Capacity building for better water management

Organization of water management in France

International Office for Water

Contents

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Introduction

Abundant worldwide, but overexploited and polluted by human activities, water has become **a fragile good,** both in quantity and in quality. If in developed countries, water pollution by domestic and industrial wastewater is better and better controlled, agricultural pollution remains alarming.

As regards the quantitative aspects, the sharing of water resources between uses is becoming necessary more than ever, in the developed countries and elsewhere.

In the developing countries, the populations suffer, above all, from the lack of safe water and from serious microbiological contaminations: water remains **the first cause of mortality** in the world with 4 million deaths per year according to WHO.

According to the 2008 follow-up report of the WHO-UNICEF joint monitoring program, about one billion people in the world have no access to drinking water and more than 2 billion people have no adequate sanitation. One of the **Millennium Development Goals** consists in reducing by 50% the percentage of people without access to drinking water and suited sanitation (as compared to 1990) before 2015.

Insofar as climate change will worsen these situations, **good water management is, more than ever, one of the conditions for sustainable human development.**

Water management must meet **several fundamental challenges:**

- allowing everyone to have access to drinking water and wastewater treatment;
- preserving water resources and aquatic environments;
- preventing permanent and accidental pollution;
- preventing and managing floods and droughts, fighting against erosion;
- ensuring agro-food production, while limiting the impacts of agriculture on the environment and resources;
- allowing the sustainable development of industry, energy production, recreational activities, tourism and inland waterways transport.

These stakes often compete and the problems cannot be solved in a sectoral manner. A cross-sectoral approach is necessary: **it is integrated water resources management (IWRM).** The geographical reality of water must be taken into account, **at river basin level.**

This means **defining an adapted institutional and legal organization:** regulations, administrative organization, agreements and partnerships, management and action plans, financing, controls, monitoring of the environments, etc.

That also implies **the mobilization of significant resources:**

- **financial resources:** to modernize existing plants, create new developments and infrastructures, establish monitoring and analyses networks, ensuring the operation, maintenance and renewal of these infrastructures;
- **human resources:** to organize institutions, to manage services and ensure the operation and maintenance of installations, to raise the decision-makers' awareness, to inform the populations, to train men.

The French experience and its positive results can inspire the public authorities of other countries, although the organization must obviously be adapted to each local situation.

The objective of this document is to present the organization of water management in France:

- **French water policy and its overall organization.**
- **Large developments and water control.**
- **Public drinking water supply and sanitation utilities.**

Introduction

French administrative organization

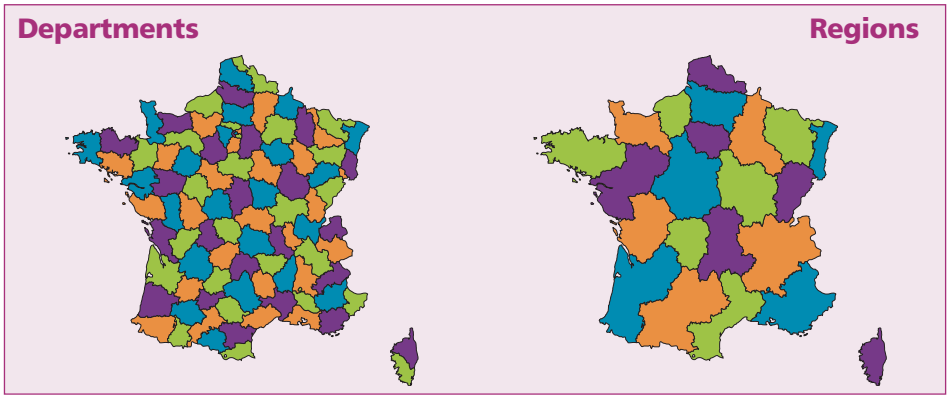
France has three levels of local authorities: Municipalities, Departments, Regions.

The Municipalities

The Municipality is the smallest administrative subdivision. It is managed by a city council elected by direct universal vote every 6 years. The city counselors elect the Mayor among them. The Mayor is the chief executive of the Municipality: he/she manages the budget, is the employer of the municipal staff, is responsible of the community (schools, town planning, social action, road system, school transport, household waste collection, sanitation, etc.). France is characterized by a very high number of Municipalities: 36,783 (data 2008). More and more often, they regroup in inter-municipality cooperation bodies to share their resources. In the field of water, the Municipalities are responsible for the management of public drinking water supply and sanitation utilities. They can also contribute to contractual actions for the management of water resources and aquatic environments (river contract for example) and to planning actions (sub-basin management plans).

The Departments

The Department is managed by the Departemental Council. The Departemental Counselors, elected for 6 years by universal vote, elect their President. The President of the Departemental Council is the chief executive of the Department: he/she prepares and carries out the deliberations of the Departemental Council, manages the budget and staff. The Department has broad responsibilities: social action, building and maintenance of high schools, land consolidation, organization of school transport, etc. France is subdivided in 101 departments (including 5 overseas). In the field of water, the Departments have a role in rural development, through financial assistance to the development of drinking water supply and sanitation systems. They can also intervene in the protection of natural environments. A service of technical assistance to the Municipalities was created in each Departemental Council.



The Regions

The most recent structure of French local government, the Region has become an autonomous local community with the Decentralization Laws of 1982. The regional counselors are elected for 6 years by universal vote. They elect the President of the Regional Council. The latter manages the budget and staff and applies the regional policy, focused on economic action, regional planning and vocational training. There are 26 regions, including 4 overseas. In the field of water, the regions can orientate the decisions through planning (regional planning and development plan), through financial assistance (State/Regional Planning Contract), or through the creation of regional natural reserves. The regions take part in water management institutions (Basin Committee, Board of Directors of the Water Agency, Local Water Commissions) and contribute in the application of the planning documents and contractual steps.

The State Government

France is a democratic parliamentary State founded on the separation of powers:

- the executive power is shared between the President of the Republic and the Prime Minister and his Government;
- the legislative power is executed by the Parliament made up of 2 chambers: the National Assembly and the Senate;
- the judicial power is ensured by the judiciary, which is independent from the two other powers.

In the field of water, policy is coordinated by the Ministry in charge of Ecology and the various aspects are dealt with by an inter-ministerial body, the Inter-Ministerial Mission for Water.

France has a deconcentrated (local-level decisions are made by the deconcentrated services of the State, closer to the local situation) and decentralized organization (many responsibilities were transferred from the State towards the local authorities).

"Deconcentration"

The central Government is located in Paris, but the State government is deconcentrated at the departmental and regional level, with a representative: the Prefect. The Departmental Prefects and the Regional Prefects are the only State authorities in the territories which they manage. The Prefect represents the Prime Minister and each Minister. He/she is locally the chief of all the deconcentrated services of the State. He/she is responsible for law and order, the organization of the various elections, and emergency relief in case of disasters. He/she is guaranteeing law enforcement and has a role of adviser and support to the local authorities. With regard to regional planning, he/she is a negotiator of the development contracts which are signed by the State government and the Regions.

In the field of water, the Prefect of the Region where the basin committee has its home office is appointed "Basin Coordinator Prefect"and is responsible for coordinating the State services. He/she approves the Master Plan for Water Development and Management drafted by the Basin Committee and adopts the corresponding Program of Measures.

"Decentralization"

The State transferred some responsibilities to the Municipalities, Departments and Regions, which became autonomous communities, from a legal and financial viewpoint.

French water policy and its overall organization

Legislative bases and fundamental principles

The building of the French water policy: more than 45 years of experience

Although some bases of the water policy go back to the 16th century, the current organization relies on a law of 1964, which was supplemented and modernized later on.

The Law of 16 December 1964 organized water management at the level of river basins. It states three essential principles, which are now recognized but which were innovating at that time: decentralized management at the level of the large river basins, concerted management, incentive financial tools. For organizing dialogue and the sharing of responsibilities, an advisory body (the Basin Committee) and an executive organization (the Water Agency) were created in each large river basin.

The Law of 29 June 1984, called "Law on Fishing", organized fishing in freshwater and fish-farming management. With this law, taking into account the aquatic environment strongly progressed. It introduced the obligation of "reserved flow", i.e. a flow considered as ecological minimal flow, which is imposed to the dam managers, in order to guarantee the functioning of the aquatic ecosystems located downstream of the dams.

The Law of 3 January 1992, called "Water Law", laid down the principles of true integrated water management: patrimonial nature of water (water is the "common heritage of the Nation"), management balanced between the various water uses, overall management of water in all its forms (surface, ground, marine, coastal water), conservation of aquatic ecosystems and wetlands, use of water as an economic resource, priority given to drinking water supply. This law developed planning instruments on a basin scale: the SDAGE (Master Plan for Water Development and Management) for large basins, the SAGE (Water Development and Management Scheme) for sub-basins.

The European Water Framework Directive (WFD) of 23 October 2000, establishing a framework for Community action in the field of water policy, gave overall consistency to a well developed European legislation (about thirty directives and regulations since the 1970s). This directive sets out common objectives, timetable and working method for the 27 Member States of the European Union. It starts with a very significant preamble: "Water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such".

The Law of 21 April 2004 transposed the WFD into French law.

The Law on water and aquatic environments of 30 December 2006 renovated the whole water policy. Its objectives are: to provide the means for achieving the goals of the WFD, to improve the conditions of access to water, to give more transparency to the operation of water utilities, and to renew the organization of fishing in freshwater. It also brought two major advances: recognition of the right to water for everyone and taking into account the adapting to climate change in water resources management. It reformed the financing system of the Water Agencies and created the new National Agency for Water and Aquatic Environments (ONEMA).

(Note: The laws concerning water utilities are detailed in page 29).

Implementation of the European Water Framework Directive (WFD)

The European directive 2000/60/EC of 23 October 2000 defines a strategic framework for water policy for the 27 Member States of the European Union. It has extended to all Europe the principles of basin management developed in France for more than 45 years.

Objectives

The WFD sets out an obligation of results: achieving before 2015 a good overall status of all waters: surface, ground and coastal waters. Extensions of timescales or less stringent objectives are possible, but they must be justified and submitted to public consultation. An adapted objective (good ecological potential) can be retained for heavily modified water bodies from the point of view of hydromorphology.

The WFD requires improving water chemical quality by reversing the trend to the deterioration of groundwater quality and by reducing the discharge of priority substances into surface waters. The discharges must be eliminated before 2020 for the substances classified as "priority dangerous substances". A first list of 33 substances was adopted including metals, pesticides and hydrocarbons.

Means

River basin management and objectives for each water body: river basin districts, sets of river basins, must be identified, including at the international level. A "competent authority" must be designated for each district. The laying down of objectives and actions to be undertaken is done at the level of a new basic unit which is the "water body".

Planning and programming: for each district, planning relies on 3 key stages to be renewed every 6 years: characterization, Management Plan and Program of Measures. The state of district, or "characterization of the district", accounts for the various water uses and their impacts on the water status.

French water policy and its overall organization

The characterization is also accompanied by a register of the protected areas being subject to special protections (drinking water abstraction areas, bathing areas, conservation of natural habitats, etc.). The Member States must set up networks for monitoring water status. They must also carry out an intercalibration of the methods for evaluating water status, which must allow comparing the quality of the aquatic environments in the entire European Union. A "river basin management plan", adopted at the end of 2009, must define the objectives to be reached in 2015. It is supplemented by a "Program of Measures" which defines the necessary actions to be initiated and their deadlines. These measures can be of a legal, financial or contractual nature. They are identified for each river basin district, according to the encountered problems.

The cost recovery principle and economic analyses: The directive requires accounting for the methods used for pricing water and the application of the principle of recovery of the costs of water services. This means also integrating environmental costs, taking into account the application of the polluter-pays principle. The contributions of the various economic sectors are to be identified, by distinguishing households, industry and agriculture. Incentive water pricing must be established before the end of 2010.

Map of the European river basin districts

The directive gives a significant place to the economic analysis: characterization, justification of exemptions from achieving the objectives, optimization of the choice of investments, pricing.

Public consultation: The directive increases the transparency of water policy and requires an active participation of the water stakeholders and the public in the development of the management plan. It defines 3 obligatory consultation periods: 2006 for the work program, 2007 for the identification of the main problems and 2008 for the Management Plan.

Transposition into French law: The directive enlarges the French water management principles at the European level: management at river basin level, participation of the water stakeholders, planning on a basin (SDAGE) and sub-basin scale (SAGE). However, adaptations were needed because the directive goes further on some points: objectives of result for all the aquatic environments, the taking into account of the socioeconomic aspects, the drafting of a Program of Measures, public participation in planning.

The large French river basins became districts according to the European definition, with some reorganization to take the international districts into account. The competent authority for each district is the Basin Coordinator Prefect. The Basin Committees were entrusted with the revision of the SDAGEs to integrate the environmental objectives of "good status" and to transform them into management plans. Each revised SDAGE was supplemented by a Program of Measures. France organized a 1st consultation in 2004 on district characterization and a 2nd consultation took place in 2008 and 2009 on the Management Plans and Programs of Measures. The monitoring network and the system for evaluating water quality were supplemented.

France plays an important role in the European Common Implementation Strategy (CIS) for the implementation of the Framework Directive, coordinated by the European Commission. It participates in several working groups and actively contributes in the production of the European methodological guidance documents.

Definition and coordination of water policy

The Ministry responsible for water policy is the Ministry of Ecology, Energy, Sustainable Development and the Sea.

This Ministry results from the fusion of several ministries in 2007. This fusion was justified by the interdependence of the issues and the need for a completely cross-sectoral and decompartmentalized approach. Today, this Ministry concentrates ecology, transport, energy, habitats, the sea, etc. It is a new approach not used up to now in Europe and is now followed up by other countries. The action of the Ministry is thus organized around five major issues: resources, lands and habitats; energy and climate; risk prevention; infrastructures, transport and the sea; sustainable development.

The Ministry of Ecology relies on three local relay levels:

1. **at the level of river basins:** the Basin Coordinator Prefect coordinates the actions of the various State services in the field of water;
2. **at the regional level (26 regions):** the Regional Directorate for Environment (DIREN); this Directorate will combine with the Regional Directorate for Industry and the Regional Directorate for Public Works in a new cross-sectoral body, the Regional Directorate for Environment, Development and Housing (DREAL) to reinforce the regional action of the State in sustainable development; the timetable of these services fusions is spread out over 2009, 2010 and 2011;
3. **at the departmental level (101 departments):** various services of the State apply water policy with its regulatory and technical aspects, through "water policing"; let us quote in particular the Departmental Directorates for Public Works and Agriculture (DDEA).

Website:

www.developpement-durable.gouv.fr

French water policy and its overall organization

The Ministry in charge of Ecology lays down and coordinates water policy. It operates the secretariat of the Inter-ministerial Mission for Water which gathers all the ministries concerned under the authority of the Prime Minister. For example:

- **The Ministry for Health** is in charge of public health protection for the various uses: drinking water, mineral water, recreational water, bathing water in particular, rainwater use, re-use of treated wastewater, etc. For this purpose, it drafts the legislative and regulatory texts and defines the standards to be complied with, within the framework of European law. Its deconcentrated services, the departmental directorates and regional directorates for health and social affairs, are in charge of controlling compliance with these regulations.
- **The Ministry in charge of Agriculture** is concerned with the needs of the agricultural sector (irrigation, storage reservoirs, etc.) and by its qualitative and quantitative impacts on water and the ecosystems.

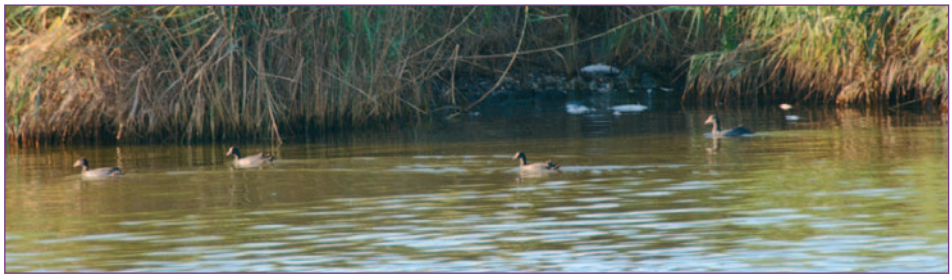
The Ministry in charge of Ecology relies on the National Agency for Water and Aquatic Environments (ONEMA), national organization responsible for knowledge and monitoring of the status of water and aquatic environments.

This public body was created by the Law on Water and Aquatic Environments of 30 December 2006. It carries out, in particular, the assignments of the former Higher Council for Fisheries.

ONEMA is organized on 3 levels: a General Directorate at the national level, interregional delegations and departmental services. Its budget comes from contributions of the Water Agencies.

