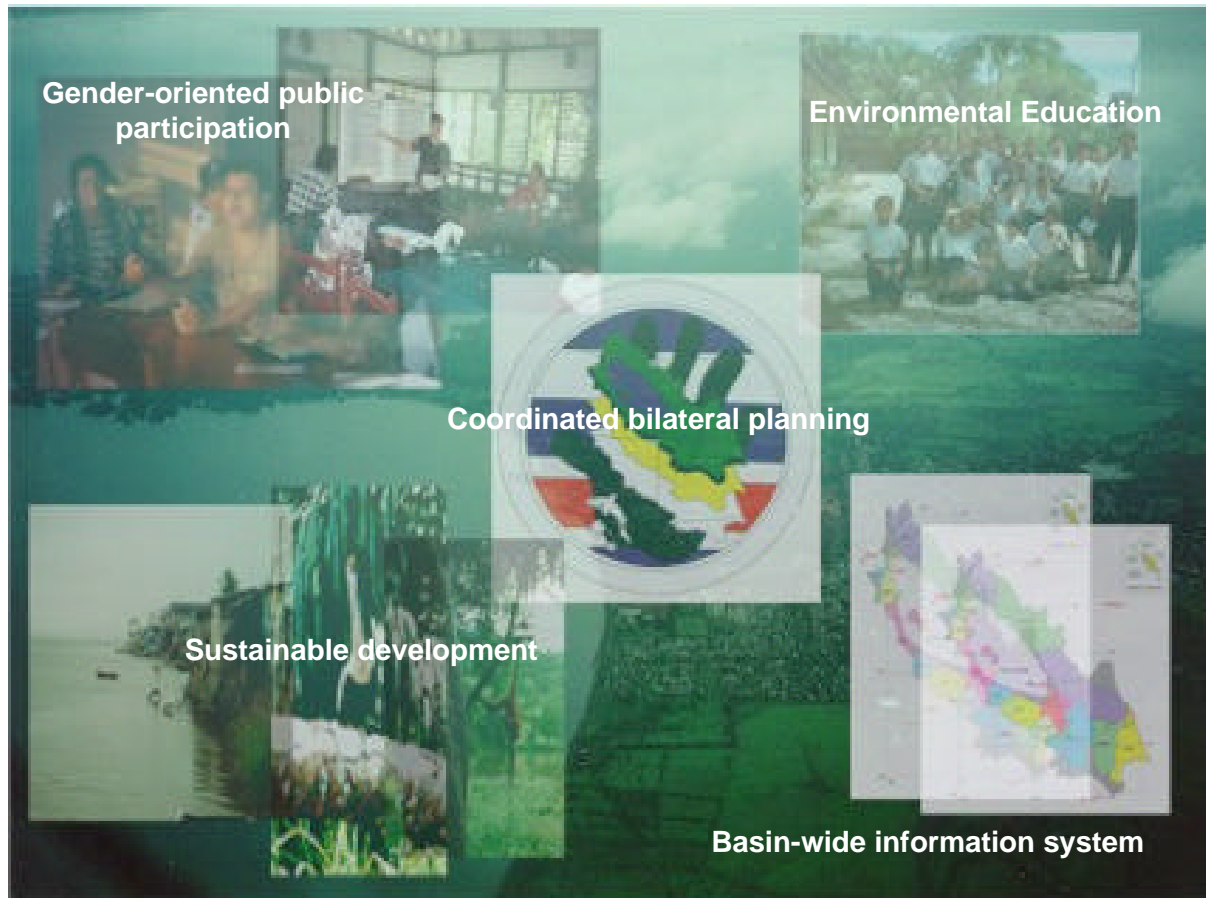


Integrated Management of Water Resources and Sustainable Development of the San Juan River Basin and its Coastal Zone (SJRB)



Costa Rica and Nicaragua



Ministry of the Environment
and Energy (MINAE)
Government of Costa Rica



Ministry of the Environment and
the Natural Resources (MARENA)
Government of Nicaragua



United Nations
Environment Programme
(UNEP)



Global Environment
Facility
(GEF)



