



RESEAU INTERNATIONAL
DES ORGANISMES DE BASSIN

INTERNATIONAL NETWORK
OF BASIN ORGANIZATIONS

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The network newsletter

THE INBO/GWP ASSOCIATED PROGRAM:

Developing and strengthening River Basin Organizations over the World



Integrated Water Resources Management (IWRM) is a global concept which purpose is to help in preparing and implementing economic and social development policies compatible with the water resources of the country and, at the same time, preparing and implementing water policies compatible with the global objectives of the given country.

Among the tools available for this purpose, river basin organizations, when well conceived and managed, are one of the most efficient.

River Basin Organizations (RBOs) were created a long time ago in different parts of the world with different goals and structures: navigation, flood protection, electricity production. Only fairly recently, some of them have been created with IWRM in mind and some of the old ones have seen their goals expanded to face the new challenges.

A lot has still to be done to improve the efficiency of the existing RBOs and create new ones when needed. They all will have to evolve with time.

The International Network of Basin Organizations (INBO), as a network of many existing RBOs, has been precisely set up to encourage cooperation between these organizations and help them progress through

exchange of information and experiences. This is what they have been doing for the last years.

INBO is a worldwide network, but some of its members may wish to cooperate on a more regional basis. The Latin-American members of INBO for example decided in 1998 to create also their own network, **LANBO**, but they still belong to INBO. This type of approach has been found interesting both by Asian and East European countries.

The cooperation takes place of course on a voluntary basis.

In the last years, and in relation to the activities of GWP, members of INBO and personalities active in the water field in many countries, found that the amount of experience and expertise assembled between INBO members could be used more proactively to help progress between members but also to help other countries widen the scope of existing institutions or create new ones, to manage, in an integrated way, rivers, lakes or aquifers.

The new INBO/GWP Associated Program

The gist of this Associated Program is precisely to help on a broad basis the improvement and development of RBOs oriented truly to the implementation of IWRM policies.

As the financial status of the RBOs seldom allow them to spend money on outside cooperation activities, there is a need for donor money:

- to run a small secretariat to coordinate the program,
- to finance the proposed activities.

The AP's activities fall into four different categories:

- 1 **Twinning for direct cooperation between existing, future or pilot basin organizations.**
- 2 **Professional Assistance from existing organizations to help with the setting-up, development and progress of other existing or new organizations.**
- 3 **Synthesis of available knowledge and know-how. This activity would provide a good input to the toolbox and shall be conducted in close relationship with the FFA Toolbox team.**
- 4 **Networking of documentation systems. This again is very close to the Toolbox initiative, and is implemented in close cooperation and without overlapping.**

This Associated Program was prepared by INBO in close cooperation with GWP, following the impulse given by INBO Liaison Bureau during its meeting in Madrid (Spain) in April 1999.

It was approved by GWP authorities during Stockholm Assembly in August 2000 and will be presented to the next INBO General Assembly in Zakopane (Poland) in October 2000.

INBO AT THE WORLD WATER FORUM IN THE HAGUE



The participants in the Workshop, organized by the International

Network of Basin Organizations during the day devoted to "Water in Rivers" in the WORLD WATER FORUM, on 20 March 2000 in THE HAGUE, formulated the following recommendations:

A sound management of water resources is a prerequisite to ensure quality of life on our planet and sustainable socioeconomic development.

The issues raised are complex and the solutions must at the same time allow for:

- the contending with natural disasters and risks of erosion, floods or drought, taking into account land and water management,
- the reliable meeting of urban and rural populations' requirements in terms of good quality drinking water, in order to improve hygiene and health and to prevent important outbreaks of disease,
- the reclamation of farmlands and the development of appropriate irrigation systems to reach food self-sufficiency,
- harmoniously developing industry, energy production, recreational activities and, in some areas, tourism and waterways navigation,
- preventing and controlling pollution of all kinds and origins, in order to preserve aquatic ecosystems and more especially, to protect fauna and optimize fish farming for human consumption,

tion, while meeting the requirements of various uses and more generally, preserving the biodiversity of the aquatic environment.

All these issues can no longer be approached by sector or localization, nor approached separately. Looking for solutions the objective of which is sustainable water use must associate the national and local authorities together with the users in integrated water resources management which respects the natural environment, and is organized on the scale of river basins.

INBO recommends that:

- ① **Integrated water resources and environmental management be organized on the scale of large river basins in order to meet rightful needs in the best way possible,**
- ② **Local Authorities, all the various categories of users and the civil society participate in the formulation of water policy within river basin committees in particular,**
- ③ **Basin Master Plans be formulated with medium and long term objectives and implemented within Five-Year Priority Action Programs,**
- ④ **Specific financing systems, based on the "users-polluters-pay" principle, be developed in order that "water pays for water" with a basin common cause concept.**

Cooperation agreements should be signed and formalized between riparian countries regarding large **shared rivers,**



lakes and seas, especially within specific international commissions.

Integrated water resources management implies that comprehensive and permanent information systems are developed at all relevant levels, especially for each national or shared river basin, to acquire better knowledge of the status of water resources and ecosystems, in terms of quality and quantity, of their uses and of the point and non-point pollution discharged.

Information and training capacities should be developed for the representatives of local authorities and users to enable them to fully assume the responsibilities and missions assigned to them within the framework of the basin policy.

The International Network of Basin Organizations approved the draft Associated Program prepared to fit in with the "Global Water Partnership".

Its objectives are:

- to develop permanent relations with the organizations interested in integrated water resources management at the level of large river basins in order to facilitate exchanges of experience and expertise among them,
- to facilitate the development of tools for institutional and financial management, programming, the organization of databases, models adapted to the needs,

- to design information and training programs for local elected officials, the representatives of users and the different stakeholders involved in water management as well as for the executives and staff of the member basin organizations,

- to encourage education of the population, the young in particular,

- to evaluate ongoing actions and disseminate their results by developing, in particular, a global integrated system for the exchange of documentation among the basin organizations.

INBO draws the attention of governments and bi and multi-lateral cooperation agencies on the prime importance of using the above principles and means in their programs to ensure sound water management at river basin level which is a prerequisite to the future sustainable development of mankind.





WORLD WATER VISION

CONCLUSIONS OF THE 2ND WORLD WATER FORUM IN THE HAGUE, THE NETHERLANDS



GLOBWINET

www.globwinet.org the Global Water Information Network - is **one of the Associated Programs of the Global Water Partnership (GWP)**. It is funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) and implemented by the German Agency for Technical Cooperation (GTZ).

The Mission of GLOBWINET is to promote the Rio/Dublin principles on **Integrated Water Resources Management (IWRM)**.

The four principles are:

- 1 Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment.
- 2 Water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels.
- 3 Women play a central role in the provision, management and safeguarding of water.
- 4 Water has an economic value in all its competing uses and should be recognized as an economic good.

GLOBWINET provides information on:

- transboundary river basin organizations,
- water law and legislation,
- national water administration and the water resources situation within a country.

So far two regional networks have been developed under the roof of GLOBWINET:

- the Southern African Water Information Network - SAWINET (www.sawinet.org)
- the German Water Information Network - GEWINET.

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The World Water Council initiated the World Water Vision in accordance with the conclusions of the first World Water Forum organized in Marrakech, Morocco in 1997.

The aim of the World Water Vision project was to develop a vision widely shared about actions needed to achieve a set of common objectives. The World Water Council objectives were:

- to develop knowledge of what is happening in the water world at regional and global levels and of the trends and developments outside the water sector that might have an impact on the future use of water;
- using this knowledge, to develop a vision on water management in 2025 which would be shared by specialists of the water sector, international, national and regional decision-makers in governments, the private sector and the civil society;

- to increase the awareness of populations and decision-makers about water issues to obtain political commitments in order to solve these problems in a serious and systematic manner;

- to provide the World Water Council with data for the preparation, in collaboration with the Global Water Partnership, of the **Framework for Action**, defining the steps needed to go forward from vision to action and use this knowledge and Forum outputs to influence the investment priorities of countries and donor agencies.

Supported by all United Nations agencies which work in this area - UNESCO, UNEP, UNIFEM, FAO, UNICEF, WMO, UNU - and by the World Bank, the World Water Vision project allowed collaboration and gathered the papers of more than 15,000 people for whom water is a challenge.

All outputs of the Vision process were presented and discussed during the second World Water Forum, held from 17 to 22 March 2000 in The Hague, the Netherlands. They were also integrated into frameworks for action at the national or regional level with the participation of the Global Water Partnership.

A Ministerial Conference, gathering more than 140 countries, including 118 ministers, was organized at the same time. This meeting allowed the adoption of a ministerial declaration and the increase of commitments from countries and donors.

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WATER WARS IN THE FUTURE?

The term hydro-conflict is fashionable. It originated various significant initiatives. A document was presented recently, during the **conference on transboundary management of water resources, held in June 2000 in Washington**. This document written by Mr. T Wolf, Ph.D., from the Geo-sciences Department of the University of Oregon, is interesting as it offers a vision flowing against the stream.

The water issue and international conflicts appeared after the publishing of an article in the New York Times on 10 August 1995 by Mr. Serageldin, then Vice-President of the World Bank, namely "Wars in next century will be caused by water". Following this publishing, many specialists emphasized that water had originated many international conflicts and that tensions caused by its ever-increasing scarcity will widen its role as cause for war. Mr. Wolf carried out an in-depth analysis of these two points.

1) Water and international conflicts

The study of different databases on international conflicts throughout the world and in all eras revealed only seven cases when armies were mobilized and attacks launched across borders because of water. Nevertheless, these disputes never ended in a war.

2) Possibilities of water wars in the future

Mr. Wolf's analysis reveals at least three basic reasons for water not being the cause of international conflicts no more than in the past.

- **Strategic argument.** It is difficult to imagine, within the current context of international relations, starting a war for a resource which costs US\$ 1/m³ when extracted from sea water.

- **Argument of shared interest.** There is a real shared interest for the different uses of a river, even a transnational one. From a practical point of view, the users are usually better off with concerted management rather than with a conflict one.
- **Argument of institutional stability.** It has been proven that once cooperation starts on the management of transboundary watercourses it usually lasts.

To conclude, this vision leads to **promote water management as a factor for stability and local and regional development**. This view illustrates the significant role of the International Network of Basin Organizations (INBO) to develop **integrated water resources management**.

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GLOBAL WATER PARTNERSHIP

VISION TO ACTION:
MOVING FORWARD
FROM THE WATER FORUM

Global Water
Partnership



As a follow up to the document, "Towards Water Security : A Framework for Action", participants at the Second World Water Forum in The Hague in March 2000 requested the Global Water Partnership (GWP) to develop a Post-Hague Report that captures the commitments made at the Forum, responds to the concerns expressed there, and presents a participatory process for taking the momentum generated in the Forum forward. I asked Alan Hall, coordinator of GWP's Framework for Action Unit, how this is being achieved.

What is GWP's role?

It is important to stress that GWP prepared the global Framework for Action at the request of the World Water Commission. This document brings together the work of thousands involved in the Vision exercise and provides options and priority strategies for action as a basis for discussion. It represents the starting point for formulating the long-term program of actions required to better manage water in the future. The actual role that GWP plays in the follow-up process is a facilitating one as clearly, the implementation of the Framework for Action is a job for many other people.

How have you been facilitating this process?

After the Forum we asked representatives from the groups involved in the preparation of the Vision to Action process for their contributions, and to suggest proposals that would help transform the "Framework" into concrete actions.

Who did you contact?

We contacted the regional groups, both those associated with GWP's Regional TACs and others involved in developing the Vision. We also contacted sectoral groups, that is, those involved in water for food and rural development, water and nature, water for people, and water in rivers.

Can you tell us what the next steps will be?

The consultations in Stockholm enabled us to consolidate the various opinions in the report. We are now preparing this final draft for circulation and comment before we go to press at the end of November.

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UNITED NATIONS ENVIRONMENT PROGRAM

THE GLOBAL PROGRAM OF ACTION

The Global Program of Action for the Protection of the Marine Environment from Land-Based Activities (GPA) provides a major tool for effective action against degradation of rivers and coastal zones.

In this regard, the United Nations Environment Program (UNEP), as GPA secretariat and the International Network of Basin Organizations (INBO), and their constituencies have major scope for cooperation.

LAND-BASED DEGRADATION OF THE MARINE ENVIRONMENT

Activities ruining coastal areas and affecting habitats, result from a host of poorly planned and regulated activities, include explosive growth of coastal population, increased tourism, industrialization, expansion of fish farming, development of ports and measures to control flooding.

POLICY OBJECTIVES

The GPA was adopted by 108 Governments during an Intergovernmental Conference in 1995. Its goal is to prevent the degradation of the marine environment from land-based activities and thus facilitates the realization of the duty of Governments to preserve and protect the marine environment. The GPA is designed to be a source of conceptual and practical guidance for local, national and regional authorities and other stakeholders when devising and implementing sustained action to prevent, reduce, control and/or eliminate marine degradation from land-based activities.

THE UNEP/GPA COORDINATION OFFICE

UNEP was designated by Governments as secretariat of the GPA and, to this end, established a Coordination Office in The Hague, Netherlands. Specific mandated tasks for the 2000-2001 period include:

- **implementation of the GPA at the national and regional level.** The GPA clearing house, launched in September 1999, serves as the primary vehicle to promote the exchange of information and expertise between countries and regions.
- **mobilizing action at the global level.**

RIVER BASIN ORGANIZATIONS

UNEP and INBO agreed to share information through linkages of their respective web-sites, they also agreed to identify possible joint pilot projects to address land-based activities. The river basin organizations in INBO are among the major stakeholders at the local and sub-regional level, in GPA implementation. The protection of the marine environment from land-based activities lies at the heart of their aims and work-plans. Therefore, UNEP regards it of critical importance to provide the channels for these GPA organizations to voice their experiences.

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www.iowater.org/inbo
All information related
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AFRICA

WORLD METEOROLOGICAL ORGANIZATION - WMO

THE WHYCOS PROGRAM IN WESTERN AND CENTRAL AFRICA: PARTICIPATION PROSPECTS FOR BASIN ORGANIZATIONS

WHYCOS : why?

Stakeholders in the water sector must access to precise and recent information on the status and evolution of fresh-water resources (rainfall, river flows, groundwater levels, water quality). Unfortunately and paradoxically, in many parts of the world, especially those affected by water scarcity, the systems for collecting and managing water-resources related information are inadequate, and often are deteriorating.

For all these reasons, the World HYdrological Cycle Observing System (WHYCOS) was launched by the World Meteorological Organization (WMO) with the following objectives:

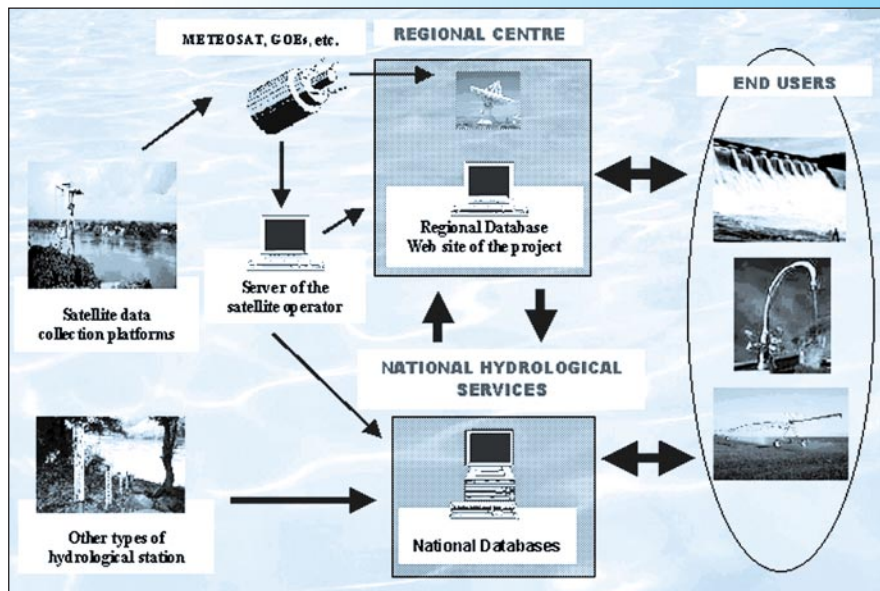
- to establish a global network of hydrological information systems which provide data of a consistent quality, transmitted in real time or near-real time to national and regional databases;
- to strengthen the technical and institutional capacities of the National Hydrological Services (NHSs) to carry out their tasks under the best conditions possible;
- to promote and facilitate the exchange, dissemination and use of water-related information, using modern information technologies, especially those of the Internet.