ONEMA has 4 great assignments:

1. **development of knowledge on water systems:** ONEMA orientates research programs;
2. **information on water resources, aquatic environments and their uses:** ONEMA manages the national Water Information System (WIS);



3. **control of water uses:** the State entrusts part of its water policing responsibilities to ONEMA whose departmental teams control the compliance with regulations and note infringements;
4. **local action:** ONEMA organizes the diagnosis of the status of water and aquatic environments, participates in the planning of local water policies (SDAGE, SAGE, monitoring programs), provides technical support to water management activities in the territories, for example for the restoration of aquatic environments or the conservation of fish species.

ONEMA
Office national de l'eau et des milieux aquatiques

Website: www.onema.fr

Basic principles of water management in France

Today, water management relies on six important basic principles:

1. **Decentralized management at the level of river basins:** The French water policy is defined and coordinated at the national level but is decentralized at the level of the large river basins. It takes into account the geographical reality of the resources because "water knows no administrative boundary";
2. **An integrated approach:** This integrated approach allows taking into account all the water uses, the needs of the aquatic ecosystems, pollution prevention and the control of natural and accidental hazards;
3. **Organization of the dialogue and coordination of actions:** It is the role of the Basin Committees and Basin Coordinator Prefects;
4. **Mobilization of specific financial resources:** "water must pay for water", pursuant to the polluter-pays and user-pays principle; it is the vocation of the Water Agencies to levy specific taxes;
5. A multiyear planning and programming:
   - planning which defines the objectives and priorities for action in the Master Plans for Water Development and Management (SDAGE) at the level of river basins and the Water Development and Management Schemes (SAGE) on a sub-basin scale;
   - programming of investments in a multiyear financing program established by each Water Agency (at the level of the large river basins) and possibly at the local level within river contracts (at the level of a river or a tributary);
6. **A clear distribution of responsibilities between public authorities and private operators for the management of municipal drinking water supply and sanitation utilities:** in France, drinking water supply and sanitation utilities are public services decentralized at the level of municipalities, which are responsible for the choice of the management method, either direct, or delegated management. In the case of delegated management by a private operator, the obligations of both partners are clearly governed by law and are defined in a contract.

French water policy and its overall organization

Integrated water resources management at river basin level

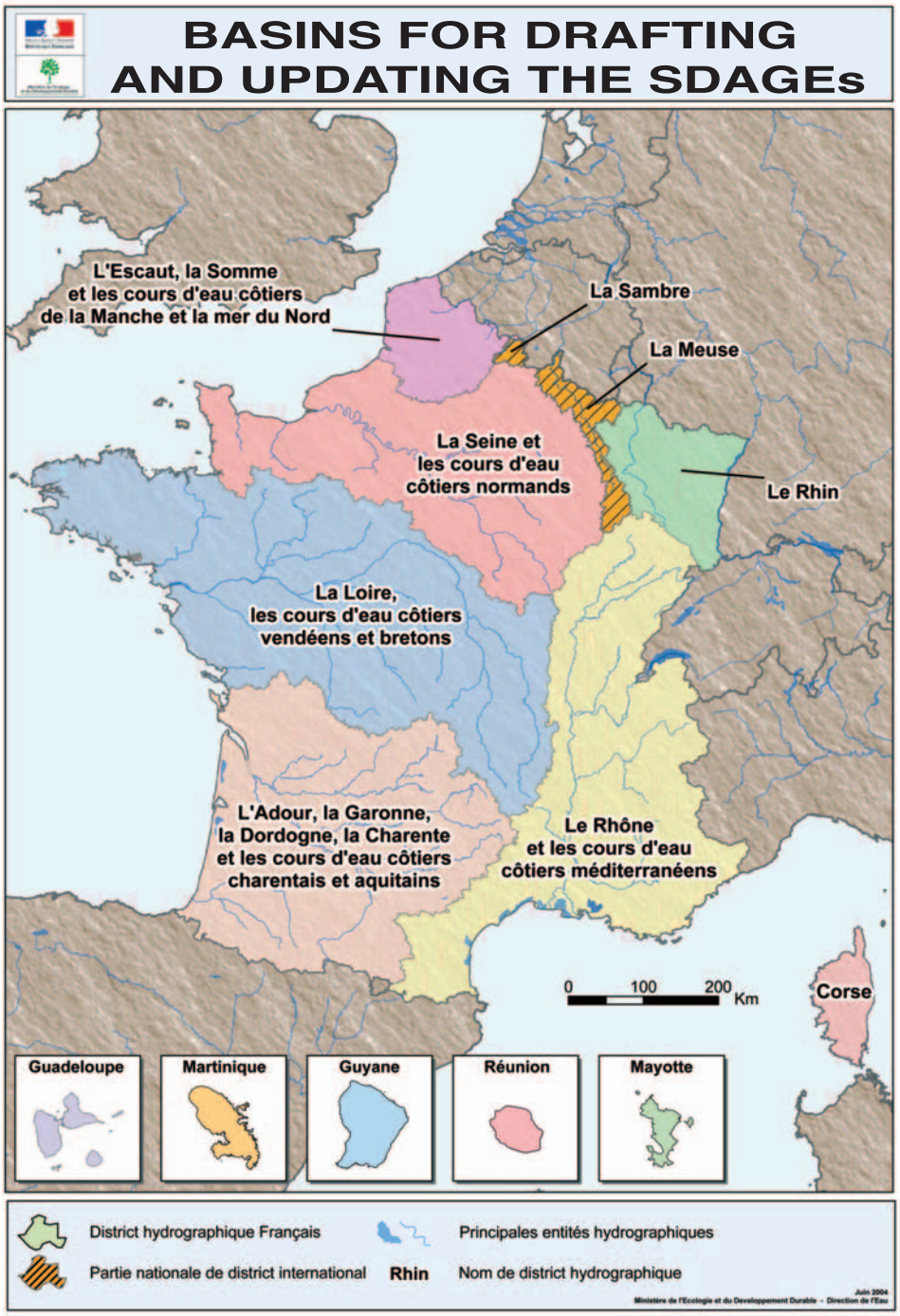
The basic unit for water management is the river basin. **Integrated Water Resources Management (IWRM) at the level of river basins allows a coordinated approach:**

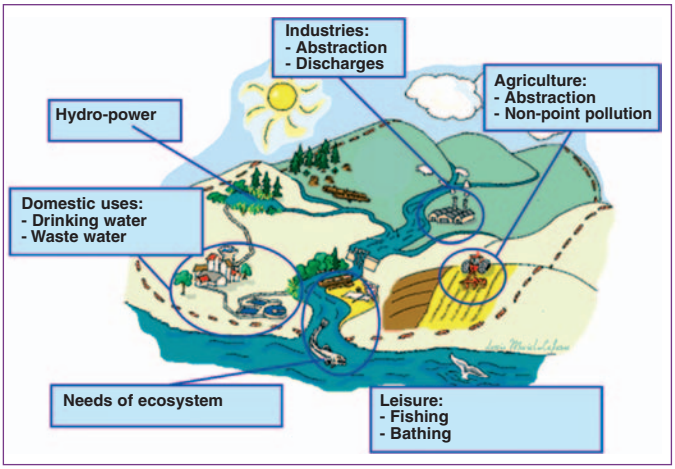
- between upstream and downstream;
- between quantity and quality;
- between surface and ground waters;
- between the needs linked to human activities and the needs of the ecosystems;
- between the risk prevention policies regarding erosion, floods and droughts.

There are **13 "river basin districts"** in accordance with the European Water Framework Directive (WFD).

For continental France:

- "Adour, Garonne, Dordogne, Charente, Charente and Aquitaine coastal rivers" district;
- "Scheldt, Somme, the Channel coastal rivers, North Sea" district;
- "Loire, Vendée and Brittany coastal rivers" district;
- Rhine district;
- Meuse and Sambre district;
- "Rhone and Mediterranean coastal rivers" district;
- Corsica district;
- "Seine and Normandy coastal rivers" district.





Taking into account all the water uses on a river basin scale

For overseas:

- Guadeloupe;
- Guyana;
- Martinique;
- Reunion;
- Mayotte.

France shares international rivers and lakes with neighbouring countries: the Rhine, the Meuse, the Scheldt, the Moselle, the Leman Lake, etc.

French water policy and its overall organization

Concerted planning involving all the users

The Governmental Administration (the State) decides of the water policy, but the latter is prepared and implemented in a concerted manner between all the water stakeholders: the State, local authorities and various categories of users.

Concerted planning is institutionalized at three levels:

At national level

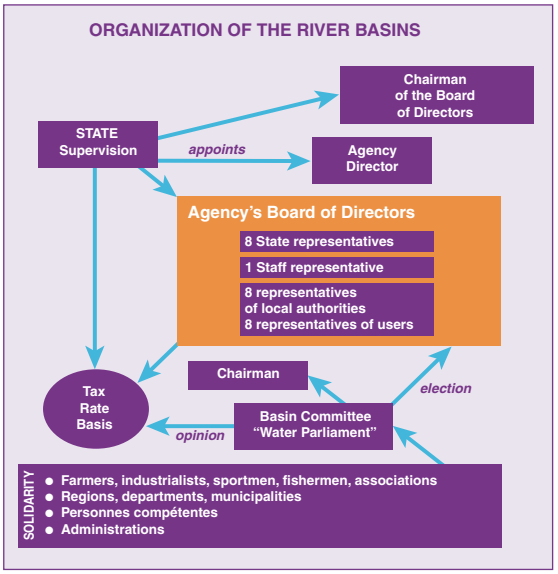
The National Water Committee is chaired by a Member of Parliament nominated by the Prime Minister. It gathers representatives of the users, associations, local authorities and governmental administrations, as well as qualified people and the presidents of Basin Committees. It is consulted on the orientations of the national water policy. It gives advice on the draft legal texts (laws, decrees), on reforms and draft governmental action plans.

The National Water Committee was created in 1964. Its assignments were widened by the Law of 30 December 2006: creation of a Consultative Committee to give advice on the water price and the quality of public water supply and sanitation utilities, creation of a committee for fishing, creation of a committee concerned with the water information system.

The number of its members was increased to adapt it to the evolution of the stakes and to its new missions: new ministries became members and the representation of some categories of users was increased.

At the level of each large river basin

The River Basin Committee is chaired by a local elected official. It is made up of representatives from local authorities (40%), users and associations (40%) and the State (20%). The system of basin committees aims at ensuring stakeholders' coordination and representativeness. All the users are represented: industrialists, large regional developers, farmers, fishermen and fish farmers, tourism, nautical activities, electricity producers, water suppliers, etc.



The Basin Committee orientates the water policy priorities in the basin. It prepares **the Master Plan for Water Development and Management (SDAGE)** which is then approved by the State.

The SDAGE is a planning document: it gives the overall orientations of water management in the basin and the objectives to be reached. The SDAGE is also a legal framework for public policies: any administrative decision concerning water management (local regulations, programs for financial assistance, town planning documents) must be compatible or be made compatible with the SDAGE.

The first SDAGEs were carried out pursuant to the Later Law of 1992 and go back to 1996. Each SDAGE was revised to become the "Management Plan" required by the European Water Framework Directive (WFD).

The Basin Committee follows up the SDAGE implementation. It also gives the main orientations for the Water Agency. In particular, the Basin Committee proposes an amount for the taxes levied by the Water Agency and votes the multiyear action plan of the Water Agency (priorities, methods for financial assistance) which finances the SDAGE implementation.

In accordance with the WFD, the SDAGE is from now on accompanied by **a Program of Measures** which distributes the means (regulatory, financial) and the actions (water policing, infrastructures, communication, awareness campaigns, education, pilot projects, contracts, experience sharing) allowing achieving the objectives of good water status in 2015. The Program of Measures is drafted by the State after advice from the Basin Committee.

At the level of tributaries, sub-basins or aquifers

A Local Water Commission can be set up to prepare **a Water Development and Management Scheme (SAGE),** local adaptation of the SDAGE. It is composed by one half of representatives of local authorities, by one quarter of users' representatives and by one quarter of State representatives.

The Water Development and Management Scheme (SAGE) is a planning document which has an administrative and legal status. When the SAGE is approved, the decisions made in the field of water by the administrative authorities in the area concerned must be compatible, or made compatible, with the SAGE. This legal status does not only concern the administration but also private individuals.

Composition of River Basin Committees in continental France	Group of local authorities				Group of users and specialists	Group of governmental administrations	Total of members
	Regions	Departments	Municipalities	Total			
Adour-Garonne	6	20	28	54	54	27	135
Artois-Picardy	3	12	17	32	32	16	80
Loire-Brittany	8	29	39	76	76	38	190
Rhine-Meuse	3	16	21	40	40	20	100
Rhone-Mediterranean	5	27	34	66	66	33	165
Seine-Normandy	7	29	38	74	74	37	185

French water policy and its overall organization

The SAGE lays down the objectives to be reached (water uses, quantitative and qualitative protection of water resources and aquatic ecosystems, conservation of wetlands, etc.). The SAGE plans various types of actions adapted to local stakes: peoples' information and education, river maintenance and development, drinking water supply, control of rain water, defense against floods, pollution control, surface and groundwater protection, restoration of ecosystems and wetlands, etc.

To implement the actions planned by the SAGE, the Local Water Commission can rely on **a Local Public Basin Establishment (EPTB)** or on any other group of communities. Indeed, for the municipalities concerned, the fact of regrouping in an inter-municipal body has the advantage of having a legal entity and of sharing financial resources to undertake studies or work on a sub-basin scale.

Contractual steps are also taken to plan and finance actions: should they concern a river, an aquifer or a bay, these steps are called **"river contracts",** "aquifer contracts" or "bay contracts".

As regards all these local tools for integrated water management, consult the "GEST'EAU" website, a reference website developed by the International Office for Water with ONEMA assistance:

www.gesteau.eaufrance.fr

Water policing: a governmental responsibility for compliance with regulations

Facilities, infrastructures, work or activities, which can have an impact on health, safety, water resources and aquatic ecosystems, are regulated by what is called **"water police"** in France. The term of "water police" covers two aspects: a special administrative mode and a tool for controlling compliance with regulations.

It is an administrative mode which requires **either a mere declaration or an administrative authorization,** according to the characteristics of the project and the limits laid down by ministerial decrees.

The decisions are made locally by the Prefect, representative of the Governmental Administration (State) in the Department.

Water intake on a lake-reservoir

When an authorization is needed, the decision to grant it or not is made after an investigation for assessing the potential impacts of the project and consulting the population concerned. The authorization is granted for a defined duration, it is not final. It can be withdrawn or modified with a stricter purpose, without allowance, should there be a risk for public health (drinking water), safety (floods) or aquatic environments.

For example, concerning an authorization for abstraction, the prefect's decree must:

- define one or several abstraction quantities according to the source and the hydrological context;
- take into account the abstraction quantity as compared to the other uses;
- comply with the provisions of the SDAGE and SAGE;
- impose the measurement of abstracted flows;
- set provisions for the building and maintenance of water intakes;
- set provisions to avoid contact between the different aquifers during drillings.

Several departmental administrations are often concerned (agriculture, town planning, health, industry, environment, etc.).

France organized coordination of these administrations within **the "Inter-Services Mission for Water" (MISE).** This unique water body allows jointly examining documents, making decisions faster in a coordinated way, taking into account all the aspects of the project and all the stakes (health standards, town planning rules, vulnerability of the ecosystems, etc.).

The MISE is under the authority of the Departmental Prefect. This device can apply to any kind of project which can affect surface and ground waters: hydropower infrastructure, river development, gravel extraction, water abstraction, wastewater discharge, opening of a landfill, building of an industrial plant, etc.

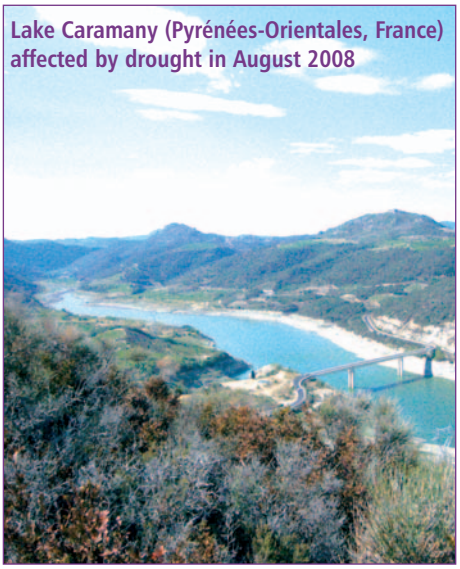
This organization allows different administrations to work together and **leave sectoral logics behind**. The decision is made in compliance with the national regulations but is adapted to local stakes. It takes into account the objectives of the SDAGE and SAGE, should there be one. It takes risks into account according to the human activities concerned (for example, proximity of an intake for drinking water supply or a bathing area).

A reorganization of the State services started in 2008 and will also support coordination, insofar as several types of services will combine at the departmental level and regional level.

French water policy and its overall organization

Coordination was also organized between the Department and the river basin district. The Prefect of the area, where the Basin Committee has its home office, coordinates the State policy for water policing and water resources management. This Prefect is called **"Basin Coordinator Prefect".** This coordination allows consistency of State actions between the Regions and Departments concerned and the homogeneous implementation of the SDAGE in the entire river basin.