Unit for Sustainable Development
and Environment
General Secretariat of the
Organization of American States
(USDE/OAS)

Integrated Management of Water Resources and Sustainable Development of the San Juan River Basin and its Coastal Zone (SJRB)

Costa Rica and Nicaragua

January 2001

This document has been prepared by the Unit for Sustainable Development and Environment of the General Secretariat of the Organization of American States, as the regional executing agency for the SJRB project, in collaboration with the United Nations Environment Programme (implementing agency for the Global Environment Facility), and the Ministry of the Environment and Energy of Costa Rica and the Ministry of the Environment and the Natural Resources of Nicaragua, as the national executing agencies. The document summarizes the preliminary findings resulting from the PDF-Block B phase of the Project which included the preparation of a Transboundary Diagnostic Analysis (TDA). It also describes the components and working elements for the formulation of a Strategic Action Program for the Integrated Management of Water Resources and the Sustainable Development of the San Juan River Basin and its Coastal Zone. The contents of the document are still preliminary, and do not necessarily reflect the opinion of the Ministry of the Environment and Energy of Costa Rica and the Ministry of the Environment and the Natural Resources of Nicaragua, the United Nations Environment Programme, the General Secretariat of the Organization of American States, or the Global Environment Facility.

The San Juan River Basin and its Coastal Zone (SJRBC)

The San Juan River Basin project area covers some 38,500 km² in the basin itself, plus its associated coastal zone on the Caribbean Sea. Of the land area, 64% is in southern Nicaragua and 36% in northern Costa Rica. The planning area covers the subbasins of Lake Nicaragua and of the San Juan River, and also four smaller but nevertheless significant subbasins with natural links to this system--the Indio and Maíz river basins in Nicaragua and the Colorado and Tortuguero river basins in Costa Rica. Although not included in the project area, Lake Managua is being taken into consideration because it sometimes connects with the SJRB. The torrential rainfall associated with Hurricane Mitch in October 1998, for example, caused it to overflow its banks, flooding the surrounding areas and sending water into Lake Nicaragua.

This transboundary basin constitutes the most significant freshwater reserve in Central America

This transboundary basin constitutes the most significant freshwater reserve in Central America. Lake Nicaragua alone covers an area of 8,000 km² and has a volume of 104,109 hm³. Regional studies now being carried out by the Regional Committee on Water Resources (CRRH), with international cooperation, lead to the conclusion

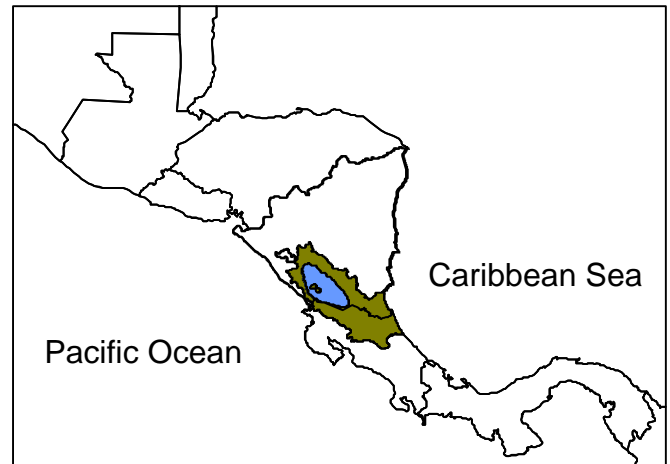


that the fresh water in the San Juan River Basin is the only source capable of meeting the foreseeable development needs of the

semiarid Pacific slope of Central America, the region's most populated area.

Groundwater is abundant and of high quality

The annual rainfall in the SJRB varies from 1,500 mm to 6,000 mm. The flow in the Lake Nicaragua-San Juan River watershed ranges from 475 m³/s at the outlet of Lake Nicaragua to 833 m³/s within the Basin, and increases to 1,308 m³/s at the river mouth. Groundwater is abundant and of high quality. Most of the land area of the Basin is less than 500 m above sea level and is characterized by extensive plains that climb slowly from the Atlantic Coast to the Central Volcanic Cordillera (1,500 to 3,000 m).