WHYCOS has been gradually implemented with regional projects: the MED-HYCOS project which is financed by the World Bank, concerns the Mediterranean riparian countries, and the SADC-HYCOS project, supported by the European Commission, involves 11 countries of Southern Africa.

The "AOC-HYCOS" project

The feasibility study of a project involving 23 Western and Central African ("AOC") countries was undertaken by WMO in 1997 on France initiative. The project includes the setting up of 150 hydrometric stations with transmission of data via satellite to which will be added the data collected from the hydrological stations without telemasurement equipment.

The pilot phase of this AOC-HYCOS project was launched in January 2000, thanks to a grant from France. It is limited to 2 years and involves a small number of countries that had expressed their interest in this project. The objective of this pilot phase is the transfer of the system for collecting and disseminating information developed and operated by the French Institute of Research for Development (IRD, formerly ORSTOM) since 1997 which offers the daily monitoring of most large water-courses of the region on an Internet server, namely the Regional Hydrological Observing System for Western and Central Africa ("OHRAOC").



A group gathering the Niger Basin Authority (NBA) and the "CILSS" Regional Center AGRHYMET have joint responsibility for the coordination of the pilot phase of "AOC-HYCOS" and for the operation of the regional database and associated Internet server.

According to the interest expressed by the Niger Basin Authority, the feasibility study

of a first component, namely "AOC-HYCOS /NIGER", will be undertaken and submitted to the European Commission in the coming months.

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NILE BASIN: MINISTERS' MEETING

The Eighth annual meeting of the Council of Ministers for Water Affairs of the Nile Basin States (Nile-COM) took place in Khartoum on 4 and 5 August 2000 with the endorsement of a number of joint priority projects that are under preparation.

The meeting was attended by ministers from Egypt, Ethiopia, Rwanda, Sudan, Tanzania and Uganda. Representatives from Burundi, the Democratic Republic of Congo and Kenya also attended. Eritrea, which has not yet formally joined the Nile Basin Initiative (NBI), attended for the first time as an observer. The meeting, therefore, became the first one where all the Nile Basin riparian countries were present.

The Council of Ministers is the highest decision-making organ of the NBI, an arrangement that brings together all the Nile basin countries with the aim of achieving sustainable development and management of the Nile waters.

The Council is supported by a technical organ - the Technical Advisory Committee (Nile-TAC) - made up of senior officials from the various countries of the Nile basin. To coordinate its activities, the NBI has got a Secretariat (the Nile Secretariat) located in Entebbe, Uganda.

Under the NBI, a series of joint priority projects for the Nile basin countries are being prepared. The projects include stakeholder involvement, training, environmental analysis and

management, and promoting power trade in the region. Others include efficient water use for agriculture, and socio-economic development and benefit sharing.

The Council endorsed the proposed projects and instructed the Technical Advisory Committee to complete the project preparation and submit the project documents by early December 2000. The proposed projects will be presented at a donor forum - the International Consortium for Cooperation on the Nile (ICCON) - for possible funding. The first ICCON is scheduled to take place in Geneva, Switzerland, in February 2001.

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KENYA

INTEGRATED WATER RESOURCES DEVELOPMENT PLAN FOR EWASO NGIRO NORTH RIVER BASIN

The Ewaso Ngiro North River Basin offers a good example of the dynamics of lowland - highland interactions in a basin. The Ewaso Ngiro North River originates from the central highlands of Kenya, which are generally high potential areas, and flows through the marginal lands in the lowlands of Northern Kenya before draining into Lorian swamps. Irrigated agriculture is the single most important water use in the upper reaches and currently there are insufficient provisions to compensate the abstracted flow for this purpose which has occasioned the continuous dimi-

nishing of dry weather flows in the rivers of this basin to the extent that some perennial rivers have turned ephemeral. This is threatening the survival of the pastoralists together with their livestock, who predominantly occupy the lower parts of the basin.

Therefore, the **Ewaso Ngiro North Development Authority** conceived the idea of carrying out an Ewaso Ngiro North River Catchment Conservation and Water Resource Management Study to come-up with an Integrated Water Resources Development Plan for the basin.

This study is being financed by a grant from the **African Development Fund** and it will put a lot of emphasis on the development of water resources for social and economic development and in particular it will look at:

- the geographical features of the basin;
- the state of the economy including the agriculture sector;
- overall government policies on agriculture, water and environment and;
- the current situation concern-

ing the use of water, soil and vegetation resources in the Basin.

The output of this study will be specific actions that the Government of Kenya will undertake to conserve the Ewaso Ngiro North River catchment and have proper water resources management for the entire basin.

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ASIA - PACIFIC

CENTRAL ASIA

ARAL SEA ICWC: WARMIS AND WARMAP

The **Water Resources Management Information System (WARMIS)** is an Information System for water and land resources management in the Aral Sea basin. It is designed for the collection, storage, processing and analysis of various data about the historical and actual situation of land and water resources and their use.

WARMIS is a component of the **Water Resources Management and Agricultural Production (WARMAP)** project, sponsored by the European Union's Tacis program. The first WARMAP project started in 1995 and ended in 1997. In 1998, a second phase (WARMAP-2) started under leadership of DHV Consultants which is continuing the development of WARMIS. Other components of the WARMAP and WARMAP-2 projects are: support to legal agreements on the management of water use and water quality, development of a database on **Water Use and Farm Management (WUFMAS)** and Project Management Support for GEF project (Water and Environmental Management in the Aral Sea Basin) sponsored by the World Bank.

The organization responsible for the development and implementation of WARMIS is the **Executive Committee of the Interstate Fund for the Aral Sea (EC-IFAS)**. In the board of IFAS all 5 Central Asian Republics (Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan)

are represented. The **Interstate Commission on Water Coordination (ICWC)** is the platform where the 5 CA Republics and the two BVOs (water management organizations in charge of the 2 main rivers: Syr Darya and Amu Darya) make agreements on water distribution within the region. The Scientific Information Center of ICWC is the main local counterpart of the WARMAP project for the development and implementation of WARMIS.

The Water Resources Management Information System has the following components:

- ➔ a **database management system (DBMS)**, containing tabular data;
- ➔ a **geographic information system**, containing spatial data and spatial analysis tools;
- ➔ a **user interface** for data input and output;
- ➔ a **toolbox**; comprising components for system maintenance, data verification, data exchange and security, user authorization, etc.;
- ➔ **three modules for strategic analysis and deci-**

sion-making support, containing several mathematical models:

- an economic optimization model to identify measures for improving the use of land and water resources and developing agricultural production,
- a model to simulate multi-year water availability in terms of quantity and quality.

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KAZAKHSTAN

NATIONAL WATER RESOURCES AND ENVIRONMENTAL PROTECTION ASSOCIATION

This Association, gathering high qualified specialists in water industry and environmental protection, was created in 2000 for non-commercial purposes.

Its objectives are the following:

- Participation in the selection of priorities for national and regional policies on water resources management;
- Preparation of legislative acts and norms for stable

water use and environmental protection;

- Assistance in obtaining financial and technical aid for modernizing potable water supply systems in rural and urban areas, improving the operation of urban water supply and sewerage systems, developing low cost technologies;
- Making water use in irrigated agriculture more effective,

providing practical aid to the Water Users Association and farmers for economic use of irrigation water and environmental protection;

- Promoting applied scientific research, related to water resources and their quality;

- Assistance in improving skills of specialists in the water sector;
- Development of international collaboration

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INTERNATIONAL MANAGEMENT OF THE IRTYSH: SIGNING IN PARIS OF A PROTOCOL BETWEEN FRANCE, RUSSIA AND KAZAKHSTAN

At the invitation of the French Ministry of Regional Planning and the Environment, Mr. Mikheiev, Prime Vice Minister of Natural Resources of the Russian Federation and Mr. Murat Musataev, Prime Vice Minister of Natural Resources and Environmental Protection of the Republic of Kazakhstan signed an agreement protocol on the transboundary management of the Irtysh river basin in Paris on 10 May 2000.

The IOWater, in partnership with the consulting firms SAFE-GE and ANTEA, will provide technical assistance with the implementation of this project, financed by the French Fund for the World Environment (FFEM).

A preliminary phase, carried out in 1999, defined the objective of this project which is perfectly in line with the Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes (articles 9, bilateral and multilateral cooperation, 11, Joint monitoring and evaluation and 13, Exchange of information between riparian countries).

Owing to the special French expertise in this sector, the project group will assist both States with the design and implementation of instruments for the basin water resources management. Technical assistance will prioritize the orientation and coordination of the national experts' work, gathered in the Irtysh River Basin Sub-Commission, which will be supervised by the Russian and Kazak Commission on the joint use and conservation of shared waters. An International Basin Information System will be set up and supplemented by the development of a hydrological model in particular. It will allow the definition and implementation of joint policy and programs for water resources management in the basin.

The outputs of the work carried out in this Irtysh project should be usefully reused in many rivers, transboundary between Russia and Kazakhstan (Ural, Tobol, Ishim), and between Russia and China (Amur).

This project is in line with the ongoing "Study Program for the improvement of water quality in the Irtysh river basin in Kazakhstan". This program which started in Spring 1999 is also financed by the French Ministry of Economy and Finance (FA-SEP).

The first conclusions are as follows:

About the Irtysh quality

It especially dealt with the hierarchization of the impact of different pollution sources on the basin. Industrial pollution, mining in particular, is the most significant. On the contrary, urban pollution has only a small impact. Additional impact assessments will be carried out in a second phase, in Ust-Kamenogorsk in particular, regarding industrial discharges and the impact of flow reduction in the Black Irtysh.

About institutional aspects

An analysis of the law on environmental protection and water code of the Republic of Kazakhstan, of the existing institutions and financial resources was carried out. As a priority, the need for a Framework Law taking up clear principles of water resources management per unit was emphasized. Proposals for such a law will thus be discussed with the Kazak partners. The existing Funds should also be a basis for the development of more incentive tools for environmental protection.

Basin monitoring system

The rehabilitation of the existing monitoring network is necessary. Several proposals were detailed to improve information and enhance data within an integrated river basin information system at the Kazak level which could be integrated into the transboundary system. They will be revised with the Kazak partners and the World Bank as concerns the investments needed.

Groundwater quality and security of drinking water supply

The main sources of pollution were identified in the 3 towns of Ust-Kamenogorsk, Semipalatinsk and Pavlodar, thanks to a campaign of additional measurements. Groundwater quality assessment in the 3 towns will be presented in the final report. A hydrodynamic model is under way for Ust-Kamenogorsk. It will allow the checking of the options for the treatment of the main pollution sources.

Sanitation in towns

In these three towns, it was proven that the pollution load received by each wastewater treatment plant remains relatively small, due to leaks in the sewerage system and the low connection percentage for wastewaters. Each plant was also evaluated in the first phase. The final report will present the improvement work to be carried out for each of these 3 plants, together with a cost estimate. A more complete assessment of the sewerage systems must be undertaken.

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Signing of the protocol

MEKONG RIVER COMMISSION

TOWARDS THE SUSTAINABLE DEVELOPMENT OF THE MEKONG RIVER BASIN

The Mekong is the world's 12th longest river, which is relatively less exploited. The river system represents the region's largest potential water resources. The Mekong River Basin contains a globally significant biodiversity, wetlands and flooded forests. Approximately 65 million people are living in the entire Basin, increasing at an annual rate of about 2%, and depend to a great extent on the natural resources of the Basin for their livelihood.

Achieving sustainable development of the Mekong River Basin in an ecological way and preventing water use conflicts in the basin are therefore central to the mandate of the Mekong River Commission (MRC) and the MRC Water Utilization Program (WUP) in particular. The WUP is conceived as a long-term program aiming to

support the MRC in developing an integrated and comprehensive basin hydrological modeling package, as well as an integrated knowledge base on water and related resources to establish a series of "rules" regarding joint water utilization and management.

The WUP Project time frame is 6 years with a total budget of US\$ 16.3 million, funded by the Global Environment Facility (GEF) with the World Bank as an Executing Agency.

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PHILIPPINES

SUSTAINABLE DEVELOPMENT OF THE LAGUNA DE BAY

The Laguna de Bay, the largest lake in the Philippines and the second largest in Southeast Asia has a surface area of about 900 sq. km. There are more than 21 sub-basins that drain into the lake out of six different provinces and a total of 60 municipalities. Its outlet is the Napindan Channel which at its confluence with the Marikina River, forms the Pasig River. The total catchment area is around 3,820 sq. km and has been significantly modified by land-use change.

In Laguna de Bay, water use and allocation conflicts and competition and resolving them in a rational and systematic manner have become an important task in ensuring the long-term sustainable use of the water resource. In considering the competing and conflicting uses including the quantity and quality aspects, the LLDA is now more than ever faced with the need for comprehensive water management and development plan for Laguna de Bay.

In view of this, a project "Sustainable Development of the Laguna de Bay Environment" was funded by the Netherlands. The project will end in March 2001. The first year is dedicated to capacity

building and decision support tool development, while the second year will focus on technical studies related to dredging, drinking water supply and infrastructure works.

The project objectives or expected outputs are as follows:

- Establishment of an Integrated Water Management Group for transfer of knowledge and capacity building;
- Establishment of an appropriate GIS /database and state-of-the-art set of modeling tools to support decision-making;
- Assessment and recommendations for technically and economically feasible solutions to water quality related problems; and
- Recommendations and procedures for removing contaminated sediments.

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CHINA

PRINCIPLES AND MEANS FOR PARTICIPATORY MANAGEMENT AT THE LEVEL OF RIVER BASINS

According to data from the Department of Soil and Water Conservation of the Chinese Ministry of Water Resources, China has been implementing a participatory management at the level of river basins since 1980 and, up to now, more than 1000 watercourses in about thirty provinces and

towns are subjected to this kind of management.

In China, participatory management at the level of a river basin is a governmental, regional and individual participation based on household shares and State support.

A NEW WATER MANAGEMENT SYSTEM IN CHINA: THE WATER UTILITIES

China is implementing a new water management system: the water utility. This system will combine water management in quality and quantity terms, in space and time, with development, economy and protection.

About 80 districts or towns have created their water utility

since 1998 and about 54 districts or towns have decided to create one. Since 1 November 1999, about 13 districts or towns have declared their willingness to set up such utilities.

WATER PRICE INCREASE IN SHANGHAI

Tax on wastewater increased in August 2000 in Shanghai, from 0.45 yuan/m³ to 0.70 yuan/m³. This tax is calculated on 90% of the water volume really consumed by households and is levied with the water charge on water intended for human consumption.