The Basin Coordinator Prefect has the means needed for crisis management in particular. He can take measures for limiting or stopping water uses to deal with accidents, floods, droughts or water scarcity. The decisions of restriction are made after dialogue with the users.



Lake Caramany (Pyrénées-Orientales, France) affected by drought in August 2008

The ONEMA agents control compliance with regulations. They make an official report when there is infringement. Sanctions are defined; they are usually administrative sanctions (obligation of completing work for compliance with the standards or closing down of the facility for example). In some cases, penal sanctions are necessary; the official report is then transmitted to the court and the judge can inflict a penalty, either financial or a sentence of imprisonment for the most serious cases.

The "Polluter-Pays" principle and Water Agencies

The Water Law of 1964 created a **Water Agency** in each large metropolitan river basin.

It is an administrative public body of the State, under the double supervision of the Ministry of Ecology and the Ministry of Finance.

In the Overseas Departments (DOM), this task is carried out by the **"Water Offices",** created more recently by the Overseas Orientation Law of 13 December 2000.

The Water Agencies and Water Offices are financially autonomous as they have their own financial resources. Their field for action covers surface water, groundwater, coastal water and territorial waters at sea.

Organization and assignments of the Water Agencies

The Water Agency is managed by a Board of Directors composed of representatives from local authorities, from the various categories of users, from the State, and from the Agency staff. The Chairman of the Board of Directors and the Director of the Agency are appointed by the Government.

The Water Agency has a highly qualified permanent staff from 100 to 200 people per agency to carry out its assignments.

The Water Agency has two levers for action:

1. **an environmental taxation:** water taxes levied on water abstractions and the emission of pollutants, which are incentives;
2. **financial assistance:** redistribution of the funds, collected from the water users of the basin, to support studies and mainly investments.

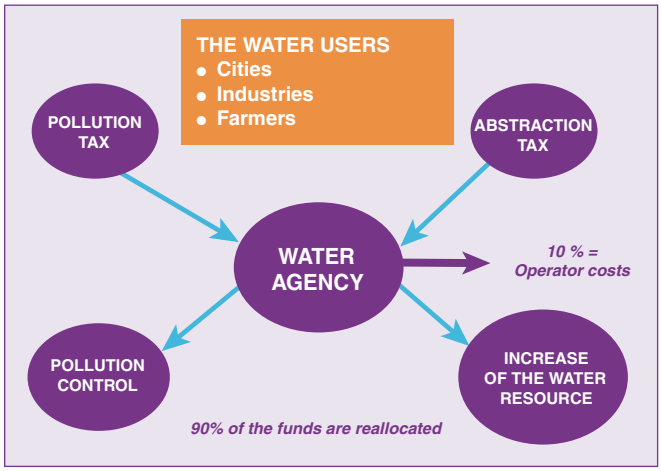
The Water Agencies contribute in investments and help with the correct operation of installations with financial incentives for local contracting authorities and accompany them in the sub-basin management plans steps and river contracts.

They sign master agreements with the Regions, Departments, communities of municipalities and Local Public Basin Establishments (EPTB). The action of the Water Agencies allows strengthening collaboration and dialogue between all the local stakeholders. They have also **a task of public information and awareness:** they manage a documentation service available to the public, disseminate information documents and provide financial support for the actions of information on the river basins (financing the organizers of rivers for example). They organize the public consultations planned by the European Water Framework Directive.

A budget fed by environmental taxation: the water taxes

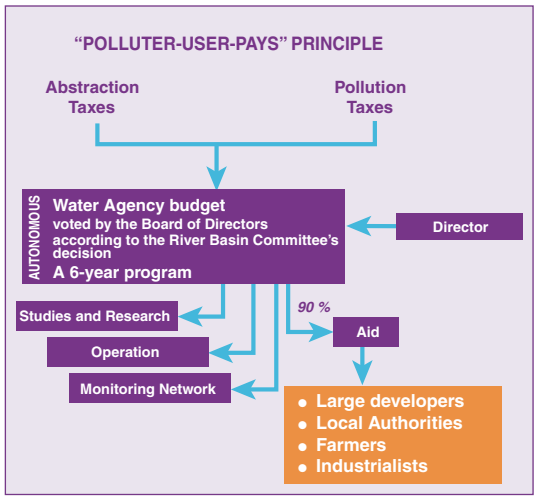
The budget of the Water Agencies is based on **the application of the "polluter-pays"** and "user-pays" principles. The Water Agencies levy taxes on water abstractions and discharges from all the users who affect water quality or modify the water regime.

They are **taxes assigned to water:** not only are they levied on activities having an impact on water resources, but also the product of these taxes is allocated to actions for water resources conservation. It is the **"water pays for water" principle.**



Sources and uses of the funds of the Water Agencies

French water policy and its overall organization



Since the Law of 30 December 2006, the Water Agencies have levied **7 different taxes** according to the user's pressure on the water resource:

- water pollution tax,
- tax for modernization of the wastewater drainage systems,
- tax on non-point agricultural pollution,
- water abstraction tax,
- tax for water storage in low flow periods,
- tax on obstacle on rivers,
- tax for the protection of aquatic environments.

The aim of these taxes is to **integrate environmental cost,** with an incentive for the water users to support the cost related to their emission of pollutants or their abstraction from the water resource. The tax rate is modulated according to the uses and to the fragility of the environment.

Thus, the objective of the "abstraction tax" is to promote water saving. The amount of the tax depends on the volumes of water abstracted during the year. The rate is modulated according to the water use (irrigation, drinking water, industrial cooling, feeding of a canal, etc.) and according to water resource scarcity (abstraction from a balanced or unbalanced zone).

As regards the "pollution tax", it aims at preserving water quality. It depends on the discharged pollution. For industrial uses, the tax is calculated from the net annual pollution discharged into the natural environment and according to various pollution parameters: suspended solids (SS), chemical oxygen demand (COD), biological oxygen demand (BOD5), reduced nitrogen (RN), toxic metals (metox), etc. Tax calculation is based on a regular follow-up of the discharges. For domestic uses, the tax is calculated for each municipality according to the permanent and seasonal populations and levied through the drinking water bill paid by the user according to the consumed volume measured by the meter. For agricultural uses, a new tax ("tax on agricultural non-point pollution") has been paid since 1st January 2008 by all the distributors of phytosanitary products according to the quantity of dangerous or toxic substances contained in the marketed products.

The tax rate is defined at the national level by the Parliament. The rate is then precisely calculated and modulated by the Basin Committee according to the priorities and local qualitative objectives given in the SDAGE and SAGEs.

These taxes are redistributed through the Action Plan of each Water Agency.

Redistribution of the funds collected from the water users

The Water Agency **supports the investments** made by the municipalities, industrialists, farmers or other water users to preserve the water resource and to improve the performances of the treatment plants. It also **supports scientific and economic studies,** as well as actions for awareness, facilitation and information in the river basins.

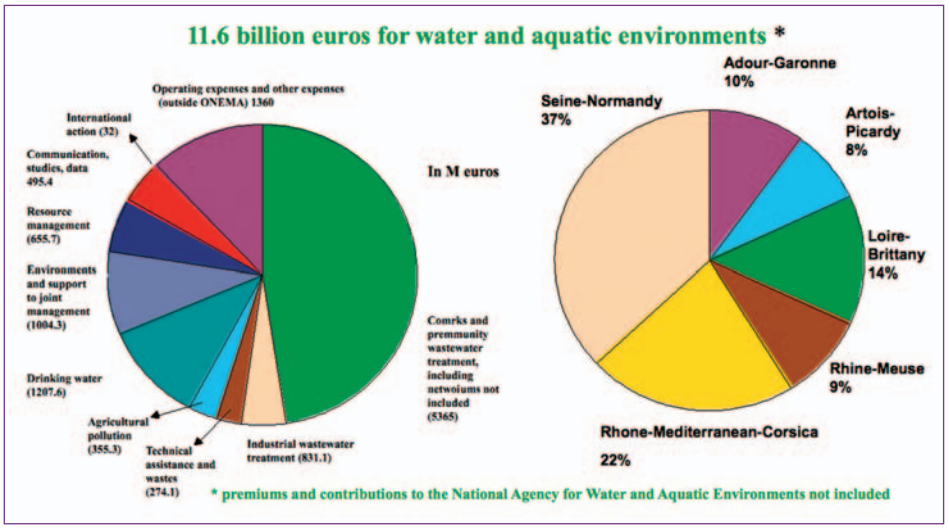
In each basin, **the Action Plan of the Water Agency** has been drafted for a six-year period in a concerted way by the Basin Committee with the local stakeholders. This Plan determines priorities for financing. Each plan is different and adapted to the basin priorities. It is then validated by the Basin Coordinator Prefect on behalf of the State.

The 9th Action Plans of the Water Agencies (2007-2012) came into force on 1st January 2007. They amount to a total of **11.6 billion euros** up to 2012 (except premiums for good water treatment* paid to local authorities and contributions to the ONEMA budget).

The Law of 30 December 2006 orientated the 9th Action Plans of the Water Agencies towards two major objectives:

1. to make all the wastewater treatment plants comply with the European "Urban Waste Water" Directive of 1991;
2. to implement the European Water Framework Directive of 2000, which aims at achieving good ecological status for water and aquatic ecosystems.

* *A premium for good water treatment is paid by the Water Agency to the municipality, when the installations developed allow avoiding the deterioration of water quality. The quality of operation of the wastewater treatment plants is indeed necessary to achieve or preserve good chemical and physicochemical status of surface water in the basin.*



Source: "The 9th Action Plans of the Water Agencies", brochure of the Ministry for Ecology, January 2007.

French water policy and its overall organization

The Water Agencies are public bodies of the State which jointly work with the State, under the supervision of the Ministry of Ecology, and with ONEMA coordination. The Water Agencies were requested to reinforce their actions in several fields in particular:

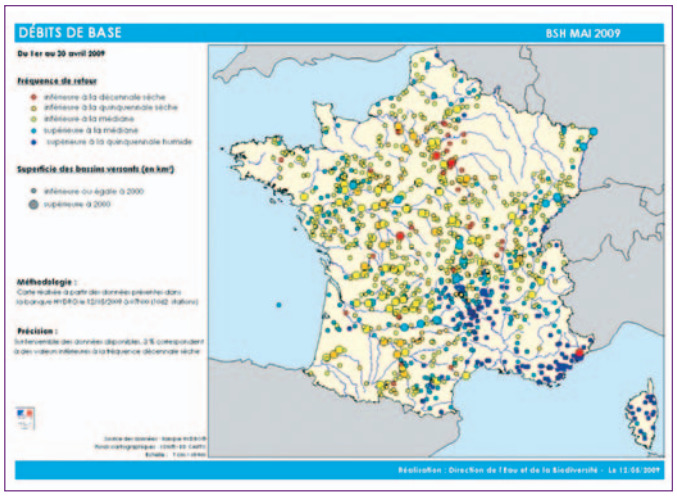
- drinking water supply and sanitation: having an action aiming more towards pollution prevention and treatment at the source, accompanying the setting-up by the municipalities of protected areas for drinking water intakes before 2010;
- control of non-point pollution: mobilizing all the stakeholders located upstream of the critical water bodies for increasing actions in sensitive areas;
- management of aquatic environments: increasing the financing devoted to the management of aquatic environments, a prerequisite to achieving good ecological status;
- water scarcity and drought: pursuant to the National Water Scarcity Management Plan **(see "Replenishment of low water flow and drought management" page 21),** increasing actions for regulating water uses according to available resources, developing innovative solutions and mobilizing new resources whenever necessary.

The Water Agencies can also contribute in **international cooperation projects** in the field of water and sanitation up to a total value of 1% of their budget. This contribution was made possible by the Law of 9 February 2005 dedicated to decentralized cooperation (called "Oudin-Santini" Law). Within the 9th Action Program of the Water Agencies, 120 million euros could thus be mobilized, between 2007 and 2012, for actions of international common cause.

Knowledge and monitoring of water resources

Integrated water management implies knowing the resources, uses and needs. The gathering and interpretation of many data are necessary to plan the actions, to follow up their implementation and to assess their effects.

The National Water Information System (WIS)



Example of mapping available on the WIS website

Although water-related data are plenty, they are often dispersed between many public and private data producers and were developed to meet different needs.

In France, the structuring of databases has been gradual since the beginning of the 1990s. In 2003, it led to the national Water Information System (WIS). The WIS ensures the harmonization, exchange and accessibility of data.

It is accessible through the website: www.eaufrance.fr

The National Agency for Water and Aquatic environments (ONEMA) manages the system at the national level. One of its main assignments is to organize the information on water resources, aquatic environments and their uses. Assisted by an inter-basin coordination group and technical groups, ONEMA prepares the national action plan, the planning and follow-up of projects. It is the agency in charge and is financing methodologies, reference frames, national databases, tools for data processing, enhancement, dissemination and reporting to the European Commission.

The WIS gathers all the data useful for knowledge of water resources and aquatic environments: quality, quantity, regulatory data, economic data, etc. Several databases are related: hydrometry of rivers and hydrology, quality of rivers and coastal waters, fish populations, piezometry and groundwater quality, economic data, shellfish farming areas, programs for monitoring water status, etc.

The WIS allows meeting several needs:

- monitoring the status of the resource and aquatic environments;
- controlling the activities having impacts on environmental status;
- developing the management plans and Programs of Measures;
- evaluating public policies, plans and programs;
- reporting to the Parliament, the European Commission or evaluation organizations (OECD, European Environment Agency, Eurostat, OSPAR, etc.);
- informing the populations of the natural risks to which they are exposed;
- preserving the data in a perennial way and sharing them;
- organizing public access to environmental information and publishing reliable quality data;
- following up the implementation of the European directives, the European Water Framework Directive in particular, and reporting to the European reporting system (Water Information System for Europe - WISE).

French water policy and its overall organization

The WIS allows meeting three major objectives:

1. **knowing the status of water resource and aquatic environments;**
2. **assessing the pressures on these environments and the consequences;**
3. **orientating and evaluating public policies for the protection and restoration of aquatic environments.**

A protocol was signed in June 2003 to define the obligations of the water stakeholders as regards data production, conservation and availability. It also specifies the organization retained at the national level (national committee and coordination group) and at the level of each basin (basin data committee). Its signatories are: the Ministry in charge of Ecology, the National Agency for Water and Aquatic Environments (ONEMA), the French Environment Institute (IFEN), the 6 Water Agencies for continental France and Water Offices for the overseas departments, the International Office for Water (IOWater), the Office for Geological and Mining Research (BRGM), the French Research Institute for the Exploitation of the Sea (Ifremer), the National Institute for the industrial environment and risks (INERIS), Electricité de France (EDF).

The WIS aims at involving **all the stakeholders intervening in data production, management, and dissemination:**

- the Ministries, their departments and the public establishments they supervise;
- the local authorities, public basin establishments (EPTB) and development companies;
- the technical, scientific and university centers;
- the environmental and users' associations;
- the industries, operators and consulting firms.

The WIS architecture is based on **a common reference frame, the National Data Reference Center for Water (SANDRE),** managed by the International Office for Water. In order to facilitate the membership of new partners, this architecture does not impose any other technological choice than complying with standards recognized at the international level on exchange formats and geographical information.

SANDRE allows an easy exchange of data between the various data producers by organizing **interoperability between the systems.** Interoperability is based on technical standards and common rules: data-gathering methods, principles of architecture of the databases, etc.

The results of SANDRE work are available on the Website:

www.sandre.eaufrance.fr

Example de geographical localization carried out by the SANDRE

The WIS allows France to meet the requirements of European "reporting": it is connected to the Water Information System for Europe:

http://water.europa.eu

WIS in figures:

- millions of data;
- about fifteen reference bases;
- hundreds of data bases;
- 612 installations for data gathering, including 440 measurement networks;
- 1,000 data producers, including 200 are already partners of the WIS.

In 2009, ONEMA has been in charge of preparing a National Water Data Scheme (SNDE).

The Water Status Assessment System

France developed a system for assessing the quality of river waters, water bodies, groundwater and coastal water: **SEQ-Water (Water Quality Assessment System).** SEQ-Water measures the water capacity to fulfill some functions: maintenance of biological balances, production of drinking water, water-related recreation and sport activities, fish farming, livestock watering and irrigation.

This assessment system was **revised in 2006** to comply with the assessment required by the European Water Framework Directive (WFD).

From now on, it measures the status of the aquatic environments, according to the type of water bodies and according to two components: chemical status (compared to the European standards on uses: bathing water, drinking water production, shellfish farming, etc.) and ecological status compared to biological criteria. "Good status" is granted when the chemical status and ecological status are good.

For groundwater, "good status" is given according to chemical quality and water quantity (balance between water abstractions and the recharge of the aquifer).

The entire implementation of the new system, called the Water Status Assessment System, will be completed in 2010.