The waters of the Lake Nicaragua-San Juan River watershed flow through at least eight distinct terrestrial ecosystems: (1) dry tropical forest to the east, north, and west of Lake Nicaragua; (2) cloud forest in the high areas of the Central Volcanic Cordillera of Costa Rica; (3) moist tropical forest to the south and southwest of Lake Nicaragua and in the eastern foothills; (4) very moist tropical forest in the San Juan Valley and on the coastal plains; (5) gallery forest along river banks; (6) wetlands to the south of Lake Nicaragua and at the confluences of the Colorado and Tortuguero rivers with the San Juan; (7) second-growth forest, meadows, and farmland in extensive areas of the Basin; and (8) coastal forest and mangrove swamps on the Caribbean coast. The Indio and Maíz river basins are covered mainly by moist and very moist tropical forest.



The SJRB is a meeting ground for species from the subarctic areas of North America and others from the subtropics of South America

Because of this range of ecosystems and associated habitats, the SJRB has a wealth of biodiversity. Its location in the natural biological corridor running the length of Central America has made it a meeting ground for species from the subarctic areas of North America and others from the subtropics of South America. To preserve this unique biodiversity, 51 protected areas, comprising the Meso-American



Biological Corridor, have been identified: 33 in Costa Rica, covering 4,257 km², and 18 in Nicaragua, covering 4,555 km².

The Basin population is generally very poor, and lacks access to safe drinking water, adequate sanitation, and schools

The people of the SJRB and their living conditions

The SJRB has a total population of about 1,100,000, 73% of whom are in Nicaragua. The population density on the Nicaraguan side is approximately 46 inhabitants/km², with 55% of the population living in rural areas. In Costa Rica, the population density is approximately 22 inhabitants/km², 85% rural. Population growth is high, averaging 4.1% a year in Nicaragua and 3.7% in Costa Rica.

An imbalance in employment and income-generating opportunities between the two countries exacerbates the poor sanitation and health conditions

The Basin population is generally very poor, and lacks access to safe drinking water, adequate sanitation, and schools. All economic and quality-of-life indicators in



the Basin area are significantly below the national averages for both countries. An imbalance in employment and income-generating

opportunities between the two countries--the Nicaraguan side has even lower incomes and a subsistence economy--and uncontrolled migration exacerbate the situation by exceeding the capacity of existing institutions to meet all the sanitation, health, and educational needs created.

Economic development in both countries is based predominantly on the primary sector, at the expense of the existing vegetation coverage

The consolidation of agriculture in Costa Rica and the advance of the agricultural frontier in Nicaragua, particularly in the Indio and Maíz river basins, increase the pressure on the natural ecosystems. Economic

development in both countries is based predominantly on the primary sector, at the expense of the existing vegetation coverage. In Nicaragua deforestation rates reach over 150,000 ha a year; in Costa Rica the figure is 18,500, and the forests are now almost gone.



Political origin, regional context, and technical cooperation background

Support for a regional approach in the management of the SJRB was seen as early as the XIII Summit of Central American Presidents, held in Panama in December of 1992. The Central American Action Plan for the Development of Border Zones, in which the San Juan River Basin was named as a priority area, led to a 1994 request by the governments of Costa Rica and Nicaragua to the United Nations Environment Programme (UNEP) and the Organization of American States (OAS) to assist them with a diagnostic study of the SJRB environment. That study was carried out during 1995 and 1996 by the ministries of environment of Costa Rica (MINAE) and Nicaragua (MARENA), and published in 1997 as the "Diagnostic Study of the San Juan River Basin and Guidelines for an Action Plan."

The execution of the SJRB project contributes to the implementation of the priorities set under the Central American Alliance for Sustainable Development

The execution of the SJRB project contributes to the implementation of the priorities set under the Central American Alliance for Sustainable Development, agreed by the Central American Presidents in October 1994. These include a variety of economic goals, such as the development of border areas, the conservation of natural resources, and the protection of biodiversity, with specific reference to strengthening the Meso-American Biological Corridor, achieving sustainable use of water resources, and protecting the integrity of drainage basins. It will further contribute to the Action Plan for Integrated Water Resources Management of the Central American Isthmus (PACADIRH), which is being implemented by the CRRH as Technical Secretariat of the Water Group created by the System for Central American Integration (SICA) in response to the devastation caused by Hurricane Mitch.