The cost price of wastewater treatment in Shanghai is about 0.60 yuan/m³, that of the outskirts is about 1.00 yuan/m³. In order to achieve better envi-

ronmental and water resources protection, Shanghai is gradually implementing projects for wastewater treatment and cleaning of the Su Zhou river. As these projects require large investments, the Government support is no longer sufficient and the inhabitants will have to contribute.

APPLICATION OF WATER CHARGES ON WATER CONSUMPTION

In order to incite water saving and strengthen the awareness raising of populations on water resources being a precious asset, China is gradually applying a water charge on water consumption in towns, especially those where water is scarce, the towns of Tian Jin, Ji Nan, Chang Chun and Shen Yang for instance.

This charge will also reduce pollution, as, according to statistics, when less water is used, pollution is reduced (while sa-

ving 1 m³ of water for human consumption, wastewater is decreasing of about 0.6-0.7 m³).

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INDONESIA

STRATEGIC ROLE OF A WATER RESOURCES MANAGEMENT INSTITUTION

To gain beneficiaries' support in order to manage and develop water resources, it is necessary to establish a water resources management institution which would be responsible for fulfilling the demands of its stakeholders and based on public participation.

It would cover information and public education on the whole management cycle that includes the following basic steps:

1 **Planning:** preparing a comprehensive and acceptable

plan suited to the stakeholders' interest and used for basic management of the river basin. It would include a master plan (guidelines to determine necessary actions to reach agreed objectives), and a medium term plan (5 years).

2 **Implementation:** preparing and implementing a yearly integrated work program based on the master plan.

3 **Follow-up:** monitoring and evaluating the implementation of the master plan; 5

year work program and of the yearly work program.

4 **Action:** making recommendations on related institutions in order that the target of the master plan and 5 year plan could be achieved properly.

A **Basin Water Resources Committee** has been established in the Brantas river basin (Jasa Tirta I Public Corporation working area). It is supervised by the Vice Governor of East Java and consists of various provincial services, such as

Provincial Irrigation, Agricultural and Planning services, Provincial Environmental Impact Management Agency, Meteorological Agency, Fishery Services, Surabaya Water Supply Enterprise, State Electric Power Company, Jasa Tirta I Public Corporation, and experts from the University, etc. In the future, this Committee will cover all stakeholders.

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BRANTAS RIVER WATER QUALITY AND POLLUTION MANAGEMENT PROJECT

The Brantas River is the largest river system in East Java. Five multipurpose hydropower reservoirs and several other water resources infrastructures (dams, levees, irrigation canals etc) have been built during the last decades in this catchment. In the Brantas River basin the reservoirs are potential supplementary supply of irrigation as well as industrial and domestic water for a rapidly growing population. **At the moment, the government is facing environmental problems, particu-**

larly water pollution from industries, households and agriculture.

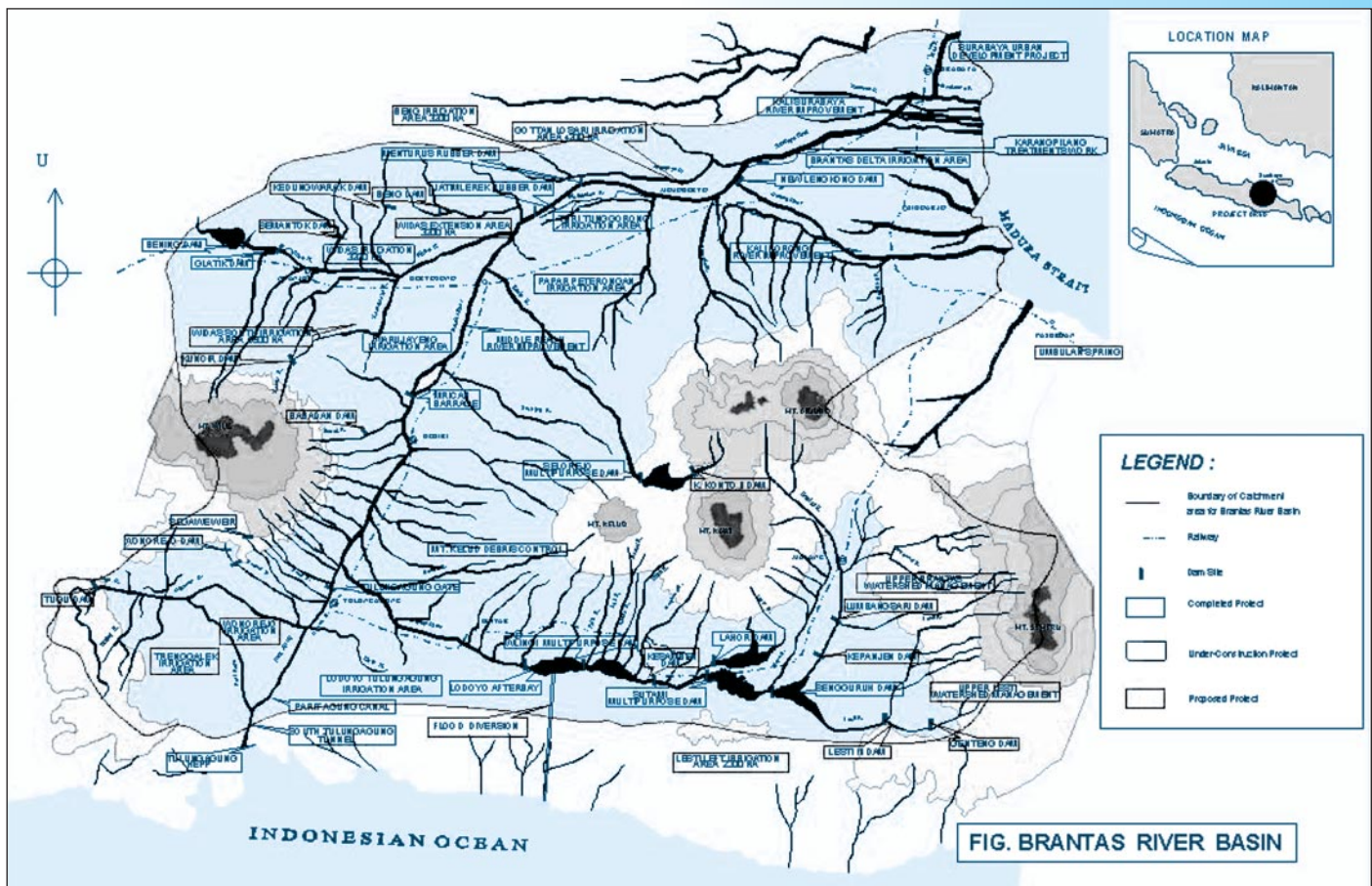
The Government of Indonesia with assistance from Austria intends to improve Brantas River water quality by installing on line water quality monitoring stations and extending the existing flood forecasting and warning system.

To control river pollution caused by the discharge of domestic and industrial wastewater, different types of treatment

plants will be designed and constructed on a pilot scale to serve as research and development facilities, to enable training of staff, to raise public awareness and to strengthen the authorities in tariff and wastewater discharge permit and authorization processes. One of the major objective of the program is to build capacity to enhance monitoring programs by increasing data reliability, appropriateness for regulation and law enforcement.

Project implementation will give priority to technology transfer and training of local personnel at all levels.

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INDIA

GANGA, BRAHMAPUTRA AND BARRAK BASINS

Floods are recurrent natural hazards in the eastern and north-eastern region of India. The mighty rivers Ganga, Brahmaputra and Barrak flow in this region resulting in extensive damage to life and property of the order of about 85% of the annual flood damage of India. The eastern region of India comprising the Bihar, West Bengal, Assam and other north-eastern states is economically the most back-

ward. Paradoxically, this region happens to be richly endowed with natural resources with almost 40% of nation mineral resources, 60% of power potential.

To mitigate flood losses in this region containing 50% of the geographical area, 42% of the population, 61% of the flood prone area and 85% of the flood losses of the country, mostly embankments, drainage channels and protection works

have been undertaken. These measures, however, have provided a reasonable degree of protection to 71% of the flood prone area.

A judicious mix of structural and non-structural measures with an integrated catchment area treatment program is essentially required to make the structural measures more effective.

Various measures were taken and a strategy formulated to lessen the adverse impact of flood on socioeconomic conditions of the people. Attempt has also been made to harness the energy of flood waters and reduce its damaging impact.

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INTEGRATED MANAGEMENT OF THE SABARMATI RIVER BASIN

Institutional and financial reforms clearly seem to be the key challenges for the development of the water sector in India.

After the organization of a seminar on Integrated Water Resources Management in New Delhi in 1994, it was decided that a pilot river basin would be selected to start the experimentation of a new approach within the framework of a cooperation between France and the Indian Union.

The Indian Authorities have chosen the SABARMATI river basin in the State of Gujarat, a dynamic State where economic and industrial development, initially based on textile and now diversified in chemistry, agro-food processing, etc. is very high. Ahmedabad, the main city of the State, and several medium-sized towns including Gandhinagar, the administrative capital, are located in this basin. The securing of drinking water supply and pollution control are the key factors for the development of these ur-

ban and industrial areas, which will host a large part of the rural population.

On the other hand, water demand for agriculture is still growing and highly dominant (about 90% of water consumption). It increases the very high pressures on resource quantity. As in many other semi-arid regions of this State, located in the western part of India, drought is seriously affecting this basin in 2000 and the drinking water supply to many villages is no more secure.

The pilot French-Indian cooperation project: "Integrated Management of the Sabarmati River Basin" started at the end of 1999 and will be implemented in two years.

Its main objectives are the following:

1. **Organization of an integrated information system** for the Sabarmati river basin, based on existing databases and gathering all water data in a consistent manner: data on resources and uses,

administrative and socioeconomic data, etc.

This obviously implies a close collaboration between the different existing projects such as the Hydrology Project/ HIS, Remote sensing center and GIS, ...

2. **Preparation of a long-term development scheme** for the Sabarmati river basin including an assessment of the situation and problems and the definition of regional objectives taking into account the plan for the socioeconomic development of the State. This scheme is based on the Integrated Sabarmati River Basin Plan (interim version, 1996, Group for Water Resources Planning, Gujarat State, NWR&WSD).

3. **Definition of a priority action program**, based on the choices of the new "Sabarmati River Basin Committee". Owing to water scarcity, measures ought to be taken to manage water demand.

These different outcomes shall be validated by a "Sabarmati River Basin Committee", gathering the various administrations involved in water management, and in so far as possible, representatives from the users within the framework of a better participatory approach. The action program will also define the possible institutional and financial reforms which will also be discussed and validated by this Committee.

The International Office for Water is managing the French technical assistance, within a group of French consulting firms, BRLI, SEURECA and BCEOM, gathering the various technical and institutional competences needed. This technical assistance is financed by a grant from the French Ministry of Economy and Finance (FASEP).

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PAKISTAN

THE INDUS RIVER SYSTEM

Pakistan is one of the largest nations of the world that depends on a single river system. The water from the Indus River and its tributaries supports the bulk of the agricultural water supply for its 130 million people. Dams on the main stem of the Indus River and its tributaries produce most of the electrical energy for Pakistan (45%).

The Indus and its tributaries originate in the Karakoram, Hindukush, and the Himalayan regions along the north and north eastern borders of Pakistan. The rivers have a combined annual average volume of 178 bcm³ discharged into the Indus Plains. The Indus System forms a link between two great natural reservoirs, the snow and glaciers in the mountains and the groundwater contained by the alluvium in the

Indus Plains of the Punjab and Sindh Provinces.

The Indus and its tributaries provide nearly 60% of the water utilized for irrigation. The remainder is groundwater, which is recharged by various basin streams. The Indus River is also the main source of domestic and industrial water.

The Indus River waters are also used for hydroelectric power generation. However, by law, water supply for irrigation is the first priority.

The Indus Waters Treaty

A number of agreements for sharing the river water took place in the Indus Basin. The most significant of these have been the **Indus Basin Treaty** (1960) between India and Pakistan

and the **Water Apportionment Accord** (1991) between the four provinces of Pakistan.

According to the Indus Waters Treaty, the flows of the four main rivers are available to Pakistan - the Indus, Kabul, Jhelum, and Chenab Rivers (called the **Western Rivers**), while India has exclusive rights to waters of the rivers Ravi, Beas and Sutlej (called the **Eastern Rivers**). As a result of this treaty, reservoirs and a network of inter-river link canals were constructed in the Indus Basin under the Indus Basin Settlement Plan. Thus, the river water diversions for irrigation were increased. The cultivable area was increased by 15-20% and the cropping intensities almost doubled.

The Water Apportionment Accord

In 1991, an agreement to share the waters of the Indus River was reached between the four provinces in the form of the Water Apportionment Accord. This accord is based on the water supply and the existent and future needs of the four provinces. It has two important features:

- It protects the existing uses of water in each province.
- It apportions the balance of river supplies, including flood surpluses and future storages among the provinces.

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AUSTRALIA

THE MURRAY-DARLING BASIN INITIATIVE

A large proportion of Australia is desert or agriculturally marginal land. However there are well developed agricultural regions around the rim and in the south east and south west. One of the most productive of these regions is the Murray-Darling river system in the south-east of Australia. It is Australia's largest river basin, extending over more than one million km².

For Australia, water is a crucial resource. As the driest inhabited continent in the world, the shortage of water has always been a determining influence shaping the pattern of human settlement, economic

development and our options for the future.

Over the last decade, governments and the various communities in the Murray-Darling Basin have developed an unusual but very effective partnership known as the **Murray-Darling Basin Initiative** which is designed to promote a comprehensive approach to the management of the natural resources of the region, with particular attention to water.

The range of stakeholders that have to be considered is very diverse. Irrigation in the Basin uses more than 10 million megalitres of water per

year, approximately 95 per cent of all water diverted off-stream in the region. Domestic consumers, industry and stock use the remaining 5 per cent. However although the non-irrigation group of stakeholders - which includes more than three million people in and outside the Basin and major industry and tourism sectors - use only a small proportion of the water diverted in the Basin, the value of the interests they represent is very high in economic and political terms.

A Ministerial Council is serviced by a Commission of senior government officials which has the capacity to make an in-

put into policy development. There is also regular community participation through the Community Advisory Council.

This overall structure - which has been operating for over 10 years - is now an effective part of the Australian political system. Its operation has been a major factor in transforming water and natural resources management in the Murray-Darling Basin.

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NORTH AMERICA

USA - PENNSYLVANIA

The Central Pennsylvania, Capital Region Water Board has expanded its activities to the 8 Counties of Central Pennsylvania covering a population of approximately 1.6 million people.

The Board will be doing a comprehensive water management study of the Lower Susquehanna Basin and a special study to address a water controversy in the Swatara Creek Watershed.

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QUEBEC

NEW WATER MANAGEMENT POLICY IN QUEBEC

On 19 June 2000, the Minister for the Environment in Quebec presented an orientation Framework to the population. It included the stakes, objectives and principles which will be the basis for a first water management policy in Quebec.

One of the objectives of the future policy will be to implement integrated water management at the level of river basins in Quebec. It will obviously involve citizens and all stakeholders participating in water management. Tools will be developed to promote dialogue and the solution of conflicts on use, especially regarding groundwater. The user-pays and polluter-pays principles will be examined and gradually introduced.

The other objectives of this policy will be to confirm that water is a common heritage of the Quebec society, to guarantee public health and to preserve, protect and rehabilitate ecosystems.

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ISW

"SOCIAL PRIVATIZATION" OF DRINKING WATER AND SANITATION

The notion of "social privatization" is a solution to the issue of access to drinking water and sanitation in disadvantaged areas.