French water policy and its overall organization

Preservation of the quality of water and aquatic environments

Quality objectives

Since the Water Law of 1964, quality objectives have been set for the main rivers. They were then integrated into the planning documents which are the SDAGE and the SAGE, with maps of quality objectives. The quality objectives were revised later on, according to the evolution of the status of aquatic environments and of scientific knowledge.

The quality objectives are from now on **based on the objective of "good status" introduced by the European Water Framework Directive.**

Good status must be reached in 2015.

In some cases, the objective of good status cannot be achieved in 2015, for technical or economic reasons (disproportionate cost); the deadline is then postponed to 2021 or to 2027 at the latest. Exemptions are strictly governed and must be justified. The defined objectives are **laid down and justified in the SDAGE for each water body of the river basin district** (coast, estuary, river, aquifer, etc.). France laid down an overall objective of 2/3 of the water bodies with good status in 2015.

Pollution control

In order to limit pollution at the source, **standards are applied to domestic, agricultural and industrial discharges.**

Specific measures are enacted in the particularly sensitive areas, which are the subject of special protection. It is the case, in particular, of protection areas which must be set up around drinking water intakes, in order to avoid non-point and accidental pollution (activities are prohibited or authorized under very restrictive conditions). Particular water policing measures are also taken for shellfish farming areas, bathing areas, "vulnerable zones" according to the Nitrates Directive, "sensitive areas" according to the Directive on "Urban Waste Water", wetlands, Natura 2000 zones, etc.

The most fragile aquatic environments, such as marshes and ponds, low alluvial valleys, estuaries, are the subject of particular protections.

Specific agro-environmental programs are implemented there in agreement with the farmers, within the framework, in particular, of the European Community regulations.

Local authorities, farmers and industrialists, are incited to comply with the standards or to increase the capacities for wastewater treatment. **The Water Agencies financially support the development of programs for controlling urban, industrial or agricultural pollution and for the restoration of rivers.**

In the 1970s, programs were initiated with the local authorities concerned, in particular for water protection of Leman Lake, Annecy Lake, Le Bourget Lake, Arcachon Bay, etc.

The "river contracts" also allow programming and financing works to be done on a river.

Protection of fish populations

Fish fauna is a good indicator of the status of a river. The "Law on Fishing" of 1984 obliges the developers to maintain **a "reserved flow" (or "environmental flow")** downstream of the installations, to guarantee aquatic life and the healthiness of rivers.

The protection of fish fauna requires proficiency in particular techniques:

- fish farming development associated with the maintenance of river beds and banks, thus protecting the diversity of fish habitats;
- calculation of the optimal reserved flow and its application in a deficit situation;
- equipment allowing the move of migratory fish;
- development of inventories and observation networks.

Fishing activities must fit in with **a Departmental Plan for the Protection of aquatic environments and fish resource Management (DPPM)** implemented on a departmental scale and local Fish Resource Management Plans developed for each river.

The Programs for the restoration of highly migratory fish initiated 25 years ago allowed the reappearance of the salmon (the Garonne, Dordogne, Rhine, Upper-Allier), of the allis shad and lamprey (the Garonne, Dordogne, Rhone).

In France, fish farming in freshwater annually produces 60,000 tons of fish for re-stocking and consumption, while guaranteeing a regular quality supply. Fish farming is developed either in installations established in river diversions or in ponds.

French water policy and its overall organization

Protection of water intended for human consumption

The raw waters that can be used for the production of drinking water must meet very strict criteria. They must be protected from pollution. Protection areas are compulsory to protect the immediate surroundings and vicinity of the water intake.

Protection areas are delimited after a hydrogeologic study. 3 areas with more or less strong constraints are planned:

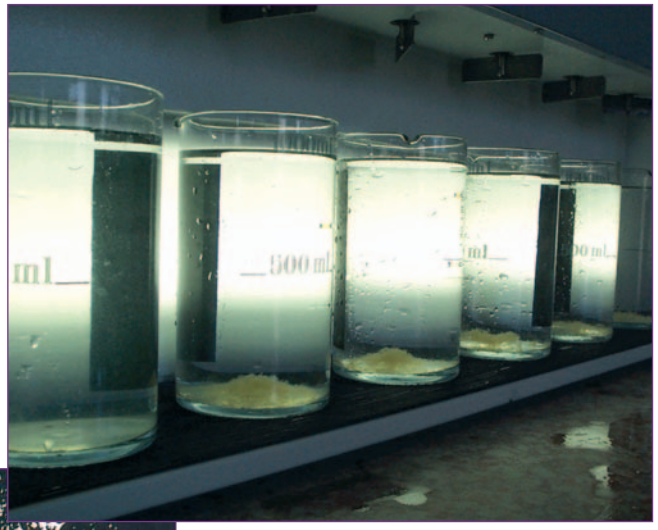
❶ **The immediate protection area** covers a few hundreds of m^2 around the intake; its goal is to prevent natural or intentional degradation of the intake and the direct introduction of polluting substances into the abstracted water. The land is bought and owned by the municipality. All kinds of activities are prohibited.

❷ **The close protection area** aims at protecting the intake from the migration of polluting substances from the subsoil. Its surface area depends on the characteristics of the aquifer, the pumping flowrate, the vulnerability of the aquifer. Activities can be prohibited or authorized under some conditions. A compensation allowance is paid to each owner or farmer according to the damage caused. The lands can be acquired by way of expropriation.

❸ **The distant protection area** is not compulsory but it reinforces the two preceding areas against permanent and non-point pollution. It corresponds to the entire drainage area of the water intake. Activities can be regulated there.

The protection areas are entered into urban planning documents.

The raw water is then treated and the supplied tap water must meet many criteria: organoleptic parameters (color, taste, odor even if they have no direct relationship to health), physicochemical characteristics, standards concerning the substances tolerated up to a certain limit (fluorine, nitrates), standards concerning the toxic substances whose contents should not exceed millionth per liter (lead, chromium), standards concerning microbiology (bacteria, pathogenic viruses), standards concerning pesticides and phytosanitary products, etc. These rigorous quality standards are based on the WHO work and on the European directives.



Health security of the water supply to the population relies on **monitoring devices** which allow making sure that the water quality requirements are complied with and that the water production plants and supply systems are correctly operated. The Ministry for Health defines the water quality requirements by relying on national expert authorities. It advises the analysis laboratories for health control of water, coordinates the certification procedure of hydrogeologists.

At local level, risk control especially relies on the **permanent self-monitoring** that the persons in charge of water production and supply have to carry out and **on the regular health control made by the State services -** departmental directorates for health and social affairs (DDASS): instruction of procedures for developing protection areas around the intakes used for drinking water production, checking compliance with the authorization procedures, inspection of installations, water quality control from the resource to the consumer's tap, etc. Every year, the control programs result in competent agents carrying out more than 310,000 samplings of water.

The 8 million analyses yearly made on these samples, by approved laboratories, deal with microbiological, physicochemical or radiological parameters, in order to make sure that the water received by the consumers complies with the regulatory quality requirements. All the controls made, as well as the description of the production and supply systems, are integrated into **a computerized national base (SISE-Water).**

To carry out these assignments, the Ministry for Health has relied for many years on the scientific expertise of the French Higher Council for Public Health (CSHPF). Since 1998, the whole arrangement for risk assessment and health monitoring has been reinforced by **the creation of health security agencies,** including the National Health Monitoring Institute (InVS), the French Agency for Environmental and Occupational Health Safety (AFSSET) and **the French Food Safety Agency (AFSSA),** the latter being from now on the authority in charge of surveys in the field of drinking water.

French water policy and its overall organization

Public information and participation

In French law, access to information fits in with **the general principle of freedom of access to administrative documents** recognized by the Law of 17 July 1978. With regard to the environment, there are procedures for public information and consultation on development projects. Using some limits laid down in the regulations, **an impact assessment study** is necessary together with a public survey.

For large developments, the Public Survey procedure was set up at the beginning of the 20th century. More recently, as regards the very large development projects, **the National Commission for Public Debate (CNDP),** independent administrative authority, was created to guarantee that public participation is complied with in the development projects of national interest, since they are strong socioeconomic stakes or have significant impacts on the environment or regional planning. France has **a long experience in consultation procedures** and all the procedures were also recently supplemented to apply the Aarhus Convention and the European directives. In addition to the surveys and formal consultation procedures, qualitative tools are more and more frequently used (public opinion polls, newsgroups, public meetings, local referendums, etc.).

In the field of water, France has developed experience in dialogue within the Basin Committees since the Seventies.

The European Water Framework Directive (WFD) goes further: it plans several steps of public consultation, beyond the consultation of the water stakeholders. Well before the deadline given by the WFD, France has developed **a vast public information and consultation campaign since 2005,** following the characterization of each river basin district. The results of this consultation showed the adhesion of the general public to the water stakes. **A 2nd consultation** on the draft Management Plans and Programs of Measures **was organized in 2008-2009.**


Meeting for public information

These consultations were jointly organized by the Basin Committee and the State (represented by the Basin Coordinator Prefect).

The Water Agency took care of technical coordination. Communication campaigns encouraged participation: regional press, TV spots and regional radios, posters, websites, information documents, etc. As for each consultation organized to apply the WFD, the documents were made available to the public for 6 months in the prefecture and at the home office of the Water Agency. They were also accompanied by a register intended for collecting comments. The public could also send a free written contribution to the Water Agency or reply via Internet. In each basin, the follow-up of the consultation was ensured by a specialized commission of the Basin Committee, associating representatives of the local authorities, users, associations and State services.

Provisions of the "Grenelle for the Environment"

The Government organized a great national debate on the environment, **in 2008, called the "Grenelle for the Environment",** gathering all the interested parties. The debate took the form of a dialogue between 5 parties (State, local authorities, associations, trade unions of employees, employers) as for the "Grenelle Agreements" which had put an end to the strikes of 1968. 8 working groups were set up and led to proposals.
National and regional consultations then allowed collecting comments from the general public and local stakeholders.

After inter-ministerial arbitrations within the Government, two bills were drafted:

1. the Law for programming the implementation of the Grenelle for the Environment, called **"Grenelle Law I";**
2. the Law on national commitment to the environment, called **"Grenelle Law II".**

These two laws include, in particular, **provisions on water management:**

- Prohibition of the use of phosphates in all the detergent products in 2012.
- Completion before 2010 of the protection areas for drinking water intakes.
- Strengthened action plans to protect, before 2012, the 500 most threatened intakes.
- Acceleration of compliance to standards of wastewater treatment plants to achieve a compliance rate of 98% before 2010 and 100% before 2011.
- Taking into account the methods for wastewater treatment in the instruction of building permits.
- Development of rainwater and wastewater recovery and re-use while complying with health constraints.
- Installation of green belts, at least 5 meters wide, along the rivers before 2015, a green and blue belt to preserve ecological continuity.
- Possibility for the Prefect of granting a single organization with an authorization for withdrawal on behalf of all the irrigators in order to support joint management of water abstractions.
- Creation of new abilities of the municipalities for controlling the on-site sanitation facilities.
- Obligation for the municipalities to make an inventory of their drinking water supply system and to establish a work program for improvement when the leak rate in the network is higher than a rate fixed for each Department.
- Authorization given to public drinking water supply and sanitation utilities to finance development and research programs to facilitate the development of new techniques, for adapting to climate change in particular.

Large developments and water control

The control of rivers, from their spring to their mouth, led to **large development programs** designed with an integrated approach of the river systems. All the aspects are taken into account: economic, technical, social, administrative and environmental. The induced effects are assessed and taken into account (impact assessment study). The public and private partners concerned are consulted.

Erosion, fast floods, floods and drought are as many detrimental natural phenomena and it is necessary to prevent and manage them. It is also necessary to organize hydropower production, transport via waterways, the storage of water in a rational way in the areas with chronic deficit.

The Master Plans (SDAGE) and Water Development and Management Schemes (SAGE) allow taking into account all these requirements in an integrated way.

France has developed **a long experience in the integrated development of rivers:**

- taking into account the whole catchment area and the upstream/downstream interactions;
- taking into account all the water uses and the needs of the ecosystems, from a quantitative and qualitative viewpoint;
- study and reduction of the environmental impacts by integrating corrective measures;
- design of multi-purpose hydraulic works.

Organization of project ownership

Public Authorities have entrusted specialized institutions with specific development or management responsibilities:

State-owned Public Establishments

- **The National Agency for Water and Aquatic Environments (ONEMA)** is responsible for fish fauna;
- **The National Office for Forestry (ONF)** intervenes in land restoration in mountains, conservation of upper river basins, afforestation, management of State and Public Authorities forests;
- **The French Waterways (VNF)** build and operate transportation infrastructures on rivers and large canals **(see for example the project of the Seine - Northern Europe canal in page 40).**

Local Public Basin Authorities (EPTB)

The large developments which concern several departments have been entrusted to local Public Basin Authorities, for example:

- **Public Authority for the Loire River;**
- Interdepartmental Public Authority for the Dordogne (EPIDOR);
- Interdepartmental Institution for the Dam-Reservoirs of the Seine River Basin.

Today, there are more than 25 EPTBs gathered within a national federation.

National or regional companies

- **The National Company of the Rhone (CNR),** a historically important national operator for the management of floods and navigation on the Rhone as well as for hydropower production. It gained a statute of private company (public limited company) in 2003;
- **Electricité de France (EDF),** which also became a public limited company in 2004;
- **Regional Development Companies,** whose main task is to supply raw water in the areas with chronic water deficit, for example:
  - Development Company for the Lower-Rhone and Languedoc (BRL);
  - Development Company for Gascogne (CACG);
  - Canal of Provence Company (SCP).

Protection against floods

Damage caused by floods is always very severe and can have very important economic and human consequences.

Responsibilities

Facing the flood risk, **the State and local authorities** have a role of prevention which results, in particular, in information actions, a policy of maintenance and management of the State-owned rivers and a planning policy. The local authorities are responsible for taking risk into account in the local urban planning documents. The State carries out natural Risk Prevention Plans (RPP) for the most threatened municipalities. The Public Authorities also organized a comprehensive alarm, evacuation and emergency relief system.

However, **the riparian owners** of non-State rivers remain the first persons in charge and have the obligation of:

- cleaning the bed regularly to restore the river in its natural width and depth;
- maintaining the banks they own;
- preventing blockage and debris, to maintain the natural water flow, and keeping the banks clean.

The French system for the protection against floods is based on the Laws of 3 February 1995 **("Barnier Law")** and of 30 July 2003 **("Bachelot Law").**

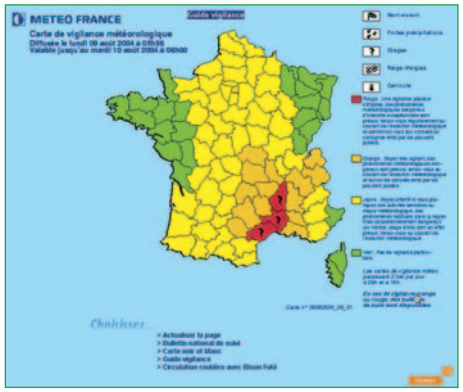
Flooding of the Rouvière dam in 2002

Large developments and water control

Flood forecasting

The Meteorological Center Météo-France of Toulouse continuously observes the precipitations. It daily publishes a four-level **vigilance map,** disseminated by the media. It processes the observations of **the network of meteorological radars ARAMIS** and the measurements of the 170 weather stations of the national network.

The ARAMIS Network is made up of 20 radars of the precipitations distributed over the French continental territory. All the data are available 24 hours a day and renewed every 15 minutes on the entire territory. The ARAMIS Network allows locating precipitations (rain, snow, hail) and measuring their intensity in real time. It gives essential information to the flood forecasting services as it also provides an estimate of the combinations of precipitations.



A theoretical example of vigilance map

Weather monitoring is supplemented by a follow-up of the flows in most rivers in plains, using a network of 200 automatic data collection stations. This network is managed by **23 Flood Forecasting Services (SPC).** These services belong to the State.

The 23 flood forecasting services

They transmit the information to the Prefect, who decides to alert the mayors of the municipalities concerned. Each mayor then alerts the population and takes the necessary protection measures immediately.

For the rivers with fast flood, mainly located in the South of France ("fast floods" or "Cevennes floods") in the Mediterranean climate zone, particular monitoring is necessary. **The SCHAPI, Central Service of Hydrometeorology and Support to Flood Forecasting,** created in June 2003 and also located in Toulouse, works in permanent relation with the teams of Météo-France. It gathers experts in meteorology and hydrology. This national service provides support to the Flood Forecasting Services (SPC) and ensures a hydro-meteorological watch 24 hours a day in the basins prone to fast floods. The SCHAPI publishes **the flood vigilance map,** an information document intended for the public.

Flood Prevention

Community protection works, such as dikes, cannot guarantee absolute protection and give a false sense of security. Prevention thus relies on a threefold approach: reducing the vulnerability of goods and people, reducing the seriousness of the floods, informing the populations.