In 1998, the governments of Costa Rica and Nicaragua, with the technical assistance of UNEP and the Unit for Sustainable Development and Environment (USDE) of the OAS, negotiated and were granted funds from the GEF PDF Block B to prepare a project brief for the formulation of a Strategic Action Program for the Integrated Management of Water Resources and the Sustainable Development of the San Juan River Basin and its Coastal Zone. As an integral part of the project brief, which was completed in November 1999, the two technical units in MINAE and MARENA, with the technical assistance of UNEP and the USDE, also prepared a Transboundary Diagnostic Analysis (TDA) that identifies the major environmental issues of the SJRB, its root causes, and the causal chain, as well as the transboundary elements.

Conclusions from the initial phases of the project

- Water bodies and associated biodiversity and natural ecosystems have inherent global value.
- The integration of land and water issues is necessary in the planning and management of water basins.
- An intersectoral focus is necessary in addressing causes of Basin deterioration.
- There is a need for comprehensive Basin-wide information on quality, quantity, and hydrologic processes that affect sustainable development in the region.
- Strategic planning must incorporate actions based on local, national, and international interests in order to address transboundary issues.
- There is a need to promote and strengthen civil society, increase the participation of women, and involve more people in making decisions on sustainable development of the region.
- Common objectives in the management of natural resources must be defined, and agreement on access to and the use of water resources needs to be reached.
- Institutional capacity is inadequate for controlling and ensuring compliance with environmental legislation.
- Strong political will exists.

Present and emerging environmental issues identified in the TDA

The TDA, carried out with the active participation of key stakeholders, pointed to a number of current and emerging problems that threaten the sustainability of development in the San Juan River Basin and ultimately the quality of life of the people who live there. These environmental issues are closely interrelated, but in the interest of seeking solutions they were broken down as follows:

- *The accelerating degradation of transboundary ecosystems.* In the traditional uses of the main ecosystems of the area, human activities have exerted pressures on the environment and led to conflicts among the various groups involved, with negative consequences for the quality of water resources. These consequences include inadequate urban, industrial, and agroindustrial wastewater treatment systems; migratory agriculture, extensive grazing, and the consequent expansion of the agricultural frontier; widespread cutting of trees for timber; unregulated ecotourism; non-conservationist farming practices; the introduction of aggressive exotic species such as



Tilapia mossambica; and uncontrolled fires in the drier forests and in grassland. An emerging problem is

the growing use of small and very small hydropower plants to tap the considerable hydroelectric potential of the region.

- *Overexploitation of valuable natural resources.* The problems here are related to poor land use, especially the farming of hillside areas and wetlands, the construction of poorly designed roads, unregulated fishing, overexploitation of valuable moist tropical forest species, and the destruction of plant cover in fragile areas, causing erosion and land degradation. The result is a loss of potential income from agriculture, fishing, and tourism, a threat to biodiversity and the natural productivity of the ecosystem, and a change in coastal and inland waterway dynamics. There are signs that three marine and freshwater species are being overexploited: *Carcharhinus leucas*, locally called “bull shark” or “freshwater shark” because of its unique behavior of migrating between the Caribbean Sea and Lake Nicaragua; *Macrobrachium carminus* or freshwater shrimp; and *Pandalirus argus* or spiny lobster.

- *Soil degradation and increasing sedimentation.* Part of the sedimentation of the San Juan River and its coastal zone is a result of natural processes, according to historical



documents. Nevertheless, road construction, the advancing agricultural frontier, and hillside farming without adequate soil-conservation techniques exacerbate sedimentation. Problems are also emerging from open-pit mining and the extraction of construction materials.