"Privatization" means that the State should contract out the implementation of services to non-government bodies who can combine technical efficiency with management expertise. This contractual arrangement does not mean that the State rescinds its responsibilities. It must continue to play its role in the redistribution of wealth and remain the upholder of the public interest.

The use of the word "social" implies that while civil society belongs in the private sector, we must recognize the capacity of the grassroots movements to organize themselves in order to participate in the management of water and sanitation. We must realize that the involvement of the populations in these contractual arrangements can be a further guarantee of the efficiency and sustain-

ability of the solutions implemented. While profitability remains an essential objective, the word "social" also underscores the goal of reducing inequalities. In other words, water is not just a vital commodity but also a heavily symbolic resource. It is a political issue.

An evolutive and modular definition of "social privatization" includes:

- ◆ User ownership of the services;
- ◆ A user body, joining the "collaborative" and the "entrepreneurial" aspects within a legal framework, in order to ensure the sustainability of the service;
- ◆ A contract-based collaboration with the public sector authorities (or the private sector when privatized), establishing the roles and responsibilities of each party;
- ◆ A public-private-community approach;

- ◆ Access to a variety of viable professional "intermediaries" with different forms and statutes, who must include a strong local representation when they benefit from international aid;
- ◆ An action plan directed at achieving financial autonomy and based on a service fee related to the means of the population, public funding and access to credit and international resources;
- ◆ A strategy of proximity, benefiting accordingly from decentralization;
- ◆ An interest in taking on other services (of general purport) which could benefit from the same approach.

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LATIN AMERICA AND THE CARIBBEAN

LANBO

GOOD NEWS



- Signing of the statutes before a notary
- Programs with other organizations
- The financial framework which will govern LANBO
- New members

LANBO is now a real legal entity, registered at a notary of office under Mexican law, according to the statutes and regulations approved during the LANBO Ordinary Assembly held in Mendoza, Argentina, in August 1999.

This legal entity is sufficient to manage national and international programs and financial resources. International institutions such as the World Bank, the Inter-American Development Bank and the Global Water Partnership are interested in working with the regional network, especially to define the bases of an Associated Program with the GWP's SAMTAC (South America Technical Advisory Committee) and CATAC (Central America Technical Advisory Committee).

In addition, the setting-up of a LANBO Foundation, a unit to check the management of LANBO assets and resources, is under way.

LANBO CENTER FOR DOCUMENTATION AND LOGISTICS

The Latin American Network of Basin Organizations, aware of the structural weaknesses of the water sector in the Latin American region, mainly caused by lack of information, of access to new technologies and institution isolation, decided to set up a Documentation and Logistics Center for the Network.

During its first Ordinary Assembly, held in Bogota in 1998, LANBO entrusted the design, organization and setting-up of this center to the Regional Autonomous Corporation of Cundinamarca, CAR, in Bogota, Colombia.

LATIN AMERICAN BASIN FRIENDS CLUB

In August of 1998, the environmental authority of Cundinamarca in Colombia, the Regional Autonomous Corporation of Cundinamarca (CAR) which is attached to LANBO, held, in Santa Fe de Bogotá, the Latin American Network of Basin Organizations (LANBO) first Ordinary Assembly.

This was the perfect occasion to introduce the program called "Latin American Basin Friends Club" oriented to develop educative and formative processes for urban and rural Latin American children and teenagers, from 5 to 18 years old, in some aspects related with environment and social

coexistence, considering the hydrographic basin as a basic, operative and functional unit.



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CEPAL

MANAGEMENT OF BASINS LINKED TO URBAN SETTLEMENTS

This document analyses conflict situations that arise from the use of water and basins supplying populations and from the changes brought into watercourses by man activities. It presents an analysis of the different methods used for river basin management and pays particular attention to the operational aspects of river basin management, emphasizing the importance of involving local authorities in these processes. It also provides rules for the setting-up of basin organizations and proposes options for financing these authorities and orientations for improving environmental services provided by river basins to urban areas. River basin management techniques are analyzed by underlining alternatives in the management of river basins which supply water to populations and of watercourses crossing urban settlements. The need to rehabilitate watercourses is also brought out owing to their significance in preserving biodiversity and leisure for populations, in mitigating flood conse-

quences and controlling pollution.

This document includes references on river basin management in Latin American countries and the United States. Appendices provide elements for decision-making regarding the rational supply of water to towns and techniques for assisting decision-making on the multipurpose use of water at the level of river basins.

CEPAL

Comisión Económica para América Latina y el Caribe

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RIO DE LA PLATA

Representatives from thirty organizations of Argentina, Brazil and Uruguay met in Buenos Aires, from 4 to 6 November 1999; to define the objectives, organization, action program and discuss the financial aspects of the **Network of Environmental Research and Management for the Rio de la Plata Basin** - "Red de Investigación y Gestión Ambiental de la Cuenca del Plata (RIGA)".

During this working meeting, the participants also decided to make effective the "RIGA" creation in November 2000 during the 3rd International Workshop on Regional Approaches for the Management and Development of Reservoirs, whose organization is part of the approved action program which also includes the publishing of the first issue of the "RIGA" technical and scientific periodical.

"RIGA" is a non-governmental organization, whose members are public and priva-

te organizations of the Rio de la Plata basin. Its objectives are monitoring, planning, evaluation, research, technological development, administration, legal aspects, water supply and management to improve the use and sustainable development of water resources and integrated management of the environment in the basin. For this purpose, "RIGA" is promoting a communication, information and cooperation system among the member organizations.

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ARGENTINA

MENDOZA: THE GENERAL DIRECTORATE FOR IRRIGATION CONSIDERS WATER MANAGEMENT AS AN IMPORTANT TOOL FOR THE NEW CENTURY

Mendoza covers a total surface area of 150,839 km², 5,4% of the Argentinean territory. The General Directorate for Irrigation is responsible for managing water in the basins of the province, a task fulfilled since 1884 as stipulated in the Water Law. In 1999, this organization presented the PROVINCIAL HYDROLOGICAL PLAN, an essential tool for enabling coordinated and sustained action in space and time.

Planning the future

The Provincial Hydrological Plan was designed to meet the short, medium and long term

demands of the water sector. However, demand increase forecasts are the first analysis elements to be taken into account together with the improvement of its flexibility to adapt to future changes and externalization. Generally speaking, the plan will be based on some basic principles enabling integrated, effective, sustainable and equitable water management at the level of river basins.

The plan will not only involve the participation of governmental organizations but also of all the users. It was designed to gather all the community's suggestions and respect and preserve the environment.

Water resources protection

Protecting water resources quality is the basis of all modern water management. Therefore, the GDI has established regulations such as the Water Impact Assessment and the Definition of Hydro-ecological Protection Areas. The first one aims at foreseeing and controlling all possible deterioration of water quality and quantity caused by new agricultural, industrial, recreational and urban activities which are developing in the Province.

As regards protection areas, some studies were car-

ried out in different places in the province and showed that many aquifers had water of very good quality. It is planned to create protected areas where any activity that can affect aquifer quality will be forbidden and where authorized activities will be controlled as well as the sound use of flora and fauna.

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BOLIVIA

POLICIES FOR WATER RESOURCES AND RIVER BASIN MANAGEMENT

Thanks to its Capacity Building project (ATR-BID 929) and its component "**policies for water resources and river basin management**" the Ministry of Sustainable Development and Planning aims to get the policies, standards, technical instruments needed for managing the country's water resources which would include

integrated and participatory river basin management.

In order to achieve this and link the political and administrative framework with that of the river basin, the General Directorate for Soils and Basins Classification, an institution in charge of implementing this component, has defined the following specific objectives:

- concerted formulating of policies, techniques and methods at the national, departmental and municipal levels for the use, protection and sustainable conservation of water resources;
- promoting, defining and implementing technical assistance with integrated and

participatory river basin management at the municipal and intermunicipal levels;

- developing and using a method for assessing the regulatory impact of the draft Water Law;
- setting up and updating of a River Basin Information System, in partnership with the National Meteorological and Hydrological Department ("SENAMH");
- designing and formulating river basin master plans, in coordination with the land use plan, with policies for forestry, environmental quality and biodiversity.

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BRAZIL

SANTA CATARINA

THE ITAJAI BASIN COMMITTEE

This article introduces a reflection on the planning and river basin management process, which is the output of four years of experimentation by the Itajai River Basin Committee, in Santa Catarina State. To summarize, this experiment shows that the setting-up of a water resources management structure is a two-way path: from top to bottom planned legal mechanisms and from bottom to top the needs of the communities living in the basin. These two paths, both simultaneous and complementary, are the “**formal component**” and “**action component**” respectively.

The “formal component” includes the setting-up of a ma-

agement structure for the basin. The “action component” deals with all activities of the Basin Committee, either expected or requested by the regional community, and activities which legitimate the Committee towards the community with which it is dialoguing.

These components are educational as they explain the actions required to those who are interested in the creation of a water resources management structure. They are also technical as they describe the professional skills needed to implement a project. The experiment of the Itajai Committee also shows the advantage of having a multi-institutional



team, like its executive secretariat and Management Committee.

The breaking down of river basin management tasks into a “formal component” and an “action component” should not last long. With the creation of the Water Agency and the effective use of management instruments in the medium term, the formal component will become minimal while the action component will represent all the committee’s efforts.

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MINAS GERAIS

THE RIO MOSQUITO BASIN COMMITTEE

Under the supervision of the Rio Mosquito Basin Committee, the first phase of the water-related project has started (control and monitoring of the schistosoma mansoni). The work is being developed by the Infectious Diseases Group of the Federal Espírito Santo University, under the coordination of Prof. Dr. Reynaldo Dietze. This program includes:

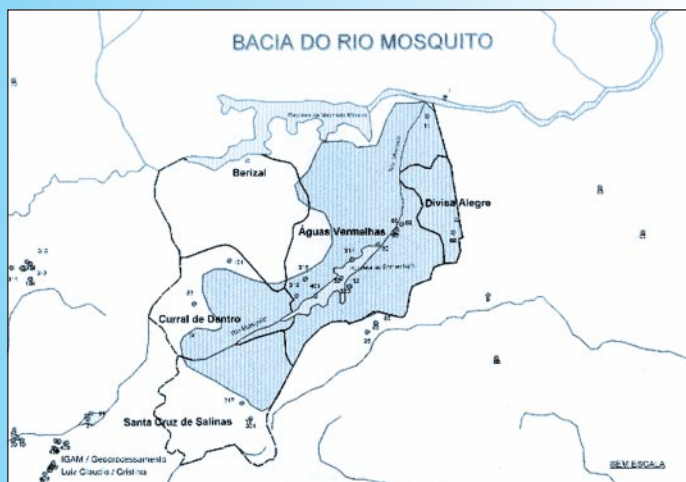
1 An assessment of the endemic situation (coprological data on school children from 7 to 14 years old), a malacological survey, an assessment of water-related diseases in the Basin, the checking of schistosoma mansoni endemia in the region.

2 Diagnosis and specific treatment of sick people.

3 Education to health with the participation of the community.

4 Biological control of water snails (the intermediate host of schistosoma mansoni) in reservoirs.

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SAO PAULO

THE PIRACICABA-CAPIVARI CONSORTIUM

The Piracicaba and Capivari river basins have had an interconnecting regional entity since October 13, 1989, to deal with issues related to water resources and environmental recovery in the region. The Intermunicipal Consortium of the Piracicaba and Capivari River Basins was founded in Americana, through regional initiative, a private, non-profit civil association technically and financially independent. Its purpose is to raise and invest resources in environmental programs and activities.

The Consortium has four functional organs:

- The Council of Municipalities (mayors and representatives of companies, members of the consortium).
- A Fiscal Council (representatives of city councils)
- An Assembly of Entities (representatives of civil society).
- An Executive Secretariat (technical team).

In June 1996, after changes made to bylaws, new members joined the Consortium (public and private companies). More than a non party political entity, the Consortium became legally an association of public and private end users of water, that presently includes 40 municipalities and 23 companies.

The Main Accomplishments of the Piracicaba-Capivari Consortium are:

- Regional awareness of environmental problems.

- General plans and projects for sewage treatment in 17 municipalities.

- General Water Abstraction and Production Plan for the Piracicaba and Capivari River Basins.

- Practical experience in technology for sewage treatment in Cosmópolis and Rio Claro Treatment Plants.

- Development and execution of the Water Spring Protection Project, that has already planted approximately one million trees.

- Increase in domestic sewage treatment rate, from 3% to 12%.

- Initiation of the Solid Waste Program.

- Development of awareness and environmental education, the Water Week, involving more than 160 thousand students.

- Project of International Cooperation with the Seine-Normandy Water Agency, ADEME and CUD (France) and the Jucar Hydrographic Confederation (Spain)

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BASIS FOR THE NATIONAL WATER RESOURCES POLICY IMPLEMENTATION: SUBSIDIARITY, ADMINISTRATION AND STRATEGIC PLANNING PRINCIPLES

The Federal Law of 1997, in its first article, declares that water is a public asset, with economic value, and its management should always provide multiple use through a decentralized institutional model, with Public Power, users and community participation.

In its third and fourth Articles, the Law gives emphasis to diversity and to inter-sectoral integration between the Union and the States, as concerns water management.

In order to implement this Policy, it is necessary to adjust, on the one hand, its close connection with local problem specificity, and, on the other hand, pay attention to a context in which the national experience is incipient.

It seems that there are two main concerns. The first one deals with reflections applied to subsidiarity and decentralization concepts for decision-making processes, with interfaces arising out of our federal political-administrative organization and its overlapping, due to its territorial division based on river basins.

The subsidiarity principle, that determines the actions to be implemented at an adequate level, seems to be extremely relevant in discussions to determine power allocation to each government level - federal, state or municipal - in its respective administrative area.

Since most of the environmental problems are local ones, the decentralized management has two main advantages:

it reduces information costs - the residents of a certain jurisdiction know their concerns better - and it permits that environmental quality and policy instruments vary according to the regions and the budget limit priorities.

The second concern has to do with the dynamic aspect of the National Water Resources Policy implementation process, identified as strategic planning tool.

An adequate answer to these concerns can be given through applying the strategic planning principle of the National Water Resources Policy, based on two dimensions: the temporal one, the strategic approach is characterized by continuity and permanence, and the geographic dimension.

The Policy implementation is, therefore, a permanent negotiation and reassessment process.

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BAHIA

INTERMUNICIPAL CONSORTIUM OF THE RIO JIQUIRIÇA

The Rio Jiquiriça is located in Bahia State and flows out into the Atlantic Ocean. The Brazilian Ministry of Water Resources and Legal Amazonia / Secretariat for Water Resources entrusted IOWater and the Intermunicipal Consortium of the Jiquiriça Valley (CIVJ) for the implementation of integrated water resources management in this river basin, for setting up possible basin structures (Committee of Water Users) and their technical tools (databases; GIS, etc.) and planning instruments (a Water Development and Management Scheme).

This approach allowed the **preparation of a methodological guide to set up a geographic information system.**

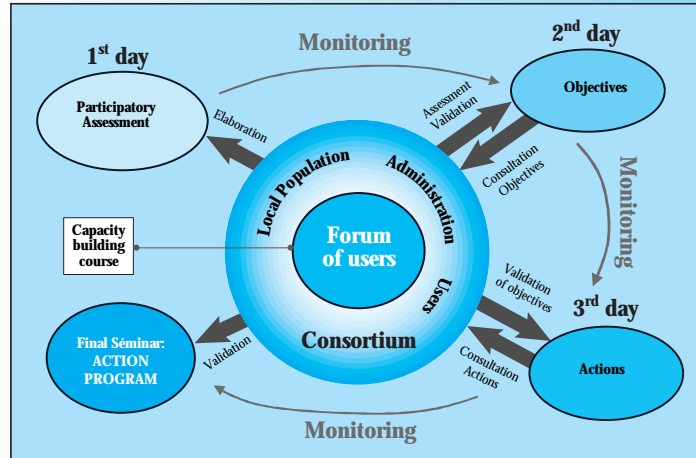
The Brazilian national water law of 8 January 1997 defines this system as a "system for gathering, processing, storing and retrieving information on water resources and on factors intervening in their management". Therefore the information system is **a tool for planning and land use**, a support for dialogue, for society's mobilization and communication.