❶ Reducing the vulnerability of goods and people

The best means for prevention against flood risks is to avoid urbanizing the exposed areas. But many dwellings already exist in these zones. The risk must thus be taken into account by controlling the existing and future urbanization:

The urban planning documents

The Urban Land Use Code imposes taking the risks into account in urban planning documents. Thus, **the Local Urban Land Use Plans (PLU)** allow refusing or accepting a building permit under certain conditions, especially in flood-prone areas.

The plan for flood risk prevention

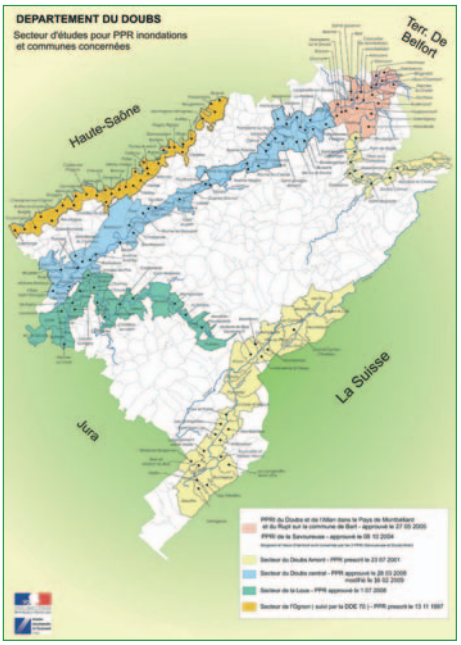
The Plans for Flood Risk Prevention (PFRP), established by the State, define prohibited zones and constructible zones with some restrictions. They can enforce acting on existing works to reduce the vulnerability of properties. The law regulates the building of works likely to become an obstacle to water run-off in period of flood.

The objective is twofold: urbanization control in flood-prone areas and the preserving of the flooding areas.

The PFRP is based on **a zoning map** which defines three zones:

- the red zone where any construction is prohibited, either because of a too high risk, or to support high flow attenuation;
- the blue zone where constructions are only authorized provided that they comply with certain regulations, for example a floor height to be respected above the reference high water level;
- the white zone, a zone which is not regulated as not floodable by the reference high water level.

The PFRP can also prescribe or recommend **structuring provisions** (development of systems reducing water logging, placing sensitive equipment out of water reach) or **provisions relating to land use** (fastening tanks or storing floating material). These simple measures, when taken, allow considerably reducing the damage caused by floods on economic goods: constructions (private and public), industrial and commercial buildings (especially those necessary for crisis management, etc.), electricity, water, communication networks, etc.



Example of a zoning map (PFRP of the Doubs)

Large developments and water control

❷ Reducing the seriousness of floods

Maintenance of rivers (regular cleaning, maintenance of banks and works, etc.) is needed to avoid worsening the effect of floods. This maintenance is the responsibility of the owner: the State or local authorities for the State-owned rivers, the riparian private owners for the rivers not State-owned. In the event of the private owners' failing, the municipality can take charge at the owners' expenses.

France developed a strong expertise **on protection works, fight against erosion and torrent control.**

Passive protection only consists in controlling flooding and its consequences (example: riprap, threshold dikes, beaches of deposits, traps for materials, spillways, etc). These protections are effective when the phenomenon has certain intensity, called "design flood". When the latter is exceeded, protections can be ineffective, even dangerous in the case of breaking. For example, this occurs with dikes that can be submerged or retarding dams on the large rivers, whose effectiveness is low when there are major floods.

France has approximately **7,500 km of dikes,** which protect a total surface area of about 18,000 km² and a population of about 2 million inhabitants.

Because of their relief and climatic conditions, **the mountains** are particularly exposed to the risk of erosion caused by freezing, snow melt and storms. Special prevention and restoration techniques are used in the upper river basins in mountains, in order to stabilize soils and to avoid the devastating fast floods of the torrents. In this case, it is **an active protection:** the aim is to reduce solid transport, while directly acting on the erosion processes and their causes.

The following can be mentioned:

- revegetation of eroded areas by means of settling plant populations perfected by the CEMAGREF;
- reforestation: planting of trees and maintenance of wooded areas by means of a planting program (work of the National Office for Forestry - ONF);
- prevention systems: barriers, rock protection shields, avalanche barriers, protection against landslides, etc., built by the service for "Mountainous Land Restoration" (RTM) of the National Office for Forestry (ONF);
- construction work and actions for the protection and management of catchment areas: dykes, canals, dams, weirs, etc.

After the serious floods that occurred in the South-East of France in September 2002, **a national Flood Prevention Plan** was launched in October 2002 ("Bachelot Plan 2003-2006"), with a national call for projects.

34 basins were selected to start action plans, whose goal was to improve the information of the populations, to build the operational capacities of local authorities and to support soft techniques such as **the restoration of natural flooding areas.** Contracts were signed by the State and the municipalities to mobilize all the available financial resources (departmental, regional, national, European). In addition to **the Loire Plan,** which has already existed since 1994, **"large rivers" action plans** were defined for the Rhone, the Seine, the Garonne, the Meuse, etc.

The Barnier Law of 3 February 1995 created **a fund for the prevention of major natural hazards (known as "Barnier Fund").**

This fund mainly finances the expropriations of the properties exposed to significant natural hazards, as well as measures for reducing the vulnerability of goods (studies and prevention work) and planning and information measures (risk prevention plans and communication actions).

The building of **dam-reservoirs** allows an inter-seasonal regulation of the flows. In winter and spring, they limit the floods by retaining part of the flow of flooded rivers. It is "flood mitigation". This stored water is a reserve for the low water period. In summer and autumn, when rains are scarce, the natural river flow can be insufficient to meet the various water uses, especially for the production of drinking water and the maintenance of aquatic ecosystems, in the areas of high agricultural irrigation in particular.

When the water level of rivers lowers in a critical way, the dam-reservoirs release water: it is "the replenishment of low water".

The example of the "Great Seine Lakes"

After the dramatic floods which occurred in Paris and the Parisian area in 1910 and 1921, large development work was undertaken upstream of the Seine to protect Paris agglomeration against floods and to replenish the low flows in time of drought. 4 lake-reservoirs were built in the Seine and Marne basins between 1949 and 1990:

- the Der-Chantecoq lake (350 million m³) on the Marne;
- the Orient lake (205 Mm³) on the Seine;
- the Amance and Temple lake (170 Mm³) on the Aube;
- the Pannecière lake (80 Mm³) on the Yonne.

In the case of a flood similar to that of 1910, the lake-reservoirs would allow lowering by 60 cm the height of the water level and reducing by 4 billion euros the undergone damage.

Lake Amance and Temple on the Aube

The Interdepartmental Institution for the Dam-Reservoirs of the Seine River Basin manages the infrastructures, regulates 800 million m³ of water, informs the riverside residents and the users, studies new projects to reduce the risks of flood and drought, participates in water policy through the French Association of the Local Public Basin Authorities (EPTB) and the SDAGE. It works in relation with the other stakeholders of the basin: Departments, Regions, Water Agency, State governmental Services.

Large developments and water control

❸ Informing the populations

Although the State and the municipalities have responsibilities, the citizens can contribute in protecting themselves effectively and decreasing their own vulnerability. For such a purpose, it is of prime importance that each one knows his own exposure to flood risk.

The Law of 22 July 1987 (revised by the Law of 31 August 2004 on the modernization of civil safety) stated the citizens' right to have information on the major risks to which they are exposed on the entire or part of the territory, as on the safeguard measures which concern them.

Drafted under the authority of the Prefect, **the Departmental Document on Major Risks (DDMR)** registers on a department scale all the major risks for each municipality. It explains the phenomena and presents the safeguard measures. With the DDMR, the Prefect presents to the Mayor the risks in his area, using 1/25.000 scale maps, and describes the nature of the risks, the historical events, as well as the measures taken by the State government.

The Mayor prepares **a Municipal Information Document on Major Risks (MIDMR),** which presents the prevention and local measures taken pursuant to the Mayor's policing powers. The MIDMR is accompanied by a communication and posting campaign. These documents are available in the city hall.

In addition, the Law of 30 July 2003 (Bachelot Law) relating to the prevention of technological and natural risks and to the compensation for damages has the objective of increasing public information and **developing a risk culture** in the population. For this purpose, the State develops tools to provide documentation to the exposure to the risks which can be freely consulted by any citizen, such as **the Atlases of Flood-prone Areas.**

Compensation

The Public Authorities created **a system of compulsory insurance** with civil liability towards third parties and encouraged the owners to insure their own properties.

A "natural disasters" compensation fund was organized (Law of 13 July 1982) based on the national common cause principle. This system, rare in the world, allows providing assistance, after a public survey on the reality of the damage.

The status of natural disaster, opening rights to guarantee, is granted by inter-ministerial decree. It determines the areas and the time periods where the disaster occurred as well as the nature of the damage covered by the guarantee.

Replenishment of low water flow and drought management

Drought or too important water abstractions at certain times of the year can cause a decrease in the river flow rates or the lowering of groundwater levels. This decrease can be dangerous sometimes for natural environments and aquatic fauna as well as for health and water uses.

The drought issue raises two main questions: crisis management (in the short term, i.e. how to face water scarcity) and quantitative water resources management (in the medium and long term, i.e. how to plan the allocation of water resources).

To respond to these two aspects of the issue, and following the important drought which occurred in summer 2003, France developed a crisis management system, reinforced in time of drought, as well as a comprehensive action plan, **the Water Scarcity Management Plan.**

Tools for water policing

The State has several legal tools within its "water police":

Declaration or authorization procedures

The maximum volume, which can be abstracted, is given in the authorization granted to the industrialists and farmers.

Drought decrees

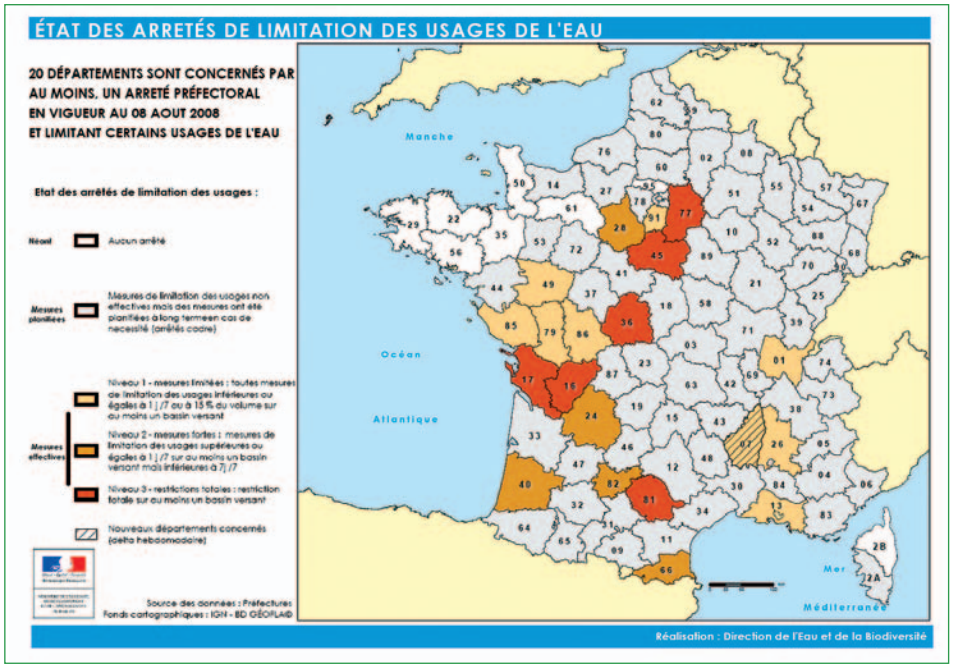
In the case of drought, the Prefect can provisionally limit or even prohibit abstractions by a "drought decree". Three thresholds are defined: an alarm threshold (level 1), a first crisis level (level 2), an increased crisis level (level 3). The objective is to preserve the priority use which is the supply of drinking water to the populations.

Replenishment of low water flows

When the level of the rivers lowers significantly, the Prefect asks the operators of infrastructures to release water from the dams and lake-reservoirs.

Reserved flow

The operators of infrastructures have to reserve a minimal downstream flow to guarantee aquatic life and safe rivers.



Situation of the limitations of water uses on 8 August 2008

Large developments and water control

The Water Scarcity Management Plan

The plan aims at planning and optimizing the long-term use of water resources, which is essential in the context of climate change.

The Plan is structured around three lines: priority given to drinking water supply, the sharing of water between the various uses and the best water optimization.

Some measures obviously concern agriculture:

- Developing water savings,
- Jointly managing the water resource (volumetric management was developed by setting quotas for water abstractions),
- Promoting the creation of alternative resources as a last resort (when they are jointly managed, when they are not a problem from an ecological viewpoint and when the economic conditions are acceptable).

The expansion of drought periods has led to an increasing demand for new water resources for irrigation. Thus, earth dams, artificial water bodies developed at the river basin head, have increased in the past decades.

After a policy rather focused on increasing the offer (building dams and reservoirs, increasing water pumping in rivers and aquifers), **priority is from now on given to the regulation of the water demand.** This means better using the existing water resources, reducing leaks and wastage, rationalizing irrigation and thus avoiding resorting to new resources.

The Plan is supervised by a National Follow-up Committee which gathers the representatives of all the stakeholders concerned, under the authority of the Minister of Ecology. A Committee also meets in each large basin.

Agricultural and rural water

Since the end of the 19th century, France has developed specific instruments for the management of agricultural water. More recently, tools were developed to reduce the impact of agriculture on the quantity and quality of the resource.

Authorized Union Associations (ASA)

In 1885, France developed a legislative and regulatory framework which allows **regrouping the farmers of the same area** for jointly developing and managing the irrigation of their lands and for drainage projects. **They are cooperative bodies** based on the participation of all the members, either for choosing collective investments or for the daily management of the irrigation utilities.

The ASAs have **a statute of legal entity** which enables them to represent the irrigators in the local or regional consultation and decision bodies. The ASAs are owners of their infrastructures (installations and utilities). They can manage themselves their irrigation networks or delegate this service to an operator. Their financial management is based on total cost recovery and the obligation of having a strictly balanced budget. The system sustainability relies on the commitments of the landowners to guarantee the collective debt. These original associations can moreover have public responsibilities under the control of the State.

Regional Development Companies (SAR)

The Regional Development Companies (SARs) were created after World War II within the reconstruction of the national economy.

Their statute is original: article 112 of the Rural Code entrusted them with missions of general interest, but they are under the private law of limited public companies and their capital stock is mainly owned by the local public authorities.

The SARs were created in the South of France after a chronic water deficit in summers.

They have the assignment of controlling water. These Companies played a major role in the development of infrastructures necessary for the improvement and security of raw water supply.

The SARs now manage very structuring regional infrastructures:

- dams and water intakes in streams;
- pumping stations;
- canals and raw water conveyance pipes on a regional scale;
- collective distribution networks, in irrigated areas in particular.

These systems were integrated into sanitation and drainage projects as well as into land reclamation and large Regional Planning projects.

They are concerted, decentralized management tools adapted to the local situation.

Examples of SAR: the Gascogne Development Company in South Pyrenees, the Lower Rhone-Languedoc Company (BRL) in Languedoc-Roussillon and the Canal of Provence Company on the Riviera coastline.

The developments (reservoirs, canals, galleries...) implemented by the SARs allowed the creation of **large community irrigated areas on a wide scale:** 110,000 ha in the South Pyrenees, 130,000 ha in Languedoc-Roussillon, 68,000 ha in Provence.

The management of collective networks is mainly carried out by the SARs by way of concessions. They gradually acquired a vision broader than the only agricultural water use; by taking into account all the water needs in the whole area concerned, including the supply of raw water to the cities, industries or to the golf courses in their area.

Today, the SARs are developing very effective techniques for monitoring the resource availability 24 hours a day, for regulating the demand according to the available water flows and for optimizing the sharing of the available water between competing uses: agricultural use, maintenance of a minimal flow, fish life, drinking water supply, industry, river tourism, etc.

Large developments and water control

The SAR is an effective operator for **water management by volumetric quotas.** This management relies on a control of the demand and consumption. Controlling the demand implies: identification of all the needs, introduction of a waiting list, equity of treatment. Controlling consumption implies: installation of meters, reading and maintenance of these devices, adjustment of the quotas to the resource availability. These principles are used in **a contract subject to private law** signed by the SAR and each user-irrigator on the basis of a quota in m^3/l/sec. Initially perceived by the irrigators as a constraint, the quotas and water metering were then regarded as useful then essential management tools. The work of the SARs is carried out by **a team of "river supervisors"** in charge of controlling the correct operation of the meters and the level of consumption and by a team for the repair of the meters. The acceptability of management by quotas relies on the creation of **a dialogue commission** (analysis of the management constraints with all the users) and a complementarity of action with the water policing services of the State.