- *Pollution of water bodies.* The main causes of water pollution are the indiscriminate use of pesticides and fertilizers, especially where intensive farming practices are used, and urban, industrial, and agroindustrial waste discharges. The water bodies being affected in Nicaragua are Lake Nicaragua, the San Juan River and its coastal zone, and the wetlands to the south of Lake Nicaragua. In Costa Rica the Caño Negro wetlands, the Colorado River, and the Tortuguero channels are suffering the consequences of degraded water quality. Sporadic die-offs of aquatic fauna and flora give evidence of such degradation, as do small-scale and occasional studies of water quality that have been carried out in some parts of the SJRB.
- *High vulnerability to natural hazards.* This is apparent in the devastating impact of hurricanes and tropical storms on the region's ill-housed populations,



on its infrastructure, and on crops grown in areas where the forest has been cleared and the soil is fragile--areas exposed to landslides caused by hurricanes,

tropical storms, and seismic or volcanic activity. Natural hazards can have a drastic, and dramatic, effect on the watercourses of the region.

These transboundary environmental problems manifest themselves both individually and collectively and often have common roots.

- *Inadequate planning and management.* There are no mechanisms for coordinating management and control across the international border and thus no ongoing institutional approach to water resources management in the SJRB. The lack of comprehensive up-to-date data on the SJRB--how it is structured, how it works, what its socioeconomic dynamics are, how information is managed at the local level--makes it impossible to proceed with the minimum certainty needed.



- *Weak institutions.* Although both countries have quite comprehensive legislation on environmental management and the sustainable use of natural resources, a paucity of financial and human resources on the local level and the poverty in which most of the population lives makes compliance difficult.
- *Insufficient human and institutional capacity.* Natural-resources management is inefficient, and it will not be possible to strengthen environmental command-and-control mechanisms without first creating local economic foundations and training people.
- *Limited stakeholder participation.* Stakeholders currently have only limited participation in sustainable development because decision-making is centralized. Both governments are trying to change this situation, which, added to reductions in the size of government, has hampered local action.
- *Extreme poverty.* Extreme poverty, combined with high population growth, low incomes, and a subsistence economy, poor sanitation, and an imbalance in employment and income-generating opportunities between the two countries, characterizes the current level of economic development in the SJRB. Uncontrolled migration exacerbates the situation by exceeding the capacity of existing institutions to meet all the sanitation, health, and educational needs created. The economic conditions force the inhabitants to move to the mountainsides and practice slash-and-burn agriculture just to survive. This behavior contributes to the environmental degradation of the SJRB, but could be addressed, in part, through building institutional capacities and creating economic instruments, neither of which now exists.



Looking to the future: formulation of a Strategic Action Program (SAP) for the Integrated Management of Water Resources and the Sustainable Development of the SJRB

The ultimate objective of the SAP is to ensure the availability of the goods and services provided by water resources for conserving natural ecosystems and social and economic development in order to satisfy present and future demands as agreed by all parties involved. A coordinated program of action conducted jointly by the two countries will minimize conflicts over the use of the goods and services generated by SJRB ecosystems.

The major components of the SAP formulation include:

- Creating a well-coordinated bilateral planning process for the SJRB
- Building capacity for sustainable development planning and management, improving infrastructure, equipping institutions, and designing mechanisms to increase revenues of local and regional institutions
- Strengthening a Basin-wide information system that provides mechanisms for gathering and disseminating data adequate for making decisions on integrated Basin management
- Strengthening public institutions and private organizations to achieve a more active and effective participation in the sustainable development of the region
- Implementing a gender-oriented public-participation process
- Formulating and implementing environmental education activities
- Promoting strategic actions, such as sustainable agricultural production, and the restoration of deforested lands



The formulation of the SAP relies on three working elements identified by the TDA during the PDF Block B phase. Those elements are (1) basic studies, (2) demonstration projects, and (3) public participation workshops.

Basic studies will provide additional information for a more precise characterization of the main transboundary problems

The basic studies were designed to provide additional information for a more precise characterization of the main transboundary environmental problems identified in the TDA. This information, which comprises scientific data and data on institutional and human capacity, will allow for a quantification and assessment of the most relevant transboundary environmental issues, and for the formulation of programs and projects to address them. The proposed studies will be carried out by universities, research institutes, and governmental institutions, which, in many cases, will collaborate with

each other, establishing the basis for the development of institutional arrangements to implement the SAP.