Steps for setting up this Information System (IS)

As a prerequisite to the setting-up of this IS, IOWater proposed to the CIVJ the following methodology: definition of the information system objectives, creation of a working group which will assist the CIVJ with this approach (its composition may reflect the future Jiquiriça basin committee); definition of the system contents, definition and analysis of the kind of information to be collected, its availability, its format, the choice of the suitable and evolutive computerized tool and equipment, definition of the human and financial resources.

The CIVJ adopt a four-step approach to set the IS:

- ◆ Definition of the topics to be dealt with by the IS,
- ◆ Acquisition of information to establish an inventory and assessment of the Jiquiriça river basin, by carrying out:
 - an assessment of local participation by mobilizing the local population,
 - a bibliographical analysis of the existing documents,
 - a survey of the key stakeholders,
- ◆ Preparation of an action program and management measures, starting with the definition of management objectives



◆ Definition of reference indicators to allow the follow-up and evaluation of the actions concerned.

The IS should not be a cartographic document only, but a breakdown into 3 complementary and indivisible documents:

- ◆ **A report** with an analysis of the gathered information, proposals for improving access to information and for standardizing its format, the elements explaining the assessment, the objectives and actions needed for developing the Jiquiriça river basin,
- ◆ **A database**, with technical sheets for each analyzed document and information. It is the basis for the setting-up of a geographically-referenced information system,
- ◆ **A cartographic document** with a series of 10 topical maps illustrating the basin assessment, 5 to 6 maps providing a geographic view

of management and development objectives, 5 to 6 maps geographically displaying the measures to be taken and actions to be implemented.

In order to involve the Jiquiriça basin's key local stakeholders in the preparation of the information system, the CIVJ has initiated a program for the "society's mobilization". Three days of meetings, training, reflection will be organized to share and exchange knowledge of the river basin. They will be included in each step of the information system implementation.

The beginning of the information system implementation was based on this methodological guide. Led by CIVJ, it should be completed within six months or a year.

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MEXICO

LEGAL FRAMEWORK FOR WATER MANAGEMENT AND USE

The law which entered into force on 2 December 1992, reaffirms the principle of water use through concessions granted by the federal executive body via the National Water Commission. Its objectives are the following:

- Regulations on the use of national waters, their supply and control, the preservation of their quality to achieve sustainable development of the resource.
- Integrated water management in terms of quantity and quality.
- The river basin is the basic reference for any planning and water resources management process.

BETTER PREPARATION TO FACE WATER CHALLENGES IN THE 21ST CENTURY

Mexico reformed its water sector these last years to better face the water challenges that are foreseen in the 21st century.

Under the pressure of an ever-increasing demand for best quality water, the operators and service providers in the water supply, sanitation and wastewater treatment sectors, are trying to control leaks, better manage demands, the metering and billing of the really consumed waters, improve operation and preventive maintenance, and take measures to increase the effectiveness of the operation and management of services. The Mexican Training Center for Water Professions will open soon and allow the meeting of training needs of thousands technicians and workers, working in water-related systems.

At the federal level, the National Water Commission, recognized by Mexican law as the authority in this sector, prioritized its operational reorganization to create 13 Regional Directorates to facilitate water management at the level of basins and aquifers. The systems monitoring the parameters of the hydrological cycle and water quality are being modernized together with hydrometeorological information collection and processing systems. **A Public Register of Water Rights (REDA)** has been established.

The first step of the organization of Basin Councils and of their auxiliary bodies is ending this year. 25 Basin Councils, 7 Basin Commissions, 3 Basin

- Increased involvement of users.
- Establishment of a water market with concession authorizations.

The Law on National Waters integrates various instruments for adequate management of the resource. These instruments are **regulatory** (users' rights and obligations) **economic** (obligation to pay water use and the services provided by the National Water Commission and marketing of water rights) and **participatory** (involvement of the society).

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Committees and 32 Technical Committees for groundwater were created to improve institutional organization.

The Basin Councils will gradually assume a more active and prominent role in the formulation, follow-up and evaluation of plans for integrated water management at the level of river basins.

A Citizens' Movement for Water was created to acquire better behavior and raise the awareness of citizens on water issues and on its strategic significance for future development. It is a self-administered non governmental movement which is supported by a "Consultative Council" promoted by the President of the United States of Mexico and made up of important persons.

The challenges of the 21st century are very high and complex, as Mexico hosts a population of 100 million inhabitants that will grow in spite of the demographic growth rate slowing down of these last years. This means that huge efforts will have to be made in investment, institutions and organization for more effective and modern water management. Mexico is now prepared to successfully face water challenges.

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FAST MEXICAN PROGRESSES IN THE WATER SECTOR

In Mexico, the water sector is favorably changing by relying on two essential lines of action: **water management at the river basin level**, as the latter is the natural unit for the resource, and a **consensus with the users** regarding the actions to be carried out to secure continuity and success in implementing jointly agreed programs.

Within the decentralization process initiated by the National Water Commission in order to solve hydraulic problems at local level, agreements were signed between the country's States and municipalities so that they can build infrastructures and implement projects in this sector. As regards irrigation in

particular, 95% of the surface area of the 82 irrigated lands became under the responsibility of their users.

As concerns consensus with the users, planning meetings were organized in each of the 13 hydrological-administrative regions of the country to define the problems to be solved and find possible alternative solutions.

The results obtained with this participation process are presented to the Basin Councils which are the legal entities established by the National Water Law and its implementation to strengthen the involvement of users in water management and conservation.

WATER RESOURCES PLANNING

To achieve better water development and conservation in the country, the Secretariat for the Environment, Natural Resources and Fisheries, through the National Water Commission (CNA), is implementing a large evolution process to promote the involvement of users and water management at the river basin level, thus replacing the traditional management by federal bodies, as water is naturally distributed in the river basin.

The steps of this planning process are as follows:

- Definition of hydrological-administrative regions.
- Carrying out of regional water resources assessments.

- Formulation of strategies for water development in each region.
- Drawing up of regional hydraulic programs.
- Implementation of a process for monitoring and evaluating progresses and results of actions included in these regional hydraulic programs.
- Adequacy between the different regional hydraulic programs, taking account of successes and planned objectives.

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COCEF: TRANSBOUNDARY COOPERATION

The **Commission for Transboundary Ecological Cooperation (COCEF)**, a binational organization, was created, through agreements complementary to the Free Trade Treaty between Mexico and the United States, to identify, appraise and approve environmental infrastructure projects. It is a community participation process.

This bilateral cooperation is unique worldwide as it has created an organization which can identify the needs in a decentralized process involving communities.

COCEF established a Technical Assistance Program to allocate funds, on a grant basis, to support communities of the border region in planning and designing drinking water supply systems, wastewater treatment plants and solid wastes management and other projects devoted to the improvement of the environment in the region.

Among the successfully completed activities, the following should be emphasized:

- ➔ Approval of 40 projects during 23 public meetings of the Management Committee, 17 of

which were on the Mexican side and 23 on the United States side, amounting to an investment of US\$ 976 million.

- ➔ Approval of technical assistance, amounting to US\$ 17.14 million for 122 projects benefiting 95 communities.
- ➔ The carrying out, in partnership with the United States Environmental Protection Agency, the Southwest Center for Environmental Research Policy and the University of Texas, of a needs assessment which enabled the identification of gaps in infrastructures for drinking water supply, sanitation, wastewater treatment and municipal solid wastes management, estimated at US\$ 3,500 million.
- ➔ Regarding community participation, 45 public inquiry processes took place in 42 communities on both sides of the border. 45 citizens' committees were created.

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PANAMA

PROMOTION OF ENVIRONMENTAL EDUCATION AND MANAGEMENT

The government of Chiriqui Province started a close coordination with the National Authority for the Environment (ANAM) and the Ministry of Education to promote the development of programs for environmental management at the municipal level in the 13 districts and 81 municipalities which compose Chiriqui Province, one of the nine provinces of the country. This program aims at implementing the General Law on the Environment which requires the organization of consultative commissions on the environment at the national, provincial and district levels.

In order to implement environmental management at the municipal level, the provincial government issued an implementation decree which created an Environmental Study Department. Its objectives are the promoting of Municipal Directorates for Environmental Management in the various municipalities of the province, the establishing of an appro-

priate technical coordination to continuously know the status of the environment and ecology in the different communities, the promoting of the development of environmental programs: forestry, ecological tourism, agro-ecology with a sustainable development purpose.

This Department initiated at the same time, in coordination with the Regional Administration for the Environment, the Regional Directorate of Education, the Foundation for River Management and the private sector, an information campaign on the environment addressing schools: the Club for a New Vision of the Environment. A new project for environmental education is the creation of a Higher School of Biotechnology.

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CLIMATIC CHANGE AND SUSTAINABLE DEVELOPMENT IN URBAN AREAS

Several programs have been initiated in order to study this global change: the "World Climate Research Program (WCRP), the Global Atmospheric Research Program (GARP) and the International Geosphere Biosphere Program, a Study of Global Change (IGBP). These programs have played a major role in the attempt to unravel complex climatological events such as the El-Niño Southern Oscillation or define climate's sensitivity to the increase of the concentration of greenhouse gases in the atmosphere.

International cooperation and exchange of knowledge have received an increased amount of attention through various organizations such as the Intergovernmental Panel on Climate Change (IPCC) set up by the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP).

At the regional level in Latin America, an ongoing effort is coordinated by CATHALAC within the region of the Trade Convergence Climate Complex (TC3) to improve the knowledge of the complex mechanisms that originate and control climate processes in the humid tropics.

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All information related to INBO is available



on the WEB
www.iowater.org/inbo

PERU

ASSESSMENT OF GROUNDWATER RESOURCES IN THE LOWER CHANCAY-HUARAL BASIN

Peruvian coastal valleys suffer from water shortage during most of the year and complement their needs for irrigation water with groundwater. Faced with such a situation, the General Water and Soil Directorate of the National Institute for Natural Resources (INRENA) undertook an assessment of groundwater resources in 1996 in the various valleys.

This study aimed at determining groundwater availability by identifying its springs, defining the exploitable volume, the aquifer geometry and behavior, water quality and calculating the total reserves.

The method used and the work completed dealt with surface hydrology, geology, geomorphology, geophysical survey, inventory of groundwater springs, aquifer reserves, underground hydraulics, hydrochemistry, wells engineering and total reserves.

Among the results obtained, it should be noted that:

- ◆ the area includes 6 hydrogeological units, rocky outcrops, sediment deposits, sandy areas, recent marine deposits, etc.
- ◆ a total of 3,542 wells exist, 3,133 of which are operating, of which 97% are being used for domestic water supply.
- ◆ the aquifer is mainly formed with alluvial deposits. It is free

- with a depth varying between 2.00 m and 42.00 m.
- ◆ the hydraulic parameters obtained indicate that the aquifer has good hydraulic status and does not suffer from any interference problem.
- ◆ electric conductivity varies between 0.30 et 1.90 mmhos/cm (moderate mineralization). Calcium bicarbonate is the dominant chemical compound and water is classified as water of good to fair quality according to the boron contents.
- ◆ water potability is classified from good to poor.

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CATAMAYO-CHIRA BASIN: ACTIONS FOR SHARED MANAGEMENT

In 1995, the last conflict between Peru and Ecuador caused the loss of many lives and an economic disaster that cannot be quantified. The signing of the La Paz Agreement on 18 October 1998 ended half a century of painful disputes and paved the way to joint development.

The IRAGER of Piura (Peru), initiated, on 18 and 19 June 1999, a first binational technical meeting on the Catamayo-Chira basin, with the support of the Netherlands Fund for Cooperation and Development (SNV). It gathered many large public and private organizations, representatives from 24 institutions of both

countries, from international cooperation agencies and from the Public Works Directorate of the Spanish Ministry of the Environment to define actions for sustainable development of the binational Catamayo-Chira basin.

The meeting allowed the formulation of technical activities to improve the quality of life in the basin and the creation of a Binational Coordination Body (CCB) for their implementation.

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EUROPE FRANCE

RHONE-MEDITERRANEAN- CORSICA

REHABILITATION OF "THE OLD RHONE OF PIERRE-BENITE"



An overall framework for water policy regarding the old Rhône: the Rhône Action Plan...

The "Rhône Action Plan", approved in 1992, has been the key element in the formulation of the Master Plan for Water Development and Management for the Rhône valley.

It focused on the three main following assignments:

- ◆ recover high ecological quality;
- ◆ prevent any risk of accidental pollution of the river;
- ◆ recover a lively and flowing river.

... in which a re- markable project on an outstanding site was planned

The building in 1960 of Pierre Bénite hydroelectric infrastructures downstream of Lyons and of one of the largest concentration of chemical industries in France, diverted the river on about 10 km. Flow reduction in the natural bed of the Rhône (from 1,000 to 10 m³/s) and the sinking of the aquifer contributed to the disappearance of "lones" and wetlands.

A thought process which started at the beginning of the 1990s on "the Old Rhône of Pierre Bénite" led to the implementation of a rehabilitation project which is remarkable by its technical and scientific quality and by the outstanding part-

nership and the developers it involved.

The rehabilitation of the Old Rhône of Pierre Bénite included four kinds of project:

- increase in the minimum flow from 10 to 100 m³/s in the diverted Rhône;
- the rehabilitation of 3 "lones";
- the development of riparian spaces;
- the scientific follow-up of results and flow rate increase.

Work is now completed, flow rate in the Old Rhône increased and the scientific follow-up will continue during the 2000-2005 period.

... is the first step of a ten-year program for the rehabilitation of the Rhône



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SYNERGY OF STAKEHOLDERS

The project involved many partners; beside seven riparian communities that mobilized, it involved the Rhône General Council, Lyons city hall, the Rhône-Méditerranée-Corse Water Agency, the National Rhône Company (CNR) the Ministry of the Environment, the Rhône-Alps region and associations for environmental protection.

ADOUR-GARONNE

A PARTNERSHIP BETWEEN ELECTRICITY OF FRANCE ("EDF") AND THE WATER AGENCY

EDF being willing to actively participate in the collective management of water resources in the Adour-Garonne basin, an agreement was signed in 1991. It mainly concerns:

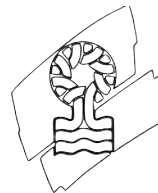
- general principles for adapting the equipment and management of some EDF hydroelectric infrastructures;
- conditions for making EDF technical and scientific skills available;
- creation of an EDF-Agency Joint Technical Group (JTG).

The first JTG assignment aimed at identifying the possible contribution of EDF regarding water resources.

Since 1996, the partnership between these two organizations has focused on the effective implementation of various hydropower-related measures provided for in the SDAGE:

- **Migratory fish passes**
- **Water releases from dams** and their potential impacts on water quality, the aquatic environment and other uses.
- **Water resources, management plan for low water flows and agreement for releasing water to sustain them**
- **Floating wastes** treatment which should be integrated into "Departmental Plans for Wastes Removal".
- **Limitation of effects of lockage water in sensitive periods**

The total water charges paid by EDF every year have amounted to about 40 million francs since the beginning of the 7th program.