The action of the SAR thus fits in with **the application of the integrated management concept,** especially though the monitoring they ensure with regard to environmental flows (reserved flows). Some SARs complement their actions by **giving advice to farmers** regarding sound water use, by carrying out agronomic experiments, and by developing technico-economic data bases related to irrigation or by managing analysis laboratories.

As their capital is more and more broadly owned by local authorities, some SARs, in addition to their hydraulic activities, take action in **the economic development of rural areas** (rural tourism, creation of companies, assistance to the agricultural sector, tourist activity management). The SARs have the advantage of having a territorial vision of hydraulics and rural development at the same time. They benefit from strong relations with the local authorities and elected officials who chair the dialogue commissions.

The SARs obtained subsidies and loans with interest rate subsidy from the State and local authorities when building the infrastructures. Today, they balance their accounts by selling raw water to the irrigators, municipalities, industrialists of their area at a price which allows them reaching the economic balance of their management.

The SAR is at the same time entrusted with a public-service mission by the State, a tool for local authorities and a tool respected by the farmers.

The experiment developed in France shows **the relevance and transferability of the SAR system.** In France, the system has developed in most basins facing repeated crises of water scarcity. The development of partnerships with foreign countries (institutionalized as in Senegal or more occasional as in Morocco) illustrates the lessons learned from the SAR experiment that can benefit to the water managers of these countries.

Water saving in agriculture

Agricultural use is the first volume of water consumption in France, especially in period of low water level (70-80%). Agricultural water demand is also the most flexible (as compared to domestic and industrial uses); it is thus in agriculture that the potentials for saving water are the highest, about 15 to 20%.

The first stake of the public approach is thus **not to favor the development of irrigation in areas already structurally with water deficit or particularly vulnerable to drought,** by taking legal and economic measures (the user/polluter pays principle), technical and organizational measures for encouraging the agricultural users to save water (reduction of abstractions) and to increase water efficiency. The recent evolutions, especially at the European level with the Water Framework Directive, imply to take into account the scarcity of the resource when implementing these instruments, to achieve "good ecological status".

Like all the significant abstractions of water, those for irrigation are subject to **declaration or authorization procedures.**

The limit values are defined according to the type of resources, ground or surface water, and to the river flow. The classification in **Water Sharing Zone** lowers from 80 m^3/h to 8 m^3/h the limit above which the abstractions require an authorization.

In case of drought, the "drought decrees" decided by the Prefect result in restriction or prohibition of irrigation.

The Water Law of 1992 requires **the metering of the volumes abstracted in agriculture.** Equipment with volumetric meters is an important factor for the control of water abstractions. At the end of 2003, France had a rate of equipment with meters of 71% of the irrigators' farms accounting for 85% of the surface areas.

Large developments and water control

Agro-Environmental Measures (AEM), especially the measures for "reduction of irrigated areas" and for "reduction of irrigation water volumes", have been implemented since the reform of the Common Agricultural Policy in 1992. But, these measures rely on the farmers' willingness and have only very little impact when they are not taken in a collective way on a river basin scale.

They however function as signals of the resource scarcity in the targeted areas.

Eco-conditionality should increase consistency between water policy and agricultural policy. It consists in providing the financial assistance of the Common Agricultural Policy to irrigated areas only if the farmer complies with the obligations of the water law, including the obligation of metering the abstracted volumes.

The increase in the water price contributes to give a signal of resource scarcity, although it fits in rather with logics of better cost recovery (as the Water Framework Directive recommends it) and is seldom implemented to save the water resource. In the case of individual irrigation (30% of the irrigators in the Rhone-Mediterranean-Corsica river basin), water is not subjected to any pricing except for the abstraction tax, that all the irrigators have to pay, but the very low levels of taxation do not encourage water saving.

In the cases of collective infrastructures, pricings are regrouped in two main categories:

- "contractual" pricing is usually used when the infrastructures are of the gravity type and managed by authorized union associations of irrigators (ASAs). Payment is usually made according to the subscribed surface area, more rarely according to the flow or to the number of abstractions. Contractual pricing can only have an influence on the decision to use irrigation or not, but not on the water volume brought to the hectare.
- "binomial" pricing, used in networks under pressure, includes a contractual share and a variable share invoiced according to the effective use of the network by the irrigator (water volume actually consumed or more rarely the surface irrigated by sprinkling).

However, the water price is not always a sufficient incentive to use water more efficiently, in particular when the water invoice is only a small share of the farmer's production costs, when there is no alternative for less water-consuming crops, because of technical, social or economic constraints, or when the water invoice is mostly made up of fixed costs.

Joint management by farmers (ASA, SAR) **and with the other water users** (planning by SAGEs and SDAGEs, river contracts) also contribute in better managing the agricultural use of water.

Control of pollution caused by fertilizers and pesticides

With regard to water quality, intensive agriculture is today a major source of pollution by pesticides, nitrates and phosphates. The problems of non-point pollution are becoming alarming.

Since 1994, the ministries in charge of agriculture and the environment have implemented, through dialogue with the agricultural organizations, **a Program for the Control of Pollution of Agricultural Origin: the "PMPOA".**

The main water pollution of agricultural origin is focused on (spreading of liquid manures of the cattle industry, phytosanitary products and nitrates) and all the production systems are concerned (animal husbandry and crops). **Changes in cultivation practices** are encouraged through sound agriculture, biological agriculture, sustainable agriculture contracts, assistance with the modernization of animal husbandry, as well as partnership contacts signed with the farmers in the upstream sections of basins for better protecting water intakes.

Large developments and water control

Large infrastructures and water economic development

Waterway transportation and tourism

The French waterways of national and European interest are managed by a State Public Authority of an industrial and commercial nature, **"Waterways of France" (V.N.F.).**

VNF manages, exploits, modernizes, builds and develops **the largest European network of inland waterways:** 6,700 km of equipped canals and rivers, more than 2,000 infrastructures and 40,000 hectares of public domain.

Its budget is now balanced by taxes. **Expenses are billed to all the users of the waterway** either for river transportation, the abstraction of raw water or for water discharges. State subsidies complement the budget for developing public service missions which are not billable to particular users but to the whole population:

- promotion of waterways as a transportation means for merchandise and river tourism;
- technical exploitation, maintenance, development of the network of canals: management of the heritage and the environment, improvement and development of the network;
- management of the state waterways and water bodies;
- implementation of a river transportation information system with the collection, processing, dissemination and management of statistical data and the carrying out of economic surveys.

VNF has a staff of **5,000 employees** intervening over the entire national territory, covering an important volume of activities as concerns transportation of merchandises and river tourism. This authority is supervised by a State governmental service: **the Navigation Service.**

An important number of small canals have been gradually transferred to local authorities, to develop river tourism of local or regional interest in particular.

Focus on ... the Seine-Northern Europe canal

The project for developing the Seine-Northern Europe canal is **a project on a European scale.** This large loading gauge canal of 106 km long between Compiègne and Cambrai is under construction and its commissioning is planned for 2013. It will represent a new system for the transportation of merchandises between France, Belgium, the Netherlands and Germany. Waterways of France (VNF) coordinate this work amounting to 4.2 billion euros.

The Seine-Northern Europe canal aims at linking the Paris basin to the Nord-Pas de Calais Region...

The basins of the Seine and Nord-Pas de Calais account for 60% of the river traffic in France. The Seine-Northern Europe canal will accommodate convoys carrying up to 4,400 tons, will offer navigation continuity between the two basins and will ensure the development and competitiveness of river transport available to the companies.

...and to the European network

The development of the Seine-Northern Europe canal will result in **a large loading gauge connection between the Seine and the Scheldt.** It was selected in April 2004 as a priority project of the Trans-European Transportation Network (RTE-T) by the European Parliament and the European Council. It will open up the Seine basin to the 20,000 km long North-European waterways network towards Northern Europe and Central and Eastern Europe up to the Black Sea, through the Rhine-Main-Danube connection. It will be **a connection with the large European seaports** (Le Havre, Rouen, Dunkirk, Zeebrugge, Antwerp, Rotterdam), and will increase their capacity of redistributing the goods inland. The territories thus covered will see their economic attractiveness increased.

A project for sustainable development of the territories

The project of a Seine-Northern Europe canal, that has been prepared with the stakeholders of the territory since 1993, is accompanied by the building of harbors that will generate **activities related to logistics, industry, tourism, etc.** This multi-purpose canal will also have a hydraulic function. It will contribute in controlling the floods of the Oise and the Somme river and to the security of the water supply of Northern France.

The Seine - Northern Europe canal will allow **increasing waterways transport and intermodality** with an objective of sustainable development: it will allow avoiding the traffic of 500,000 trucks in 2020 and reducing the emissions of greenhouse gas (it will avoid 220,000 to 280,000 tons of CO2 in 2020 and up to 570,000 tons in 2050).

It is also **a driving force for economy:** by improving accessibility to the territories and by structuring logistics, it will increase the competitiveness of the companies and will promote the building of new factories.

The Seine-Northern Europe canal will be a factor for the development of many processes, the first of which is distribution logistics, agriculture and agro-industry, making materials and manufactured goods carried in containers. Divided into 4 zones of activities on the canal banks, 360 hectares of harbor areas will offer multimode transport services and spaces for industry and logistics. The Seine-Northern Europe canal will create **employment for 10,000 to 11,000 people** (including 4,000 directly on the building site), and new employment is planned for 25,000 people before 2030 in logistics, industry and transport.

With 4 yachting ports of call, 1 marina, exceptional engineering structures to visit and suitable spaces for recreational activities, such as water reservoirs, the Seine-Northern Europe canal represents a high tourist development potential for the territories.

Large developments and water control

The project is designed to respect and be integrated as well as possible in its environment: avoiding of sensitive areas, development of ecological spaces, respect of the natural relief, harmonious engineering structures and rehabilitation of rivers modified by the Northern canal…

Water saving is a central element of the project. The sealing of the canal basin, the 2 reservoirs and basins for saving locking water at the locks will guarantee **an optimized management of water.** The water supply to the canal, mainly from the Oise, is guaranteed on the long-term and excludes any groundwater abstraction. The Seine-Northern Europe canal will also bring **a response to floods,** with a lowering of the level of the flooding Oise, up to 1 meter in northern-Compiègne region. The possibilities of transferring water towards the North will also secure the drinking water supply to Lille region.

More information:

www.seine-nord-europe.com

Hydropower

Hydropower is still governed by an old Law of 1919 related to the use of hydraulic power and by two more recent laws, a Law of 2000 related to the modernization and development of the public hydropower utility and a Law of 2005 giving the orientations of the energy policy.

The number of French hydropower stations is the highest in the European Union. In France, the electric power produced by hydraulic resources provides about 15% of the total energy and 80% of the French renewable electric power production.

This high percentage results from favorable geographic conditions and from the strong incentive to the public authorities during World War II to build many dams and hydraulic works, most of the mining resources being then in occupied territory.

There are about **400 hydropower dams of more than 4.5 MW in France.** The oldest goes back to 1675. These dams belong to the State. They represent a total power of 23.5 GW and can produce 63 TW.

The State has granted **concessions for the exploitation of these dams** since the Law of 16 October 1919.

The National Company of the Rhone (CNR), created in 1933, was granted by the State in 1934 the concession of the most powerful French river, the Rhone, to exploit and develop it according to three missions: electricity production, navigation, irrigation.

Electricity of France (EDF) was created in 1945 and received a concession for the exploitation of most of the other hydropower dams. Today, the exploitation of these dams is shared between EDF (80%) and the National Company of the Rhone (25%). In 2003, the capital of CNR was opened and its main shareholder is Suez via its Electrabel subsidiary company.

Since 2006, EDF has no more the monopoly of the exploitation of the hydropower dams of which it has the concession. At concession renewals, **a call for competition** is obligatorily organized and private operators can be candidates.

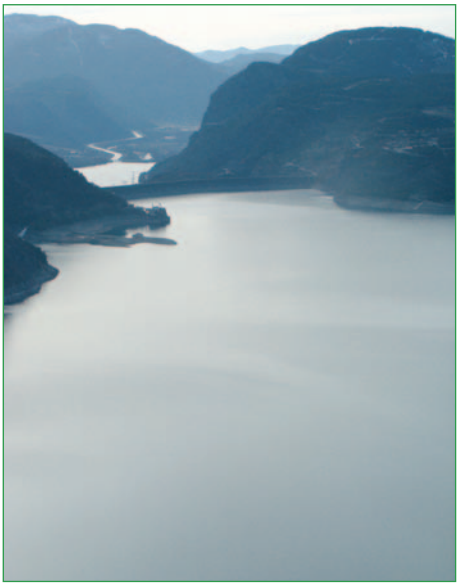
Some small hydropower stations (or micropower stations) were also developed to provide electricity to riparian inhabitants and municipalities.

At the beginning, before World War II, the hydropower dams had been mostly designed with the single aim of energy production. Today, **the dams cumulate several functions** (energy production, protection against floods, guarantee of reserved flows and replenishment of low water levels in the river, water supply for irrigation, industry and drinking water supply, etc.). They must also **respect the environment,** with the creation of fishways, the conservation of wetlands and with strict conditions concerning water releases and the draining up of the reservoirs.

Hydropower must from now on reconcile contradictory objectives: the development of renewable energies (European Directive of 27 September 2001 on electricity from renewable energies) and the achievement of good ecological status in rivers (European Water Framework Directive of 23 October 2000).

France developed a high level of technical expertise concerning **safety and the impacts of dams** (monitoring methods, control organizations, studies on hazards, etc.). The dams are controlled by a "dam inspectorate", which belongs to the State, which also has a technical department with national responsibility and an inter-ministerial committee on dams.

Example: the Serre-Ponçon Dam, the largest dam in Europe!



The devastating floods of the Durance, in 1843 and 1856, led to feasibility studies of a dam. The too high permeability of the soils however required to wait for the emergence of new techniques. A century was needed to concretize the project. In 1955, a Law entrusted the development and exploitation of the dam to Electricity of France (EDF) which received the concession. Work was completed in 1961.

The "Law on the development of Serre-Ponçon and the Lower-Durance" of 5 January 1955 showed the willingness of the legislator to associate irrigation and hydropower. Thus, starting at the reservoir, a concreted channel, managed by EDF, deviates most of the river water to the pond of Berre. The "canal of the Durance" follows the natural bed of the river and allows agricultural irrigation. The Serre-Ponçon dam ended the recurring droughts and floods.

The hydropower station became essential for the economic balance of the area: it is essential for its electricity supply (production of 6 billion kWh/year: i.e. the equivalent of two nuclear reactors). The dam also became a tourist attraction (40% of the summer tourist frequentation in the Upper-Alps) and it allows meeting the needs for irrigation in Provence (200 million m^3 abstracted/year in the lake, irrigated area: 100,000 ha).

Municipal drinking water supply and sanitation utilities

In France, drinking water supply and sanitation utilities are **decentralized public services.**

The municipalities are responsible for organizing the water utilities and are owners of all the facilities.

The municipalities can directly manage them themselves through a "public authority" or delegate their management by temporary contract to a public or private operator.

In the case of public-private partnerships, the participation of the private sector is governed by a comprehensive legislative and regulatory framework.

France emphasizes **the responsibility of the municipalities,** the necessary call for competition for the operators, the follow-up of service quality (reports, performance indicators), the rigor of budgetary control and transparency for the users.

To support the investment effort of local authorities, **the mutual system of the Water Agencies** allows levying taxes and redistributing at least 93% of them, according to the priorities (equalization) defined by the Basin Committee.

These various principles participate in the good governance of water utilities.

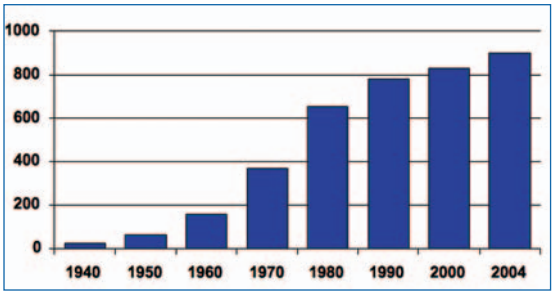
Infrastructures

Some figures (IFEN data 2004):

- In 2004, the water abstractions amounted to 34 billion m³ (Gm³) including: drinking water (6 Gm³), industry (3.6 Gm³), irrigation (4.7 Gm³), energy production and cooling of power plants (19.1 Gm³).
- Out of the 6 billion m³ of supplied drinking water, 4,45 billion m³ were consumed. The remainder was lost through leaks in the networks.
- Domestic water consumption reaches 165 liters per day and per capita on the average.

Evolution of the infrastructures and equipment level

Drinking water:



Evolution of the linear of the drinking water supply network (in thousands of km)
Source: Water Directorate, Ministry of Ecology

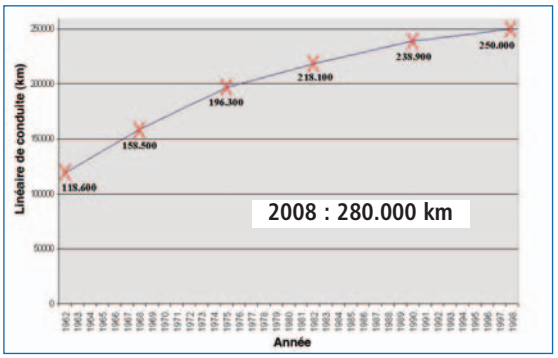
99% of the French population is connected to a drinking water supply network.