Demonstration projects will provide an assessment of both the cost and the feasibility of replicating such projects throughout the SJRB

The demonstration projects will illustrate methodologies and technologies, and institutional arrangements and participatory approaches, providing an assessment of both the cost and the feasibility of replicating such projects throughout the SJRB. More particularly, they will provide a more accurate estimate of the baseline investments and incremental costs needed for the implementation of the SAP. The demonstration projects will be executed in collaboration between NGOs, local governments, and governmental institutions. Thus, like the basic studies, these projects will also foster the development of local and regional alliances and technical cooperation agreements. Furthermore, they will promote the participation and appropriation of the Project of all the stakeholders in the SJRB.

Public participation workshops will allow for the exchange of information, experiences and ideas among the various stakeholders

The public participation workshops will allow for the exchange of information, experiences, and ideas among the various stakeholders. They will also serve to follow up and evaluate the progress of the different components of the Project. Within a much broader and long-term objective, the public participation workshops will foster the participation of all the stakeholders in the SJRB, in particular the civil society, with a focus on gender.



In addition to these three elements, a monitoring and evaluation process will be put in place with the participation of national and international consultants who will also assist the local governments, governmental institutions, universities, and research institutions with the execution of the basic studies and demonstration

projects. The process will also provide the mechanisms to incorporate the results of all the Project activities into the SAP.

Organizational Structure for the Formulation of the SAP

The project continues to be executed by the governments of Costa Rica and Nicaragua, through MINAE and MARENA respectively. A series of well-defined activities are being carried out in each country and throughout the SJRB, under the coordination of the two technical units in the national executing ministries. UNEP and the OAS support the execution of the project.

Various mechanisms have been designed and established for the coordination of the activities and decision-making of the Project. A Steering Committee has been established for the project, composed of the ministers of MINAE and MARENA, a representative of each country's Foreign Ministry, representatives of associations of municipalities, the Director of OAS/USDE, the Director of the Division of Environmental Information Assessment and Early Warning of UNEP, and the project's two national directors. Observers include the other two GEF implementing agencies (the World Bank and the United Nations Development Programme), the technical coordinators, and other cooperation agencies willing to be part of the SAP. This board is the highest organ of the project and meets at least twice a year to approve the work plans of the technical units, the terms of reference of demonstration projects and studies, and any advisory opinions that OAS/USDE may present in concert with the national directors and the technical coordinators. It also approves any significant change to programs and budgets.

A Consultative Committee made up of national institutions involved in the management of the SJRB, private organizations taking part in the project, and academic institutions has been set up in each country, to promote the active participation of the institutions and to advise on the orientations of the project. It is chaired by the national directors and serves as a mechanism for the coordination of national actions.

Expected results

The main result expected from this new phase of the project is the completion of a Strategic Action Program. A coordinated program of action conducted jointly by the governments of Costa Rica and Nicaragua, with the participation of local governments, non-governmental organizations, the private sector, and organized civil society groups, will serve to guide and coordinate the investment in the SJRB, so that conflicts related to the use of the goods and services generated by the SJRB ecosystems are minimized, and agreed present and future water demands are met.

Specific results will be:

- Identification of incremental costs to achieve global benefits
- Identification of baseline investment--domestic development plans
- Identification of partners for the execution of the Strategic Action Program

Integrated into the SAP are two elements that are the foundation for its formulation and execution, and have received particular attention throughout the execution of the project: (1) a public participation program, and (2) binational, national, and local institutional arrangements.

Contributions to regional initiatives, such as the PACADIRH and the strengthening of the Meso-American Biological Corridor (MBC), are also expected.

GEF Programming Context

This Project conforms to the GEF Operational Strategy and Operational Programs, in particular the water-body based Operational Program #8. It will illustrate how freshwater-basin and coastal management can be integrated to resolve transboundary issues and will also serve as a demonstration project for the implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA) in Latin America. The Strategic Action Program to be formulated under this project will contribute to the conservation of natural ecosystems and to social and economic development in order to satisfy present and future demands, minimizing water conflicts.