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THE NEW EUROPEAN FRAMEWORK DIRECTIVE AND RIVER BASIN MANAGEMENT PLANS

The French Water Law of 1992 stipulates that a Master Plan for Water Development and Management (SDAGE) should be formulated for each river basin.

The Framework Directive on water policy in the European Union, coming into force in 2000, requires the adoption of a water management plan in each "basin district", even when shared by several states.

What are the similarities and differences between these two kinds of schemes?

They are both based on the principle that water is a **common heritage**, to which **integrated management** should be applied, taking the **river basin** as the implementation unit and involving **user participation**.

The Framework Directive is mainly focusing on a qualitative objective.

The SDAGES are assigned with an overall mission of good qualitative and quantitative management, which integrates concerns about meeting needs for use and those for the protection of the natural environment and sustainable development.

The European Directive requires the adoption of a management plan in each river basin to coordinate all decisions and actions made to achieve its objectives.

It should be formulated on the initiative of the district's "**relevant authority**" which will make the document available to the people" for them to express remarks before decisions are made.

The SDAGES provide **orientations and a framework** for future public actions.

They are prepared by **Basin Committees** and the State Administration relying, for each stage, on **geographical and topical working groups**, gathering representatives from users, contracting authorities, local authorities and Governmental administrations.

The SDAGES are designed with long-term provisions and orientations (**15-20 years**) while management plans for basin districts should be revised every **6 years**.



SEINE- NORMANDY

THE SEINE, PARIS AND COMPREHENSIVE WATER MANAGEMENT

Comprehensive water management is an old tradition in the Seine river basin. This can be explained by Paris belonging to this basin. Indeed, the Seine river basin has a specificity of having in its middle (the same distance from the river mouth and spring: 350 km) a town of prime importance which has had considerable influence, from a political, economic and cultural point of view, on the surrounding provinces since the Roman era.

The 118 members of the Basin Committee have replaced the four aldermen and the merchant Provost who regulated waterways traffic.

In our modern bodies, all stakeholders are working together. However, their purpose extended and democracy gained from it. To-day, a sole community is



not supervising the waterways trade, thus water quality, but joint basin bodies are dealing with quality issues among other things. In accordance with the

Water Law of 1992, the Master Plan for Water Development and Management (SDAGE) for the Seine-Normandy basin was approved on 20 Sep-

tember 1996 after four years of extended dialogue. It set out quality and quantity objectives to be complied with and the infrastructures to be built to achieve these objectives. In addition, the Board of Directors of the Water Agency and the Basin Committee have just unanimously approved the main lines of the 8th Action Program for the Seine-Normandy basin.

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FRENCH POLICY FOR FLOOD PREVENTION

France has been subject to spectacular floods at all times. These events seriously affected urban areas which have unwisely extended since the industrial revolution on the banks of watercourses around waterways-related infrastructures (ports, mills, plants).

In order to stop this trend and following floods repeated since September 1992, the government decided, on 24 January 1994, to strengthen public policy for the prevention of natural hazards, using regulatory tools and financial means (especially by implementing a multi-year program for the prevention of natural hazards, amounting to billions of francs).

The first priority is given to limiting the use of flood-prone areas for vulnerable activities and to the conservation of the storage capacity of these areas:

- ➔ forbid new constructions in the most exposed areas
- ➔ preserve flood plains
- ➔ forbid any embankment or new filling which would not



be justified by the protection of existing urban settlements.

The second priority is the modernization of monitoring and warning systems.

In order to monitor river changes, each Flood Warning Department receives from Météo-France special rainfall forecasts and from automatic tele-transmitting monitoring stations rainfall and water level measurements.

Finally, the State launched a program for the maintenance and rehabilitation of watercourses, complemented with aid for the protection of settlements.

The ten-year plan for the rehabilitation and maintenance of watercourses to be implemented should amount to 8.2 billion francs for the works financed by the State at an average rate of 25% for watercourses not belonging to the navigable waterways which are under the responsibility of the public "French Waterways" company.

Reflections started on the possibility of using an economic tool to help implementing the policy for the prevention of natural hazards.

Studies were carried out to examine the relevancy of the water charges

levied by Water Agencies on installations, infrastructures, works and activities that might worsen the damage caused by floods (changes in the water regime caused by dams, filling and use of flood plains, soil waterproofing).

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LOIRE-BRITTANY WATER AGENCY



EXAMPLE OF THE LOIRE RIVER BASIN

An effective strategy for flood control should be comprehensive and include a component focusing on forecast and prevention.

Although the water agencies' involvement in the direct protection of properties and people against floods seems still to be currently ruled out, a new action in prevention could nevertheless be considered, especially if new taxes brought new means.

Prevention includes the following topics:

- ◆ knowledge of hydraulic phenomena
- ◆ definition of a method for developing flood-prone areas
- ◆ maintenance and rehabilitation of the natural functioning of watercourses.

Knowledge is obviously the essential basis for any prevention policy. The understanding of high water flows formation, of their propagation and overflow localization enable the decision-makers and po-

pulations to be informed of possible floods and their serious consequences.

To reduce flood hazards, a lasting approach to diminishing the vulnerability of properties exposed in flood-prone areas should be prioritized. This abatement should rely on a social and economic approach and on a harmonious regulation of the way of life in flood-prone areas.

This policy has unquestionably no meaning if not accompanied by stringent measures to control urbanization in flood-prone areas.

To maintain or recover conditions benefiting the river hydraulic functioning is a challenge and its positive consequences may be more significant than the building of protection works.

These proposals are currently being discussed.

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EUROPE SPAIN

JUCAR HYDROGRAPHIC CONFEDERATION PLAN FOR FLOOD CONTROL ON THE JUCAR RIVER BANKS

The specific meteorological features of the Spanish Mediterranean coastline lead to extraordinary rainfall with great disproportion between usual and unusual river flows which causes floods to be extremely serious in the Jucar Hydrographic Confederation, especially on Valencia territory.

sive approach which implies that structural and non-structural measures are taken and that a strong coordination exists between the various administrations concerned. These different actions, structural or not, were integrated by the Ministry of the Environment through the Jucar Hydrogra-

- ◆ works for high water flow abatement,
- ◆ river development,
- ◆ hydrology-forestry rehabilitation,
- ◆ improvement of road drainage,
- ◆ cartography of flood hazards,

These proposals of the Ministry of the Environment for structural actions, amounting to 22,500 million pesetas, are complemented with local actions of the Generalitat Valenciana and urban drainage works, estimated at 6,000 million pesetas.

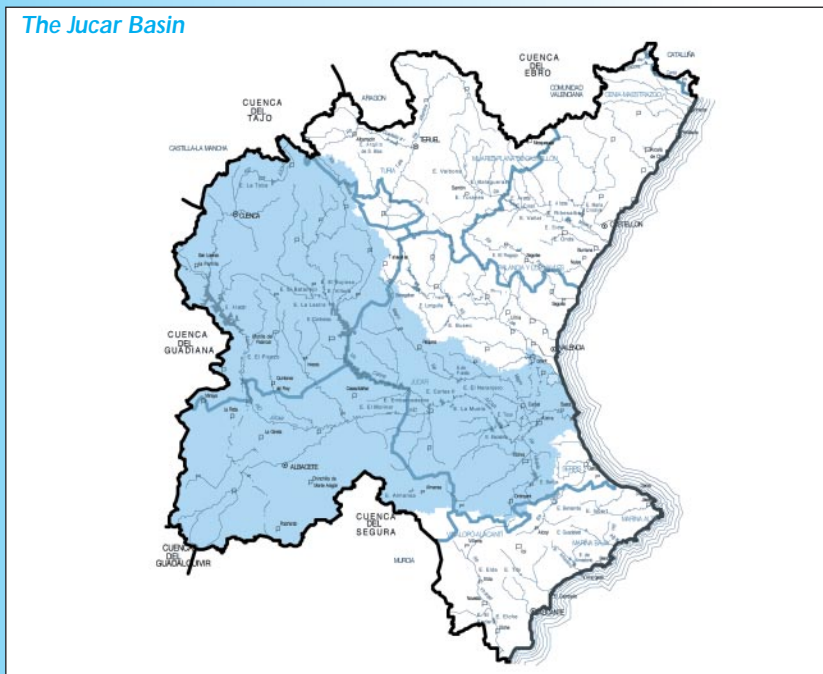
The overall plan also includes significant activities for hydrology and forest rehabilitation and the improvement of road drainage which should be defined and estimated by the administrations concerned.

These actions are also complemented with non-structural programs, based on the detailed mapping of flood hazards on a 1/2000 scale in the Jucar plain. This work aims at facilitating civil protection, regional planning and safety policy which will be carried out by the relevant administrations.

In particular, common maps made available by the local administration will allow a better development of municipal action plans for flood control which will be formulated in accordance with the Special Plan for flood control in Valencia district and the Directive for the planning of civil protection against flood hazards.

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The Jucar Basin



The State Administration's investments were significant and, to get an order of magnitude, the Plan for the South Valencia town can be referred to. It concerns the diversion of the Turia or of the Tous, Bellús and Escalona reservoirs on the Jucar. These proposals were presented after the floods of 1982 when 24,000 ha were flooded with damage estimated at 242,000 million pesetas (1998 value). However, the problem still remains in this area, as shown by the resolution of Valencia Court in 1998, requesting the formulation of a Plan for the Jucar High Waters.

From a technical and environmental point of view, any structural action in the Jucar basin is conditioned by the specific geomorphological layout of rivers in the coastal plain, with a high impact on coastal dunes which has to be taken into account in any action on rivers as the natural drainage system sustains large wetlands.

It is difficult to reduce flood hazards and their associated damage without a comprehen-

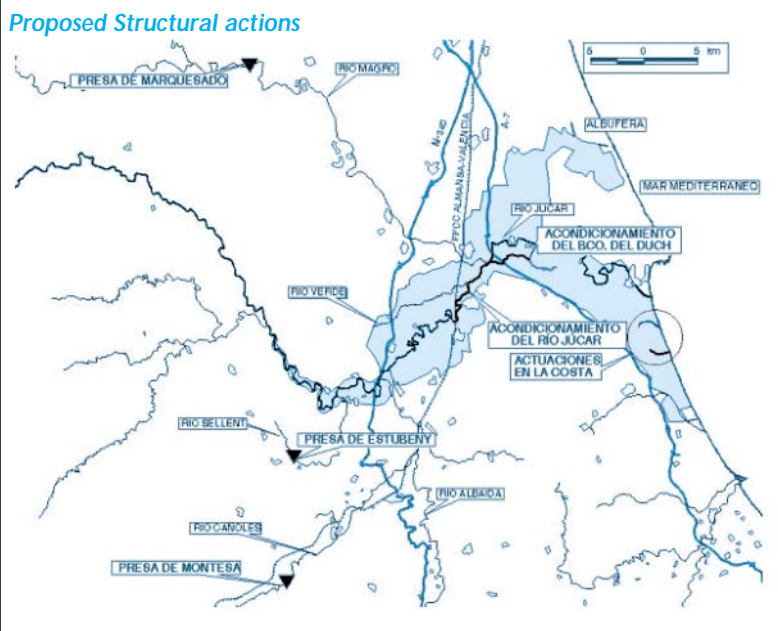
sive approach in the **Overall Plan for flood control on the Jucar river banks**. This plan whose formulation started in 1998 is now finalized. It is characterized by the citizens' participation in partnership with the Upper Bank and Lower Bank.

This participation process allowed the presentation of in-depth hydrological and hydraulic technical studies, undertaken by the Center for Hydrographic Studies of CEDEX, a research organization supervised by the Ministry for Development, with a large consensus on the final solution proposed.

This process defined a set of actions needed to achieve the protection objectives adopted in the overall plan. These actions are broken down into four structural and four non-structural programs:

located between the Carcaixent urban area and the crossroads with the A 7 highway. This action was complemented downstream with the improvement of the Jucar south bank drainage.

Proposed Structural actions



TAGUS HYDROGRAPHIC CONFEDERATION

THE SPANISH HYDRAULIC ORGANIZATION: THE HYDROGRAPHIC CONFEDERATIONS

The administrative structure of the Hydrographic Confederations distinguishes **administration entities** (Board of Directors and Presidency) from **management entities**, in a "participatory regime" for fulfilling the tasks which are entrusted to them (User Assembly, Commissions for Dam water release, Exploitation Committees and Infrastructures Committees) from a **planning entity** (the Basin Water Council).

During the last decades, the Hydrographic Confederations were very effective instruments for the public sector in planning and exploiting water resources. This model is suited to the geographical context of the country and is sufficiently flexible to be adapted to sub-basins to better develop and exploit the existing water resources.

GUADALQUIVIR HYDROGRAPHIC CONFEDERATION

AUTOMATED INFORMATION SYSTEMS FOR HYDROLOGY (SAIH) AND WATER QUALITY (SAICA)

The territory of the Guadalquivir Hydrographic Confederation covers 63.822 Km² and is crossed by the Guadalquivir (666 Km long). It hosts a population of 4.5 million inhabitants and includes towns such as Cordoba (300,000 inhabitants) and Seville (800,000 inhabitants) among others, and an irrigated area of 550,000 ha.

The regulating infrastructure is made up of 65 dam-reservoirs with a total capacity of 8,500 hm³, the main one being Iznajar (980 hm³) on the Genil river, tributary of the main river.

The SAIH objectives are:

- ➔ to automatically provide information in real time on climatic, hydrological parameters and on the status of the hydraulic works which are important to control the basin hydraulics,
- ➔ to make short-term forecasts on the evolution of water levels and flows and generate warnings to minimize damage caused by high waters and floods,

In the future, it will be necessary to strengthen the users' participation to broaden the democratic system, taking account of the interests of all parties concerned, ecological sector inclusive.

Finally, the basin system may lead to consider water as the heritage of a specific territory and loss of common cause may arise with the opposition to a water transfer not only between two different basins (cases of the Tagus-Segura, Ebro-Catalonia or Duero-Levant) but also at the level of sub-basins.

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- ➔ to control and optimize in the short term the operation of dams, canals and mains in the basin to meet demands and manage floods,
- ➔ to make medium-term forecasts on surface and ground water resources availability to optimize their sharing among the different uses: irrigation, water supply of populations, hydropower generation and minimal environmental requirements.

The system comprises 142 control points.

The SAICA continuously transmits information in real time on such parameters as pH, turbidity, temperature and dissolved oxygen. It comprises 14 control points on the main rivers.

In addition to detecting any anomaly, the system can also make samples to be analyzed later in a laboratory.

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SOUTHERN HYDROGRAPHIC CONFEDERATION

PUBLIC COMPANIES FOR HYDRAULIC DEVELOPMENT

This topic is fashionable and is being reviewed due to the socioeconomic and environmental problems arising, recognized in the Community legislation on sustainable development of water resources and respect of the environment.

To deal with all aspects related to this topic and all criteria of processes leading to changes is necessary.

The Framework Directive on water policy requires total recovery of water supply costs.

The Law 13/96 on fiscal, administrative and social measures has planned mechanisms for the financing and exploitation of hydraulic infrastructures which allow for the participation of users in the future development of hydraulic infrastructures in Spain.

The creation of public water companies for the Ebro (ACE-SA), the Southern Basin (ACUSUR), the Júcar (AJUSA), Hidroguadiana, the Segura, the Duero and Aquavir, shows the rise of a new legal and economic framework for the development of hydraulic works.

In such a context, this problem should be dealt with methodologically by breaking it up in six sub-topics concerning the most relevant aspects.