The drinking water supply network is to-day made up of **878,000 km of drains** (in 1950, there was only 8% of this linear).

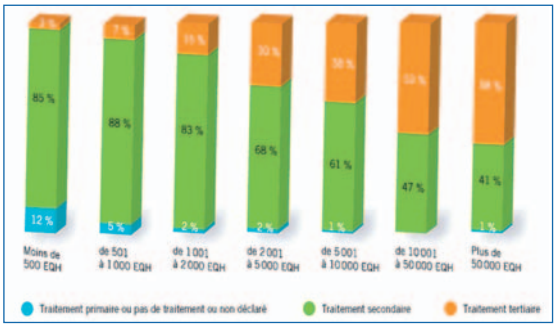
Source: "Public water utilities in 2004 - drinking water component", IFEN, October 2007"

Wastewater collection and treatment:

Today, **the wastewater of 95% of the population is treated** (81% in community sanitation, 19% in on-site sanitation).



Evolution of the linear of the wastewater drainage network used in continental France from 1962 to 1998 (IOWater study, 2002)



Wastewater treatment by size of wastewater treatment plant in 2004 - Source : FP2E, February 2008

The wastewater collecting system includes **280,000 km of sewers,** to which are added 93,300 km for storm drainage. The share taken by the separated sewer systems is progressing.

There are about 17,300 wastewater treatment plants with a total capacity of 89 million population equivalent (pop.eq.). Three-fourth of the wastewater treatment plants have been built since 1990.

In 2004, 7 billion m3 of effluents were treated. More than half of the effluents entering a plant were treated by additional treatment, called "tertiary", to eliminate phosphorus or nitrogen. The other half was treated by "secondary" treatment allowing the degradation of the organic matter. Only a very small volume (0.8%) was only treated by simple decantation.

(Source: "Public water utilities in 2004", IFEN, January 2008).

With a rate of community service coverage for drinking water supply of 99% and a sanitation rate (community and on-site) of 95%, **the first infrastructure building on the French territory is almost entirely completed.**

The renewal of the infrastructures will be the main challenge in the future and will require very significant means.

Municipal drinking water supply and sanitation utilities

Responsibilities and legislative framework

The State defines general rules and guarantees common cause

As the responsibility for water and sanitation utilities is local, the State has primarily **a role of regulator.** It lays down the general rules for the management of utilities at the national level: laws, decrees, etc. It sets the environmental and public health standards, controls the quality of the supplied drinking water **(see page 16),** takes care of water policing (authorization for abstraction and discharge, controls), supervises the relations between local authorities and private companies (public-private partnership), makes sure that transparency for the users is complied with, guarantees common cause between users and access to water for everybody. It controls the accounts of the public drinking water supply and sanitation utilities, whether directly managed or delegated.

Since the Decentralization Laws of 1982 and 1983, the State has no more a prior control on water utilities, but only **a post-audit control:** it controls the legality of public procurements and, generally speaking, of all the activities of local authorities (Prefecture); it checks compliance with technical standards (Departmental Directorates of Agriculture, Public Works, Health and Social Affairs); it controls the accounts (Regional Court of Accounts, Competition Council).

The municipalities organize the public water services

In France, **the municipalities have taken charge of organizing public drinking water supply and sanitation services since 1885.**

The Law on water and the aquatic environments of 30 December 2006 extended the responsibilities of the municipalities:

- concerning on-site sanitation: control and rehabilitation of the on-site sanitation facilities and creation of a Public On-site Sanitation Service (SPANC);
- regarding rain water drainage: possibility of establishing a specific local tax (0.20 euro/m^2 maximum) on waterproofed surfaces to finance work [in parallel, the law created a tax credit for the private owners to finance work for the collection of rain water and softened the regulation in order to allow its use, but only for uses external to the dwelling (watering, washing of cars, etc.), for reasons of public health.]

The drinking water supply and sanitation utilities are local public utilities, **for 36,783 municipalities, there are 29,000 water utilities :** 12,400 for drinking water supply and 16,700 for sanitation (IFEN-SCEES 2007, data 2004).

The management of the utility may be carried out:

- ➤ directly by the municipality itself,
- ➤ by regrouping municipalities (inter-municipality).

For drinking water supply, inter-municipality is predominant: ¾ of the municipalities are regrouped within inter-municipality bodies.

For sanitation, only 44% of the municipalities are regrouped. For 20 years, the development of inter-municipalities has had a significant impact on the management of water utilities, by allowing a pooling of human resources and technical means.

The municipalities have the choice of the management method

The municipalities can:

- either directly manage the utility themselves (public authority or direct management);
- or hand over management to a specialized operator, which can be public or private (delegated management). This delegation is governed by a contract having a predetermined duration.

The elected officials of the Municipal Council or of the inter-municipal body make this choice according to the local situation and based on a report presenting the document containing the nature of the services provided by the delegated operator.

Whichever management option they choose, the municipalities are **always owners** of all the facilities and always remain answerable to the final users. They set the tariffs in particular.

There are 3 main management methods:

❶ Direct management or by a "public authority"

The municipality has complete responsibility for investments, the operation of the water utility and for relations with the users. The staff members of the public authority are municipal employees with civil servant status. Direct management by a public authority concerns large towns whose technical services are highly structured or small rural communities.

Municipal drinking water supply and sanitation utilities

❷ Delegated management

The municipality delegates the management of all or part of the public water supply utility to a public or private industrial company within contracts with predetermined duration. "Affermage" (leasing) and concession are the two types of contracts that are usually used. "Affermage" is the most frequently used.

- **With "affermage",** a leasing contract, the municipality makes and directly finances investments and only entrusts the operation of installations to the operator. The latter's services are paid by billing the water price. The operator levies, on behalf of the owner municipality, the amounts corresponding to expenditure of technical depreciation cost and financial amortization;
- **with concession,** the operator builds the facilities and operates them at its own expense, taking full reimbursement from the water price. The municipality receives no payment. The candidate operator must assess which investments it is prepared to make.

In both cases, the risk of deficit (or benefit) is assumed by the operator and at the end of the contract, the operator will hand the network and installations, the operating software, the customers' file back to the municipality.

This delegated management system has largely proven reliable for several centuries of its existence in France. The big companies of the water sector (Veolia, Suez Lyonnaise des Eaux, Saur) as well as the small to medium-sized enterprises (SME) developed great know-how and carried out research, which place the French water industry as the very first worldwide.

In 2007, in France, **drinking water supply was mainly implemented under delegated management** (72% of the covered users) and sanitation was more and more often entrusted to private operators (55% of the users in 2007 as compared to only 35% in 1997).

When a municipality decides to require the services of a private operator, it will be within a multiyear contract after a call for competition. This contract defines:

- the duration, which must not be tacitly renewable;
- the terms of references of the expected services;
- the payment of the operator which will be included in the water price to be paid by the users;
- the formula of this payment variation;
- end-of-contract conditions for the handing-over of the installations and "to-be-returned goods".

This contract states the precise contractual obligations and distributes the risks between the co-contractors, who will have usually to work as partners for 10 to 20 years. The average duration of the contracts is 11 years (source: TNS Sofres - MEEDM study on the procedures for the delegation of public drinking water supply and sanitation services made in 2006).

The contract is awarded within a strict regulatory framework guaranteeing a call for competition with an obligatory transparency. On the average, **there are about 700 calls for competition made for contracts each year in France.**

❸ Mixed management

There are a lot of intermediate possibilities between direct and delegated management, proving **the flexibility of the French system.** For instance, municipalities can operate drinking water production plants by themselves and only delegate supply. Another example, the commercial aspect, i.e. relations with users (invoicing and recovery) is more and more often entrusted to a specialized operator.

Focus on... the regulation of public drinking water supply and sanitation utilities

Decentralization Laws of 1982 and 1983: these laws organized the decentralization of the State towards local authorities: the local executive power was transferred from the Prefect (State representative) towards the elected officials (departemental council and regional council).

Law n° 92-125 of 6 February 1992, called "ATR Law": the law on the Local Administration of the Republic (Administration Territoriale de la République – ATR) created two new Public bodies for Inter-municipal Cooperation (Etablissements Publics de Coopération Intercommunale - EPCI) with their own taxation: the Community of Municipalities and the Community of Cities, responsible for economic development and regional planning.

Law n° 93-122 of 29 January 1993, called "Sapin Law": this law, relating to the prevention of corruption and to the transparency of economic life and public procedures, does not only exclusively concerns water management, but had a considerable impact on the governance practices of all the public utilities. It lays down, in the case of delegating of a public utility, the obligation of a call for competition for the companies. The introduction of an invitation to tender procedure ended the tacit renewal of contracts.

Law n° 95-101 of 2 February 1995, called "Barnier Law": this law on the increase of environmental protection lays down the obligation of an annual public report of the Mayor on the price and quality of the drinking water supply and sanitation services. The Barnier Law also sets the duration of the delegating of public utilities and prohibits the practice of "import duties" which were traditionally paid by the delegated company for having the right to operate the public water utility.

Law n°95-127 of 8 February 1995, called "Mazeaud Law": this law relating to the delegating of public utilities plans a reporting by the delegated company, which must give the accounts of all the operations related to the execution of the delegating and include an analysis of the service quality. The report must be supplied with a financial and technical appendix allowing the public authority to appreciate the conditions of the contract implementation.

Municipal drinking water supply and sanitation utilities

Law n°99-586 of 12 July 1999, called "Chevènement Law": this law, on the strengthening and simplification of inter-municipal cooperation, laid down a new framework for inter-municipal partnership and involved a local evolution of the water utilities. The number of bodies was reduced, inter-municipal financial common cause increased and the operating rules were standardized. Four bodies were created or reinforced: the Urban Community, the Community of Agglomerations, the Community of Municipalities and the inter-municipal Syndicate.

Law n° 2002-276 of 27 February 2002 on neighborhood democracy: this law obliges informing and consulting the users on the management of public utilities. It increases the role of the advisory commissions of local public utilities (CCSPL) which involve elected officials and representatives of associations. These commissions must be consulted on any project for the creation of a public utility, should its management be delegated or carried out by a public authority.

Law n°2006-1772 of 30 December 2006 on water and aquatic environments: this law especially reinforced all the tools for water policy. In particular, it increased the responsibilities of the municipalities as regards on-site sanitation (control, maintenance, rehabilitation, the owners having to reimburse the municipality). The municipality has the possibility of creating a new Public On-site Sanitation Service (SPANC).

Decrees of 2 May 2007: these texts define the performance indicators which must appear in the Mayor's annual report on the price and quality of the public drinking water supply and sanitation services.

The Water Framework Directive (WFD) of 23 October 2000: as regards utilities, the WFD introduced incentive pricing before 2010 and the recovery of the costs of the services related to water use for all the Member States of the European Union.

The ISO TC 224 standards: work of the ISO TC 224 Technical Committee, chaired by France, led to the adoption of three international standards on 1st December 2007. They provide guidelines on the management, evaluation and improvement of drinking water supply and sanitation utilities.

Financing

In the special case of a concession, the operator finds the funds that are not covered by public funds. In the other cases (affermage, public authority, etc...), the municipalities have to gather the funds necessary to build the installations. In most cases, the municipalities make directly the investments, by resorting to loans from specialized banks.

Some figures on financial flows

On the whole, the expenditure of the water sector almost amounted to 20 billion euros in 2005 ("environmental economics in 2005", IFEN, 2007): 11.7 for sanitation and 8.2 for drinking water supply. These figures add up the expenditure of the public drinking water supply and sanitation utilities, the expenses for on-site sanitation, the expenditure for water supply and treatment in industrial and agricultural activities.

With regard to public drinking water supply and sanitation utilities, **expenditure is covered by the water bill paid by the users: 11.8 billion euros** in 2006, including 7 billion for drinking water and 4.8 billion for sanitation.

The total invoice of 11.8 billion euros, all taxes included, paid by the users is distributed as follows:

- 629 M€ for the State (VAT and tax repaid to VNF);
- 2,993 M€ for local authorities (for the services managed by a "public authority");
- 1,445 M€ for the Water Agencies (taxes later repaid in the form of assistance).
- 6,753 M€ for the delegated operators (for the services under "delegated management"), 2,022 M€ of which (about 30%) are repaid to the local authorities;

Financial assistance from the Water Agencies

Assistance to local authorities for investments in drinking water supply and sanitation is the main expenditure of the Water Agencies. **This assistance amounts to 8.3 billion euros, i.e. 72% of the total amount of the 9th Action Programs (2007-2012):**

- 2.8 for wastewater treatment plants (including 379 M€ for urban-rural common cause);
- 2.4 for sanitation networks (including 263 M€ for urban-rural common cause);
- 1.9 for treatment premiums and assistance for wastewater treatment performance;
- 1.2 for drinking water supply (including 334 M€ for urban-rural common cause).

The financing system by the Water Agencies contributed to improve the networks and installations while allowing accelerating investments and amortization. **This allowed upgrading the French infrastructures and reducing pollution.** The initial objective was indeed to increase the number of urban and industrial wastewater treatment plants: the French territory counted 300 wastewater treatment plants in 1966, there are 17,300 today. After 1990, the Water Agencies increased assistance to build sewerage systems in order to improve the wastewater input to the treatment plants. As regards drinking water supply, the Water Agencies intensified the financing of interconnections and reservoirs after the drought of 1976, in order to recharge low water levels and to decrease water cut-offs in low water periods.

Example of a water bill

Municipal drinking water supply and sanitation utilities

Public assistance mechanisms

There are various mechanisms of public assistance to avoid a sudden increase in the water price, which the user could find unbearable.

➤ Support to underprivileged people

Household expenses related to water are very low in France: they account for 0.8% of their budget on the average, a stable rate for 10 years (2.4% for telecommunications, 3.8% for gas and electricity). The rate of unpaid bills is also very low (less than 1% in the delegated services). But common cause is essential to help a growing number of citizens to face their problems.

The Mutual Housing Fund (FSL), created in 1990, is managed by each Department. It allows helping underprivileged people to face their expenditure related to their dwelling: water, electricity, gas, telephone. In particular, **it allows maintaining the water supply and dealing with the water invoice** thanks to close cooperation between the departmental services and the water companies.

In 2008, the water companies processed about 33,500 files related to the FSL, as compared to 30,800 in 2007.

The water bill can be totally or partially dealt with. Financing is jointly ensured by the Department (Departemental Council) and the water company concerned. The water companies take charge of the bill share which should be due to them (approximately 40%). They can also give up the possible expenses of closing down and reopening up the connection. The Department takes charge of the taxes levied for other organizations (State, Water Agency, local authorities, etc).

➤ Support to rural municipalities

The Regions and Departments support the investment efforts of rural municipalities, from their own budgets and under certain regulations. This can either be in the form of subsidies, or interest rebates on loans.

The National Fund for Rural Water Supply (FNDAE) : this fund, although it does not exist any more, is interesting because it played an historic role in France and can inspire other countries.

This "town and country" common cause fund was set up in 1954 and operated until 2006. The FNDAE levied a tax on each invoiced m^3 of drinking water.

The collected sums were redistributed in each Department to subsidize the investments of rural municipalities. The FNDAE budget amounted to about 144 M€ each year. In 1997, the FNDAE extended its action to agricultural pollution control for an amount of 22 M€ per year. Rural facilities were greatly upgraded. The FNDAE does not exist any more at the national level, but at the level of each basin part of the subsidies of the Water Agencies are still directed towards urban - rural common cause.

Principles for the management of utilities

❶ A balanced budget

Accounting laws and instructions guarantee a sound budgetary management of the public water supply and sanitation utilities.

Public water supply and sanitation utilities must **balance their budget between income and expenditure,** whatever the management method chosen.

As regards expenditure, this budget includes: repayment of loans and bank interests, operation and management costs, maintenance and repair costs, the cost of technical depreciation of installations to renew them when they become obsolete.

Special attention must be paid to operation: technologies have become complex and require well-trained technical and administrative personnel.

In France, personnel cost is the first expenditure (38 % of overall costs, i.e. 55% of operating costs) while investments only represent 30 % of the total costs on the average.

❷ A budget reserved for drinking water supply and sanitation ("water pays for water")

The budgetary and accounting instruction regarding water supply and sanitation utilities, **the M49 instruction,** published in 1990, has been applicable since 1st January 1997 to all utilities, either delegated operators or public authorities. It limits transfers between the main budget of the municipalities and their "water and sanitation" budget.