- 1 Assessing the demands, integrating environmental and socioeconomic issues should be done before building hydraulic works, by establishing procedures including environmental and socioeconomic issues and economic and performance evaluation in the decision making process.
- 2 The processes used for building hydraulic infrastructures should be revised to identify the advantages and disadvantages of public or private or mixed participation.
- 3 Public companies, users' participation and concession sub-contracting for the building and exploitation of hydraulic infrastructures belong to the 3rd sub-topic. It will deal with the identification of users, formulae for the recovery of investment costs and evolution of public subsidies for these works. The impact of the new terms imposed by market liberalization and globalization must be assessed.

Changes in the citizens' behavior regarding water considered as a scarce resource is one of the determining factors to be taken into account when formulating new policies.

- 4 The fourth topic concerns an analysis of the system used for managing hydraulic infrastructures. Availability of information, calculation in real time, new technologies used in hydraulic systems have an impact on planning, management and control of regulating systems.
- 5 The training of technicians to these new technologies and their use will change the management of hydraulic infrastructures and should be taken into account.
- 6 Safety of hydraulic infrastructures is the fifth topic to be dealt with. The formulation of regulations regarding risks and management policies to guarantee safety is needed.
- 7 Finally, the maintenance of hydraulic works should be dealt with by analyzing the advantages and disadvantages of their implementation by public or private companies. It could be interesting to study the latest experiences.

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HUNGARY

AN EXTRAORDINARY CHALLENGE FOR THE HUNGARIAN BASIN ORGANIZATIONS: THE HISTORIC FLOOD IN THE TISZA RIVER BASIN IN 2000

Since November 1998, Hungary and especially the Tisza River Basin have been afflicted by several disasters, caused by nature and man.

In 1999, an extreme protection against excess waters was running in the Great Hungarian Plain, while at the beginning of the year 2000 cyanide and heavy metal pollution overburdened the State bodies and the 5 river basin organizations in the Tisza valley to protect the population.

The flood wave of 3 April, which used to occur once in 500 years, threatened the entire Hungarian Great Plain and overloaded all protection works.

On 18 April, this was extended to the area which spreads up to the southern border of the country, further to the river mouth of the Hármas-Körös, thus the length was increased up to 1,614 km. However it was not only the height of waters



All flood records were beaten on that section of the Tisza which extends from Tiszabecs up to Mindszent, and on the total length of the Bodrog river, the water levels having exceeded the highest values ever measured. In Szolnok town the levels reached 1.32 m, (65 cm in 1999 and 67 cm in 2000). This situation worsened with cyanide pollution between 30 January and 10 February.

which was extraordinary but its duration too. In Szolnok flooding lasted 18 days.

The total cost of raising levees on 310 km and other protection works reached 13.2 billion HUF.

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WATER RESOURCES MANAGEMENT IN THE 21ST CENTURY

International Conference in Budapest, 1-3 June 2000

As a follow up of the II. World Water Conference, an international conference was held in Budapest with the goal of broadening knowledge and understanding of the existing water resources planning and management practices in different countries, the new water policy and planning system of the European Union.

Since this goal is very familiar to the INBO member organizations, maybe it will be useful if we try to give a short report on the Budapest conference which attracted an audience from 25 countries, mostly from Central and Eastern Europe. The main topics of the conference were as follows:

- New water policies with special reference to Europe
- River Basin Management Planning
- Implementation and harmonization of water directives and standards
- International framework for water management
- Management of extremes: Floods and droughts.

The importance of river basin management and water resources management was underlined by the Tunisian, Brazilian, Norwegian, Hungarian, Iranian and Ukrainian lecturers. This wide spectrum of lecturers shows the global interest expressed towards the basin as a natural unit for planning, managing and using water resources. In the lectures special regards were given to the implementation and harmonization of water directives expressing the importance of international cooperation in the field of water management.

The most interesting topic was the management of extremes. Altogether eight lectures dealt with the issues of floods and droughts. The catastrophic flood in the Tisza valley, the Rumanian and Hungarian flood management, the drought problems in Tunisia, Portugal, Bulgaria and Hungary were introduced and discussed.

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CZECH REPUBLIC

PROPOSED FLOOD PROTECTION MEASURES IN THE MORAVA RIVER BASIN

The Morava River is one of the largest tributaries of the Danube River. The Morava River Basin (22,000 km²) covers 26 percent of the Czech Republic and has a population of 2.7 million. The average annual rainfall is 635 mm and the mean annual runoff is estimated at 3,430 million m³.

The enormous flooding of July 1997 triggered discussions on the need for a flood protection system.

In partnership with Aquatis, Povodi Moravy presented its "Master plan of flood prevention measures in the River Morava drainage area" to the Ministry of Agriculture in May 1998. Experience drawn from the recent flooding concluded that a significant part of damage was concentrated in zones characterized by the inadequate capacity of infrastructures for storing, diverting or conveying water and of the water management system. A comparison of the different parts of the drainage area showed the positive role of existing storage reservoirs and storm water retention tanks. On the basis of this experience, the master plan proposed flood control measures for the affected parts of the Morava drainage area:

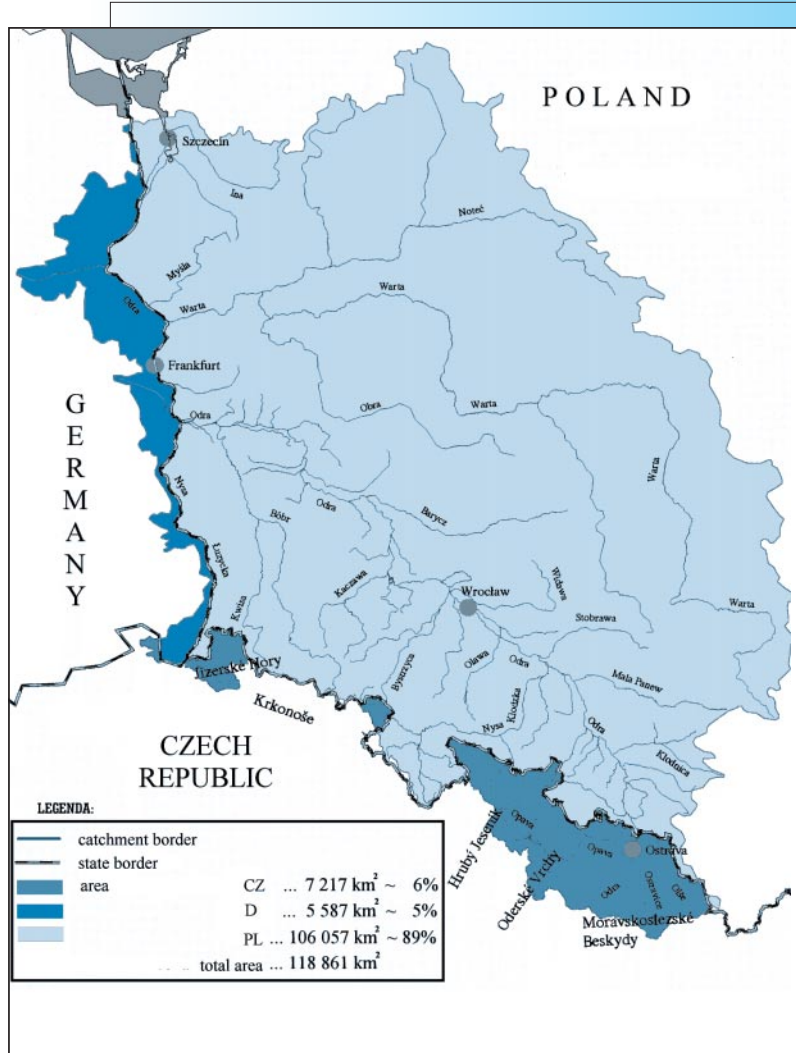
- flood control measures to protect settled areas or sites of special public interest; agricultural areas will not be protected;
- measures designed for the biggest flood observed,

- use of existing retention capabilities (natural flood areas, man-made storm water retention facilities);
- measures to extend the flood control systems already in place.

The first measures concern new storm water retention tanks, river bed modifications to increase retention capacity, the building of new dikes along residential areas. The measures proposed thus represent a synthesis of a number of previously prepared local documents and plans adjusted on the basis of the experience gained in the 1997 floods. The second set of measures deal with better land use.

A flood model was created to obtain an accurate description of the 1997 floods and used to establish different scenarios to illustrate the effect of variable floods.

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LATVIA IMPLEMENTATION OF INTEGRATED WATER MANAGEMENT

Latvia has launched a process to become a member of the European Union. **The EU Water Directives shall be transposed into the Latvian legislation before 2002.** The Ministry of Environmental Protection and Regional Development decided to start preparatory work for implementation of the European Water Framework Directive which will meet the possibilities to use a holistic integrated river basin approach in water management.

To demonstrate the possibilities of introducing integrated water management in Latvia, a **two-year Daugava River Basin Project** started in March 2000, based on an agreement between the Latvian Ministry of Environmental Protection and

Regional Development and the Swedish Environmental Protection Agency.

Daugava River is one of the biggest rivers in the Baltic Sea basin and the biggest in Latvia. Its catchment area covers 87,900 km² and is situated on territories of Russia, Byelorussia and Latvia. 28% of the total area are located in Latvia and cover 38% of the State's territory.

The Project is primarily a training and capacity building program for the Latvian water administration.

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POLAND

WATER MANAGEMENT IN POLAND

Poland belongs to the Baltic Sea basin, in which flow the two main Polish rivers: the Vistula and Odra, as well as several coastal rivers.

Seven regional Water Boards ("RZGW") were created in 1991, their responsibilities covering seven regions:

- **Gdansk** - basin of the Lower Vistula and eastern coastal rivers,
- **Warsaw** - basin of the Middle Vistula,
- **Cracow** - basin of the Upper Vistula,
- **Szczecin** - basin of the Lower Odra,
- **Poznan** - basin of the Warta, tributary of the Odra, constituting a particular hydrographic system,
- **Wroclaw** - basin of the Middle and Upper Odra,
- **Gliwice** - basins of the Upper Odra and Upper Vistula.

In April 1997, the new water law legally stipulated water management at the level of river basins and entrusted the water boards with a legal entity and increased their responsibilities.

On 1 January 2000, the Minister for the Environment entrusted the regional water boards with a new water management related task - the administration of watercourses be-

longing to the State and the undertaking of hydraulic works of national importance, formerly assumed by the Regional Directorates for Water Management.

In February 2000, the Minister for the Environment created the Water Management Board whose main task is coordinating the activities of all regional Water Boards.

The amendment of the Water Law plans for a new reform of the water management system. Among other things, it will ratify the Basin Committees of the regional Water Boards. They will be made up of representatives from the users and local governmental administrations. It is also planned that basin water exploitation becomes part of the water management plans drawn up for hydrographic basins.

In order to achieve sound management of water resources, it is planned to improve the financial aid and control systems. The dissemination of information by the regional boards and the Water Management Board will increase.

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FLOOD CONTROL IN THE UPPER VISTULA BASIN

The basin of the upper Vistula spreads, in its main part, within the area of three big physico-geographical units, i.e., the Carpathians, the Sub-Carpathian Basins and the Uplands of the Little Poland. This basin is an area with the greatest abundance of water in Poland (24% of its resources).

There are two types of overbank flows in this basin: flows caused by spring thaw and rainfall floods.

Many hydrotechnical and regulating structures were damaged by the flooding which occurred in September 1996. Not only the areas situated near the watercourses but also the areas which were affected by soil erosion caused by intensive runoff, were flooded and, in consequence, destroyed.

The extent and duration of the flood of 1997, caused by long-lasting unfavorable weather conditions also resulted from the technical condition of flood control infrastructures. As a consequence, hundreds kilometers of embankments and

many infrastructures were seriously damaged or completely destroyed.

On 23 December 1997, the Republic of Poland signed a credit agreement with the World Bank for the implementation of a flood control project.

This project includes three components:

- Urban and rural infrastructures,
- Protection against flood and risk reduction (planning, monitoring, analyses and warnings, investments and prevention program),
- Project administration and technical assistance.

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THE REGA RIVER BASIN MANAGEMENT

Szczecin Regional Water Management Board is under the obligation to formulate the conditions for the use of waters in the Rega river basin. This obligation arises from the Water Law of 1997 and from the Regulation No 38 issued by the Minister of Environmental Protection, Natural Resources and Forestry, on 1 February 1991, on the establishment of Regional Water Management Boards.

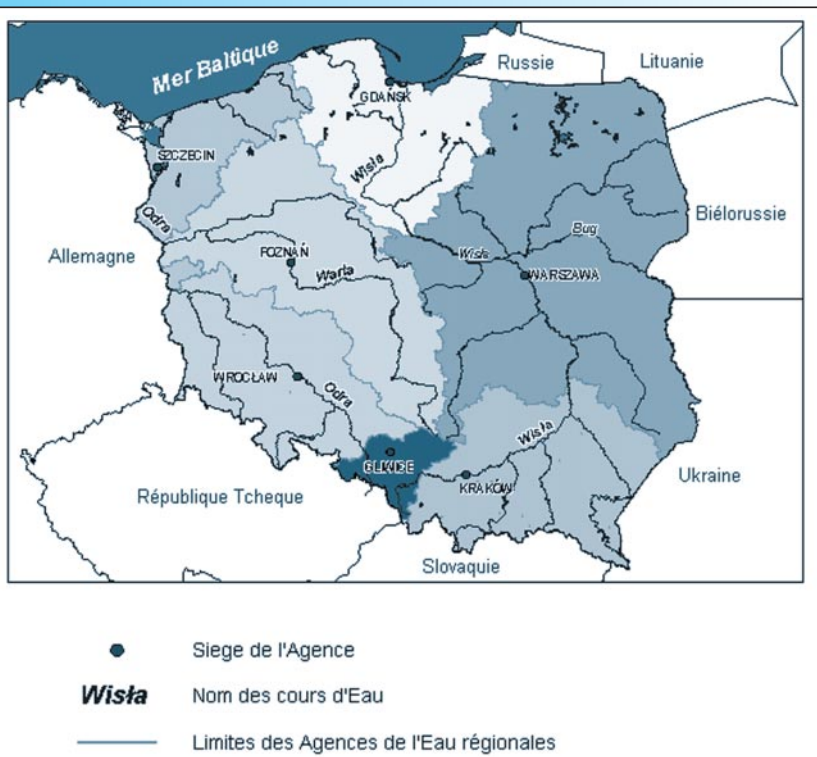
Those conditions should take into account:

- ◆ the basin water management balance,
- ◆ environmental protection requirements,
- ◆ land use management plans,
- ◆ approved hydrogeological documents,
- ◆ binding water permits,
- ◆ the basin's physico-spatial and economic characteristics.

The draft "Conditions" are a formal document of law. After consultations with territorial self-governmental parliaments, it is confirmed by the Ministry of Environment by means of a decree.

The essential part of the document is a set of limitations and permits arising from the assessment of water resources status, their use and the conception of future water resources management.

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ESTONIA

LAKE PEIPSI AND NARVA RIVER BASIN: THE ESTONIAN-RUSSIAN JOINT TRANSBOUNDARY WATER COMMISSION

Lake Peipsi is the fourth largest lake in Europe. Its surface area is 3,550 sq. km, with an average depth of 7 meters. Of the total lake surface area, 1,550 sq. km or 44% are located on Estonian territory; the remaining 56% on Russian territory. The Narva River connects Lake Peipsi with the Gulf of Finland and thus the Baltic Sea. Major environmental issues in the Narva River and Lake Peipsi basin are water eutrophication and management of the lake's fish resources.

In August 1997, the Estonian Republic and the Russian Federation signed an intergovernmental Agreement on the Protection and Sustainable Use of Transboundary Water Bodies. This Agreement deals with the transboundary waters of the Narva River basin, including Lake Peipsi. The agreement established a Joint Commission on Transboundary Waters for coordination of activities on implementation of the agreement.