It imposes establishing **a specific budget reserved for drinking water supply and sanitation.** It is an instrument for transparency and sound budgetary management. Thus, the practice which consists in fixing tariffs at a level higher than the one which allows balancing the utility budget, with the aim of feeding the general budget of the municipality by the transfer of surpluses, is from now on impossible. Similarly, the opposite situation, where the general budget of the municipality (i.e. the income tax paid by the taxpayers) financed the water budget is prohibited today.

❸ Responsible users: cost recovery

To comply with the new European and national environmental and health standards, to meet the increasingly higher users' requirements, it is necessary to build new facilities, to ensure their maintenance, modernization and management. This has a cost, the price of which the users must agree to pay. **The cost of the water service must be covered by the water users alone.** This cost recovery principle, which already existed in France, was reinforced to apply the European Water Framework Directive (WFD). This means adding up all the costs of the services related to water use, including costs for the environment and water resources.

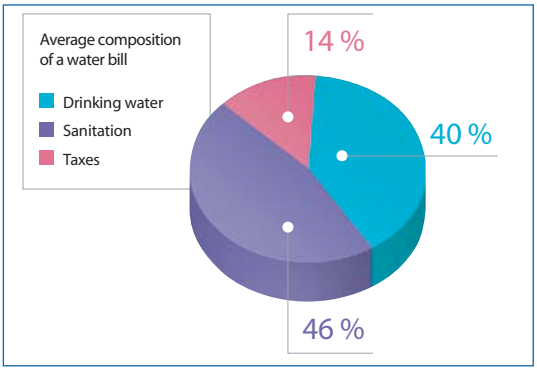
❹ Transparency

The accounts are checked by the delegating authority. They are also controlled by financial jurisdictions. In addition, the budgetary documents and the contracts are all accessible to the public, upon request. Finally, **a yearly report** is published and advisory commissions of users are created.

Municipal drinking water supply and sanitation utilities

Water price and pricing

The water price



Source : IFEN, March 2007

In 2004, the domestic water bill (drinking water + sanitation + taxes) amounted to 177 euros per capita and per annum and the average cost of one m^3 of water amounted to 3 euros ("The domestic water bill in 2004",).

On the average, the water and sanitation price represented one euro per day and family.

The water price is estimated locally. It can vary a lot from one municipal territory to another because the costs supported by the utility depend on local characteristics:

- nature of the resource (spring, river, groundwater), its accessibility, its availability, its quality requiring more or less thorough treatments;
- nature of the dwellings to be covered (urban or rural areas, tourist areas, etc.);
- number of inhabitants to be served;
- investments already made by the municipality, the level of maintenance, the rate chosen for technical renewal or compliance of equipment with the standards;
- management method chosen by the municipality (management by a public authority or by a private company);
- planning of investments over a more or less long duration;
- quality of the service provided to the customers, etc.

After a period of very high increase in the water price in the years 1980-2000, this evolution settled insofar as most of the investments necessary for compliance of the installations with the standards had been made. For 10 years, the average increase in the water price has slowed down with rates close to the inflation, ranging between - 0.4% and 3.5% per year.

The water bill covers:

- The cost (investment + operation) of the drinking water supply service;
- The cost (investment + operation) of the sanitation service;
- The taxes collected by the Water Agencies;
- VAT and various taxes.

The tariff structure

In France, today, the water bill compulsorily includes:

- **a fixed part:** "the subscription", which gives right to drinking water and to sanitation according to the case. It is justified in theory to cover the fixed overhead costs of management of the facilities. The amount of the subscription strongly varies depending on the municipalities. On the average, the subscription amounted to 56 euros per annum in 2004. The fixed part of the water price is defined by methods laid down by ministerial decree.
- **a variable part** which strictly depends on the consumed volume measured with the meter (in any construction of new building, a cold water meter must be installed in each flat as well as a meter in the common parts; for the already built buildings, the individualization of water supply contracts and necessary work are possible by vote of the majority of the members of the joint ownership syndicate).

There are several ways of setting tariffs:

- **pricing by consumption bracket,** which is either progressive or regressive: in the first case, the price per m^3 rises with the increase of the consumption bracket in which the user is. In the second case, the price goes down when the user passes from a consumption bracket to another.
- **fixed pricing,** which does not depend on the volume consumed. This may exceptionally be authorized in two special cases: "when the water resource is naturally abundant and only a very small number of users are linked up to the mains", or "when the municipality usually has strong variations of its population". The invoice then remains unchanged whether consumption is null or strong.

Although the costs of the water utilities are primarily fixed (80% to 95% of the costs of the utilities are fixed and do not depend on the supplied volumes), the fixed share of the bill only represents about 17% on the average.

Social aspects

In France on the whole, the part of the water supply service expenditure has remained marginal and stable since 1996: **0.8% of the household budget.**

But common cause provisions were established to support the poorest people **(see the Mutual Housing Fund page 31).**

The Law of 30 December 2006 also introduced new provisions:

- it reaffirmed the right of access to drinking water for all;
- it very strictly supervised water cut-offs in case of non-payment;
- it created a common cause fund which allows helping the poorest users: while strictly respecting the balanced budget principle, this "social" expenditure must be supported by the social budget distinct from the municipality responsible for the service;
- the joint guarantees and the deposits that have been required until now when opening a subscription are from now on prohibited. The deposits paid until now must be repaid within 2 years.

Municipal drinking water supply and sanitation utilities

Transparency of the information

Informing the users: reports of the mayor and delegated operator

The law requires transparency on the public utility management by the municipality and delegated operator.

The mayor must draw up and publish **a yearly report on the price and quality of the water services,** with precise details on completed, ongoing and planned work, as well as on the debt. This report is presented by the Mayor to the City Council or by the President of the Public Inter-municipal Cooperation Authority to its deliberative assembly. The report must be presented, for the utilities managed by a public authority and for the delegated utilities. It is then made available to the public.

Reciprocally, **the delegated operator must draw up a report on the contract** execution before 1st June at the latest each year: accounts regarding all the actions related to the execution of the delegating of the public utility, analysis of the service quality, appendix allowing the delegating authority to appreciate the conditions for implementation of the public service.

Performance indicators

Since 1st January 2008, a new regulation (decree n° 2007-675 of 2 May 2007) has requested to public and private operators to publish performance indicators, which, since 2009, must appear in the Mayor's yearly report on the price and quality of the water supply and sanitation services.

The objective is twofold:

❶ **implementing services with a progress approach:** to make service quality progressing with a follow-up by performance indicators corresponding to 3 aspects of sustainable development: environmental, economic, social. A methodological guide and descriptive sheets for each indicator are available on the website "Eau dans la Ville" created by the Ministry of Ecology and the International Office for Water:
www.eaudanslaville.fr

❷ **improving public access to information:** giving more explanations on the water price and on the provided service.

Each drinking water supply utility will be described by indicators related to water quality, continuity of the service provided to the consumers, or resource protection even.

Each sanitation utility will be described by indicators on the conformity rate of the discharges, on knowledge index and patrimonial management of the network. Each on-site sanitation facility will also be concerned, with a specific indicator.

This regulation on performance indicators is **the result of a collective step and several years of dialogue** between ministries, local authorities, public and private operators, associations, experts.

The public water supply and sanitation utilities are **the first local utilities to have a common indicator system in France.**

This evaluation of the provided services allows the users to:

- be informed on the quality of the provided service;
- understand the price evolution;
- be able to intervene in a constructive way.

The managers of facilities to:

- have indicators allowing identifying, quantifying and qualifying malfunctions;
- have elements to communicate;
- lay down precise quantitative and qualitative objectives, to identify the improvements to be brought to the service.

The local authorities to:

- have a tool for following up the technical management of the facilities;
- anticipate investments and renewals;
- have elements for evaluating service quality;
- be able to evaluate the status of the assets;
- control the utility management;
- lay down recommendations and objectives.

An information system makes the locally published indicators available at the national level. It allows access to all the public data on water supply and sanitation utilities and allows comparing similar service performances. This supervising tool allows the municipalities organizing services to follow the evolution of their performances from one year to the other. It offers the users greater transparency on the management of the utilities.

www.eaufrance.fr

Users' consultation: advisory commissions

The users are associated to the management of public utilities.

At the local level, an advisory commission of local public utilities is created for each utility. Every year, it examines the various above mentioned reports, as well as a progress report for the utilities managed by a local authority. It is also consulted for advice on any project for delegating management of a public utility or for creating a public authority with financial autonomy.

At the national level, a national advisory authority on water supply and sanitation utilities was created within the National Water Committee.

Budgetary control by financial jurisdictions

Regional Courts of Accounts control the budgetary management of utilities. Governance of drinking water supply and sanitation utilities became a real matter of interest to the society, the political and economic stakes of which are important.

Municipal drinking water supply and sanitation utilities

Vocational training

The technicality of water professions requires very precise skills and more and more qualifications. **All the technical and administrative staffs** must be well trained in basic training and **continuing vocational training.**

In France, **the National Water Training Center (CNFME),** located in Limoges - La Souterraine and managed by the **International Office for Water (IOWater),** is at the core of continuing vocational training of the water sector. The CNFME has existed since 1978 and trains about 6,500 people with all kinds of qualifications each year, using **practical teaching in real working situation.** The CNFME proposes:

- a catalogue of 845 training courses per year;
- technical units for practical work in real situation, such a site being unique in Europe (drinking water treatment, wastewater collecting systems, wastewater treatment plant, etc.) ;
- tailored training programs adapted upon its customers' request: need assessment, evaluation of the staffs' abilities, training plans, personalized work-linked training;
- training days for elected officials and people in charge of local authorities, in relation with their responsibilities regarding water or waste (more than 10,000 elected officials attended these training days during the last 10 years);
- trainers' training and design of teaching documentation;
- distance training via the Internet: "e-learning";
- systems for measuring the gained knowledge.

More than 1,200 organizations have their employees trained by **IOWater:** public and private operators of drinking water supply and sanitation utilities, consulting firms, equipment suppliers, industrialists, etc. **IOWater** carried out specific training projects for local authorities (Lyon, Lille, SIAAP, etc.), large private groups (VEOLIA, Suez Lyonnaise des Eaux) in France and abroad: FES (Switzerland), SONEDE (Tunisia), ADE (Algeria), ONEP (Morocco), REGIDESO (Congo RD), ICRC (Geneva), etc.

This arrangement today inspires many countries, which want to reinforce their own training facilities. This led to cooperation projects with **IOWater** to create or develop **national water training centers abroad:** after the first success of the creation of Gdansk Water Foundation in Poland, the Mexican Training Center for Drinking Water Supply and Sanitation jointly promoted and financed by the French and Mexican Governments is an excellent example of this collaboration, as well as cooperation projects carried out in South Africa, Algeria, Morocco, Kenya, Nigeria, Romania, Tunisia, Burkina Faso, Venezuela, Brazil, Libya, etc.

IOWater also carried out the feasibility study of the Riyadh training center in Saudi Arabia.

IOWater takes care of the secretariat of the International Network of Water Training Centers (NWTC), created in 2008:

www.ricfme.org

IOWater provides assistance to **assess training needs, to build local training capacities and to establish financing mechanisms,** three items essential for the good operation of professional training.

Access to specialized documentation and data is also part of capacity building. France contributes in the effort of sharing sources of information through **the Euro-Mediterranean Water Information and Documentation System (EMWIS)** associating 27 countries of the European Union and the Mediterranean Basin.

IOWater is one of the three technical operators of **EMWIS,** in cooperation with its Italian and Spanish partners.

It is also a partner of **the African Water Information System (AWIS).**

French experience at the service of international action

Water: one of the priorities of French cooperation policy for development

France is one of the first donors in the water sector. On the average, it devoted 228 M€ per year to bilateral assistance in 2006-2007 (OECD figures) and about 100 M€ per year to multilateral assistance (2001-2003 averages). **It had a water action plan adopted by the G8 in Evian (2003).**

French assistance has doubled in the water sector

In 2005, France made the water sector one of the 7 priority sectors of its cooperation policy for achieving the Millennium Development Goals (MDGs).

It has given itself a multiyear reference strategy for water and sanitation. This strategy confirms the objective of doubling its assistance in the water sector, in Africa in particular, which had been announced in Evian.

This water and sanitation strategy plans that this doubling will prioritize: sanitation, access to water for underprivileged populations in rural, semi-urban and peri-urban areas, water resources protection and development based on integrated and efficient management (management at the level of national and transboundary river basins, water savings, water quality, irrigation).

The financing of infrastructures is accompanied by actions for:

- assisting governments in defining national water policies and reforms;
- organizing concerted and sustainable water resource management at the level of river basins;
- increasing capacity building through training at all levels (decision-makers, engineers, technicians, etc);
- involving the local stakeholders and more particularly the local authorities as being responsible for drinking water supply and sanitation utilities and thus reinforcing the local contracting authorities;
- developing multi-partnerships (State, local authorities, NGOs, the civil society, private operators).

A pioneer law at the service of decentralized cooperation: the Law of 9 February 2005

This law, called "Oudin-Santini Law", allows the French local authorities and Water Agencies to levy up to **1% of the incomes from water and sanitation utilities to finance actions of international common cause.**

All the categories of stakeholders develop actions of international common cause

- **The State:** the Ministry for Foreign and European Affairs coordinates the interministerial strategy in relation with the Ministry of Finance with which it shares the supervision of the French Development Agency, the Ministries of Ecology, Agriculture and Health provide their institutional and technical expertise and finance targeted cooperation projects.
- **The French Development Agency (AFD)** is the central operator of French official development assistance. It contributes in the financing of development projects by subsidies or loans.
- **The municipalities and their groupings** started decentralized cooperation actions a long time ago. These actions can be extended and strengthened by the Law of 9 February 2005.
- **The Water Agencies** carry out or finance international common cause activities pursuant to the Law of 9 February 2005.
- **The small, medium-sized companies** or great groups developed a know-how which is recognized by the international community.
- **The Non-Governmental Organizations (NGOs)** are active in development, environmental protection and emergency response.
- **The scientific and research organizations** play an active part.
- **The International Office for Water (IOWater)** carries out cooperation projects specialized in institutional reforms, the management of information systems and continuing vocational training.

Creation of a Users' Committee,
Prey Tok vVillage, Battambang Province, Cambodia
(IOWater project, December 2005)

Conclusion

Common cause between all the stakeholders is necessary to meet the challenges of water management and the impacts of climate change.

The lessons that can be learned from the French experience are:

- integrated water management at the level of river basins;
- decentralization of water management;
- participative management, involving all the stakeholders and the public;
- application of the polluter-pays principle and the Water Agencies' role of economic mutualization;
- local public responsibility for water supply and sanitation utilities;
- experience feedback from the various methods used for managing water utilities, either managed by a public authority or by a delegated private company;
- transparency in the operation of services and information to the users.

But, of course, while this system is efficiently operating in France, it cannot be exported as such to other countries. On the other hand, the methods developed in France can help the countries, which wish it, to reinforce their water resources management at the national, regional or local level and to develop international coordination for transboundary water resources management.

The International Office for Water

The International Office for Water (IOWater) was created in 1991 to assist all the countries wanting to modernize their water management, by inspiring themselves from, in particular, the public organization that France has developed with effectiveness for nearly one century. For this reason, it intervenes abroad in the following fields in particular:

- integrated river basin management and development;
- governance of public drinking water supply and sanitation utilities;
- restructuring of organizations in charge of water development and collective irrigation;
- implementation of the European Water Directives, Pre-accession Twinning Arrangements and Neighborhood Policy;
- vocational training and the creation of Water Training Centers abroad;
- creation of Water Information Systems and databases.

IOWater manages the French National Water Training Center - CNFME (6,500 trainees and 845 training courses each year) in Limoges - La Souterraine.

It proposes:

- continuing professional training courses for decision makers, managers of utilities, technicians, HRDs, trainers, etc;
- assistance in training engineering to define national training systems, assess the training needs of the services and draw up training plans, create and develop local training centers abroad as in South Africa, Algeria, Saudi Arabia, Kenya, Laos, Mexico, Nigeria, Poland, Vietnam (feasibility study, design of the buildings and educational units, drawing up of training programs, training of trainers).

IOWater is entrusted with the secretariat of the International Network of Water Training Centers (INWTC).

IOWater manages the National Information and Documentation Center on Water which contributes to the public access to information in the field of water (documentary bases, development of websites, data management, studies, strategic watch, syntheses, etc.).

IOWater helps to set up **water information systems** in the Mediterranean (Euro-Mediterranean Water Information System), as well as in Europe, Africa (African Water Information System - AWIS) and Latin America.

Since 1994, **IOWater has taken care of the Permanent Technical Secretariat of the International Network of Basin Organizations (INBO)** which structure experience sharing between basin organizations worldwide.

IOWater developed recognized abilities in institutional organization, advice and professional training. With its Department of International Cooperation based at Sophia-Antipolis, **it can provide assistance to carry out the reforms and capacity building needed in all the countries which wish its assistance.**

IOWater is a founder member of **the French Water Partnership (FWP)** which gathers the French water stakeholders and coordinates their participation in the international events such as the World Water Forums.

The French National Water Training Center

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