The Commission organizes the exchange of data between the Parties in accordance with

the agreed monitoring program; defines priorities and programs of scientific studies on protection and sustainable use of transboundary waters; agrees on common quality indicators as well as methods for water analyses; coordinates the actions of the Parties in cases of extraordinary situations; facilitates cooperation between different agencies and organizations working in the field of sustainable development and protection of transboundary waters; and ensures publicity of discussions on issues related to the use and protection of these transboundary waters. Official Representatives to the Commission are: in Russia, Mr. Nikolai Mikheev, Deputy Minister, Russian Ministry for Natural Resources, and in Estonia, Mr. Sulev Vare, Secretary General, Estonian Ministry of the Environment.

Two Commission secretaries, representing environmental authorities in Estonia and Russia, coordinate activities on implementation of the transboundary water agreement. These activities are organized

into four Commission working groups: a working group on water protection, a working group on water management, a working group on monitoring and research, and a working group on cooperation with NGOs, local authorities and international organizations.

At its Second Meeting (24 November 1999, Krivsk, Russia), the Commission adopted a decision to start preparation of a complex river basin mana-

gement program that would be based on principles outlined in the EU Water Framework Directive.

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ROMANIA

PROTECTION AGAINST FLOODS : LEGISLATION, ACTION PLAN

The Governmental decree N° 47 / 1994, approved by the Law 124 / 1995, created the Governmental Commission for the Protection against Disasters which organizes and leads the protection activities concerned with 9 central sub-commissions, specialized by type of disaster: prevention, protection, action measures -in the short, medium and long terms- needed for limiting the harmful effects of disasters.

The Central Commission for the Protection against Floods is made up of representatives from the central administration, self-governing state companies and other economic

stakeholders involved and having responsibilities in this field, executives from higher education institutes and specialists of research institutes.

This Commission is chaired by the Minister for Water, Forestry and Environmental Protection.

Its main attributions are:

- ◆ the formulating of a national strategy for the protection against floods and participation in the formulation of a national strategy for the protection against disasters;

- ◆ following-up of international agreements on protection against floods;
- ◆ formulating draft regulations for the organization and operation of departmental commissions dealing with the protection against disasters as regards the aspects of the protection against floods,
- ◆ approving departmental plans for the protection against floods and plans for protection against floods at the river basin level,
- ◆ submitting, once a year or at various intervals, summary reports on floods,

measures taken and implementation of protection measures to the Governmental Commission for the Protection against Disasters;

- ◆ information of the public on the areas at risk, on the imminence of floods or dangerous meteorological phenomena and on the measures taken.

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BASIN COMMITTEES IN ROMANIA

Article 47 of the Water Law, number 107/1996, requires the setting-up of a Basin Committee for each river basin within the National "Apele Romane" Company.

Pilot Basin Committees were created for the Siret and Crisuri rivers to extend this experiment later on to other Basin Committees in Romania. The National "Apele Romane" Com-

pany benefited from the assistance and the logistics support of French specialists.

A National Workshop on "Basin Committees in Romania" took place in Bucharest in June 2000 to extend this experiment at the national level. The main conclusions were the following:

- need to set up Basin Committees in all large river basins, taking account of the experience gained by the Siret and Crisuri Pilot Basin Committees;
- improvement of economic mechanisms in the water resources sector to secure the total/partial financing needed for some water management infrastructures;
- increase of the Basin Committee's role to solve some water management issues, either general or transboundary.

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RUSSIA

THE VOLGA: PILOT BASIN FOR TRAINING AND INSTITUTIONAL REFORMS

In Russia, two projects are financed by the European Commission's TACIS program:

- **Strengthening of training capacities in the environment sector in the Volga river basin.** European consortium enabled Russian trainers to learn about the management of water resources and water supply utilities during a study tour in France in December 1999. They met people from Water Agencies, development companies, private water suppliers, etc. These first Russian trainers will then be in charge of training other instructors so that they can teach technicians and specialists in the Volga river basin to meet their training needs.

- **Improvement in water resources management in the Russian Federation.** This project, started in February 2000, should provide the basis for the institutional reforms necessary for implementing water resources management directly inspired from the European models.

Gathered in a consortium, BCEOM, project leader, VER-Seau and IOWater have a two-year deadline to complete this project which will also take the Volga and more particularly its tributary, the Oka, as a testing zone for pilot implementation.



Seminar for a presentation of the TACIS-Russian project, namely "Water Management in Russia"



UKRAINE

THE YOUJNY BUG BASIN COMMITTEE

By alternating between training and assessment missions in the Ukraine and a seminar in France held with the support of the Rhone-Mediterranean-Corsica Water Agency, this program, after a first phase aiming to raise awareness among the executives of the Ministry for Environmental Protection and Nuclear Safety as well as local representatives from communities and industry, consists of a **pilot project for integrated water resources management in the Youjny Bug Basin (Southern Bug)**. This project is funded by the European Commission's TACIS program and the French Ministry for Foreign Affairs.

Three seminars were held in the basin's main towns: Khmel'nitsky, Vinnitza, Nikolaiev. They gathered the stakeholders of future water management: Vodokanals, Industrialists, Representatives from Local and National Assemblies and specialists from the local and national administrations of the Ministry of the Environment. These meetings which gathered more than 150 people, allowed the operational use of the large principles which govern modern river basin management.

Following this training phase, legal advisers of the Ministry of the Environment together with representatives from the Ministers' Cabinet and National Assembly, drew up the draft regulatory texts needed for the setting-up of the Youjny Bug basin committee. This text was submitted to the Ministers' Cabinet at the beginning of year 2000.

The project duration, limited to 1 year, did not allow for establishing the means needed by the Basin Committee to operate.

The Ministry for Environmental Protection and Nuclear Safety is studying the possibility of an additional component to the project.

INTERNATIONAL BASIN OF THE BUG, LATORICA AND UZH RIVERS: MONITORING WATER QUALITY

This project, financed by the European Union's TACIS program and amounting to 2 million Euros, started in January 1999.

The objective of the Ministry of Ecology and Natural Resources is **to implement the European Directives relative to the management of transboundary rivers and especially water quality monitoring in the Western Bug, Uzh and Latorica basins** in order to supply, in the long-term, the border region with good quality water compatible with downstream uses and needs.

Many experts' missions took place to assess the existing situation and propose institutional changes.

The "data management" component is one of the main actions. Several experts' missions were carried out, and a computer scientist from IOWater was seconded in Kiev for a 13-month duration.

The main objectives were:

- to develop and make an information system operational in the pilot basins to allow water-related data collection and processing;
- to contribute to the development of a national information system in the Ukraine and the establishment of procedures for the international exchange of data.

An Access/MapInfo application is now installed in three regional directorates of the Ukrainian Ministry of Ecology. This multilingual application (English and Ukrainian) allows queries and the updating of the collected data relative to:

- the administrative framework,
- the bodies of water,
- the monitoring stations,
- water quantity (water levels, flow) and quality.

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MANAGEMENT OF EUROPEAN SHARED RIVERS

FRENCH WATER ACADEMY

RIVER BASIN MANAGEMENT: THE CASE OF SHARED WATERS



The Water Academy had already studied the management of shared waters which poses real problems nowadays. A study carried out on this topic examined five transboundary river basins: **the Rhine, Lemán Lake, the Iberian rivers, the Oder and Senegal**, as well as existing international treaties and conventions which govern shared waters. Its objective was to provide references to the countries which wish to start negotiations on the sharing of waters by setting-up an "International Basin Commission".

The proposals which resulted from this preliminary study and which form an "Advisory Charter" to be used by international basin commissions, were already presented to the General Assembly of the International Network of Basin Organizations (INBO) held in December 1998 in Bahia. INBO had then envisaged to promote the creation of an "Association of International Basin Commissions".

The Academy took up this study as its study to widen its bases. It was encouraged in doing this by the warm welcome received by its study from INBO, then in March 2000 from The Hague Forum.

The present study will be broken down in two documents:

- An analysis of 11 new transboundary basins: **the Danube, Nile, SADC, Parana, Rio Grande, Great Lakes and the Saint Laurent, the Euphrates and Tigris, the Aral Sea, the Mekong, Ganga and Brahmaputra.**
- The second will present proposals for effective management of transboundary waters.

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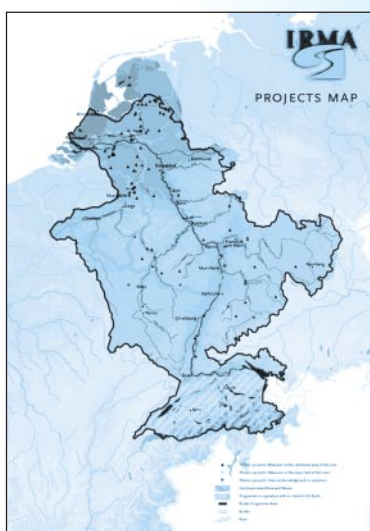
IRMA

A TRANSNATIONAL APPROACH TO FLOOD PREVENTION IN WESTERN EUROPE

The IRMA program (Interreg Rhine Meuse Activities) was established after the severe flooding of the rivers Rhine and Meuse in 1993 and 1995. In order to increase safety and public awareness along the rivers Rhine and Meuse and their major tributaries, and to reduce the chance of flooding and the corresponding damage and loss in the future, the countries in the catchment area of the two rivers - Belgium, France, Germany, Luxembourg and the Netherlands - submitted a joint flood control program to the European Commission within the framework of the INTERREG-IIC initiative. Switzerland also participates in the program.

The IRMA program provides EU financing for flood control projects that satisfy the initial program objectives and are being carried out within the catchment areas of the rivers Rhine and Meuse. At the end of 1999, a total of 153 projects had been approved by the IRMA Steering Committee, which is made up of representatives of all

the member states involved. The total sum in EU funding available for these projects is 141 million euros, to be disbursed before the end of 2001. The IRMA program covers a total eligible investment of approximately 420 million euros (EU funding plus national co-financing) in flood prevention and spatial planning within the period 1997 - 2001.



The individual projects were evaluated on their **transnationality**, their **integrated and innovative character**, and their ability to fit within the initial IRMA objectives.

The principles of the IRMA program can be summarized as the interaction between **spatial planning** and **flood prevention** within a **transnational river basin approach**.

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RELATIONS BETWEEN EQUITABLE PARTICIPATION AND INTEGRATED MANAGEMENT OF INTERNATIONAL WATERCOURSES

Sound management of international watercourses is one of the most complex and worrying issues, as water is vital to sustain life, economic development and the conservation of ecosystems. In addition, the existence of water is related to the existence of living beings and any threat to watercourses threatens us.

This management should be comprehensive, taking account of all technical, economic, legal and social aspects related to the environment. This integrated management of international watercourses applies the principle of participa-

tion and equitable and rational use of their water.

The economic and social requirements of States are criteria without any defined limits as those requirements are unlimited, especially regarding the population expectations which are increasing instead of decreasing.

The doctrine has confirmed the principles of common cause, equitable participation and optimal use. The work undertaken by international organizations such as UNO, mainly FAO, and non-governmental organizations, which apply the integrated management principle, also confirm them.

A CONFERENCE ON MAJOR EUROPEAN RIVERS

The Rhone-Mediterranean-Corsica Water Agency decided to organize an international conference entitled:

"Scientists and decision makers: acting together for sustainable management of our river systems" - 6, 7 and 8 June 2001 in Lyons (France).

Large European rivers, among which is the Rhone, will serve as examples for this conference which will be based on a limited number of common topics forming the subject of specific workshops devoted to:

- floods and use of the alluvial areas,
- qualitative management of water resources and use,
- use of the rivers and physical rehabilitation of the environment,
- activities in the catchment area and water quality.

The various papers, discussions and exchanges will deal with the necessity and the means of integrating science's contribution to the creation of a sustainable form of management of the major river systems, and will attempt to provide some concrete proposals.

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THE MEDITERRANEAN ALGERIA

THE WATER AGENCIES ADVANCE SLOWLY ... BUT SURELY

During the last six months, the organization of the water sector was deeply changed:

- Water resources management (production, use, exploitation) was entrusted to a sole department at ministerial level, **the Ministry of Water Resources**;
- **Four national water authorities** were set up (drinking water supply, dams, irrigation and sanitation).

The organization of the technical departments of the central administration of the new ministry is inspired, for consistency purpose, from the four technical structures of national authorities (mobilization, drinking water supply, sanitation, irrigation).

Within such a context, which is a real structural change, how are **the five Basin Agencies, created in 1996**, going to evolve and position themselves?

Without anticipating on the results of the reflection work under way and on the decisions which will be made by the higher authorities in the Ministry of Water Resources, it may be possible to affirm that:

- the water agencies' database is going to be strengthened;
- the agencies' financial security for its public service will be better ensured;
- its task of controlling the implementation of regulations, especially regarding pollu-

tion control, will also be reinforced (implementation of the Water Code).

The five basin agencies are currently making efforts on:

- 1 **Water data collection and classification.**
- 2 **The permanent awareness raising of water stakeholders** to obtain their gradual and convinced approval of this new entity.
- 3 **Training:** as integrated management is new in Algeria, the training of engineers is prioritized in the new water policy.

In 1999, the agencies benefited from a short training pro-

gram, mainly focusing on the agencies' action strategy and water databases. Twenty engineers benefited from this training program.

As regards the 2000-2002 period, a short training program and courses were defined with a total immersion in the French Water Agencies.

This program is executed within the framework of Algerian-French cooperation.

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JORDAN

A WATER MANAGEMENT INFORMATION SYSTEM IN THE JORDAN VALLEY

The Water Management Information System (WMIS) is designed to optimize water management in the Jordan Valley, by providing all involved with the relevant information and decision support tools. The system consists of a dynamic database, where all relevant information related to water management is gathered, and application modules, which process the information and provide decision support.

WMIS Database

It is made up of:

- **A Static Database** with data related to hydraulic infrastructures and general water management policy.
- **The Historical Database** contains field measurements.
- **A Water Management Database.**

WMIS Application Modules

Three modules cover the activities of water management strategy: monthly forecasts of flow rates in rivers and wadis, balance of water resources with water demand for the coming months, performances of water management.

Two application modules cover **drinking water supply.**

Six application modules cover **water distribution:** irrigation scheduling program, billing and accounting program, statistics of water consumption for irrigation...

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MOROCCO

THE SETTING-UP OF BASIN AGENCIES

The economic and social development plans, implemented in Morocco, give first priority to the water sector, thus allowing all urban areas access to drinking water, the irrigation of a million hectares by end of 1997 and hydropower generation of more than 2000 GWH/year on the average.

The extent of investment in the hydraulic sector is such that it exceeds the State budget capabilities. **It emphasizes the problem of recovering the raw water cost, the pricing of water services (drinking water supply, irrigation, energy) and the respective contribution of the State and users.**

The Law 10-95 on water has already partly integrated these concerns and introduced water charges, based on the "user-pays" and "polluter-pays" principles. These charges will be used to finance actions such as inventory, assessment,

planning, mobilization, water management and usual maintenance of hydraulic works.

The water agencies therefore are the adequate framework for the users to gradually bear the water cost, involving the administration, local communities and the water users themselves, with a view to achieve a common cause and participatory management of water at the level of a river basin.

After the effective setting-up of **the Oum Er Bia Basin Agency** in July 1999, the following timetable is proposed for the other agencies: Agencies of Sebou, Tensift, Bouregred and Moulouya (2000), Northern Agency (2001), Souss Massa Agency (2002) and the South-Atlas Agency (2003).

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