

**A comparison between French and Chinese Legal Systems  
in terms of Integrated Water Resources Management**

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**ABSTRACT**

This paper compares legal systems for water management between France and China, with a focus on integrated water resources management (IWRM), regarding particularly the formulation of policies and their implementation. The study shows the willingness of China to commit itself to a more efficient and sustainable water resources management. This commitment has been often interrupted or has been proven to be often insufficient, on account of a lack of socio-economic and environmental priorities. France has developed a complete legislative framework and practical instruments to apply integrated water resources management at river basin level since the 1960's. This experience and the current implementation of the European Water Framework Directive bring elements that can contribute to help the Chinese society to meet the environmental challenges.

**KEYWORDS**

Legislation, regulation, water policy, integrated river basin management, integrated water resources management, planning, participation, protection of water quality and aquatic environment, water permitting, financing, water pricing.

**INTRODUCTION**

Through this paper, the authors propose a comparison between French and Chinese water policy systems. It is obviously difficult to compare China with 1,3 billion inhabitants and France with 65 million inhabitants, with so different territories and cultures. But the main differences and common ground can be drawn. France has developed a wide expertise of water management, both for integrated water resources management and public services of water supply and sanitation. The French experience can inspire the public authorities of other countries, although the organization must obviously be adapted to each local situation. It is recognized necessary for China to avoid simple duplication while learning from French experience in water legislation regarding Integrated River Basin Management, with the hope that the water resources in China's river basins may reach a state that is sustainable both economically and environmentally for its people and for surrounding countries.

## 1. INSTITUTIONAL FRAME, LEGISLATION AND MAIN PRINCIPLES

→ **France**, 65 million inhabitants, is composed of 26 Regions (4 of which are overseas), 101 Departments (5 of which are overseas) and 36 783 Municipalities. Even if France has been a long time a centralized State, it has undertaken a **decentralization process since the 19th Century**. On the one hand, the State government is decentralized with a State representative in each Department, the Prefect (“Préfet” in French). The function of Prefect was created after the French Revolution by Napoleon Bonaparte in 1800. As each Region comprises several Departments, one of the Departmental Prefect is designed as Regional Prefect. This form of decentralization is more precisely defined as a deconcentration. Both the Departmental and Regional Prefects coordinate deconcentrated State services which are competent at these territorial levels. On the other hand, more recently, the State transferred some responsibilities to the Departments and Regions, which became autonomous communities, from a legal and financial viewpoint, by a Decentralization Law in 1982.

**Water management is also decentralized.** Regarding the management of drinking water supply and sanitation utilities, it is decentralized at the **municipality level**. The French municipalities are responsible for their organization since the 19<sup>th</sup> Century: they own the infrastructures and they can directly manage them or hand over the management by a temporary contract to a specialized operator, either public or private. The responsibility for water supply and sanitation services lying at local level, the State plays essentially a regulation role, establishing general rules for the utilities management, the protection of environment, the public health, the public-private partnership, ensuring social solidarity between users and guaranteeing access to water for everyone. Regarding the water resources management, it is decentralized at the **river basin level** and this article will focus on this matter.

At national level, the ministry responsible for water policy is the **Ministry of Ecology, Energy, Sustainable Development and Sea**, resulting from the creation of the Ministry of Environment in 1971, from following extensions during the past decades and more recently, from the merging with several other ministries due to the need for a completely **cross-sectoral approach**. The Ministry of Ecology defines and coordinates the national water policy, and manages the **Inter-Ministerial Mission for Water**, gathering all ministries concerned under the authority of the Prime Minister. Its departmental and regional services locally apply water policy with its regulatory and technical aspects, through the so-called “water police”.

The main principles of water resources management in France are: decentralized management at river basin level, integrated approach, dialogue and coordination of actions, stakeholder and public participation, mobilization of specific financial resources based on the polluter-pays principle, multiyear planning and programming.

Although some bases of the water policy go back to the 16th century, the current organization relies on a law of 1964, which was then supplemented and modernized. The laws which directly organize IWRM in France are the following:

- The **1964 Water Law is the founder law** of river basin management in France. It stated three essential principles, which are now recognized but were innovating at that time: decentralized management at river basin level, concerted management, incentive financial tools. For organizing dialogue and sharing of responsibilities, an advisory body (the Basin Committee) and an executive organization (the Water Agency) were created in each large basin.
- The **1984 Fishing Law** 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 **1992 Water Law** laid down planning instruments on a basin scale and the principles of integrated water management. All waters and aquatic environments have become the « common heritage of the Nation »; the water belongs to nobody including the State itself. The law requires also a balanced management between water uses, with giving the priority to drinking water supply, an overall management of all waters (surface, ground, marine, coastal water), and the conservation of aquatic environments and wetlands.
  
- The **European Water Framework Directive (WFD) of 23 October 2000** establishing a framework for Community action in the field of water policy is an European Law with a very high importance. It gave an overall consistency to a well developed European legislation (more than 30 European legal texts) and laid down common objectives, timetable and working method for the 27 Member States of the European Union. It sets out an obligation of results: achieving before 2015 a good overall status of all waters. It applies to all European countries the French founder principles of water management: management at river basin level, integrated water resources management, participation of the water stakeholders, planning on a basin scale. River basin districts must be identified, including at the international level. For each river basin district, before end 2009, a management plan should define the objectives to be reached in 2015 and a program of measures should identify the necessary actions and the timetable. When elaborating them, each river basin authority has to ensure an active participation of the water stakeholders and the public. The directive requires applying the cost recovery of water services, including the environmental costs, applying the polluter-pays principle.
- The **2006 Water and Aquatic Environment Law** updated the whole water policy 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 management of public water utilities. 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).

→ **China**, 1,3 billion inhabitants, is composed by 33 provinces, each of which has a population varying between 10 to 80 million people. Differences over the sharing of common water bodies are thus unavoidable. During past 20 years and along with rapid economic booming, disputes over water use, water pollution and degradation of the water resources had become a major concern in the country. For example the Yellow River, the water source to the 9 alongside provinces with about 200 million people, was catastrophically dried up for 126 days in 1997.

The **Ministry of Water Resources (MWR)**, founded in October, 1949, is the Government Department responsible for water administration.

But the Ministry of Construction is in charge of the urban water utilities. There is also the **Ministry of Environment Protection, formerly State Environment Protection Administration (SEPA)**, in charge of protecting China's air, water, and land from pollution and contamination. It replaced the SEPA during the March 2008 National People's Congress in Beijing. There is overlapping with the Ministry of Water Resources (MWR). In the area of water pollution control, the conflicts between the MWR and SEPA over policy implementation have hampered further improvement of water quality in rivers and lakes in China. The MWR is the main ministry overseeing water resource management, as legally authorized by the Water Law, and the ministry also claims authority over water quality control. However, SEPA is regarded as the ministry in charge of water quality control. Because the duties of the two ministries overlap, conflict arises in cases where there is a dispute over trans-boundary water pollution between upstream and downstream users. In these cases, SEPA is supposed to have a mediating role to resolve the conflict over the trans-regional environmental problem. Since trans-boundary water pollution conflicts usually take place in a river, it is not SEPA but the MWR that is authorised to resolve the dispute. The undefined and **overlapping responsibilities** in water policy implementation between the ministries have resulted in unnecessary duplicate data collection, and incoherent water quality control policy implementation.

The central government has established a **wide range of laws and regulations** relating to water policy since 1949. In response to the legal institutions established at the national level, provincial and municipal governments have been able to establish their own legal systems appropriate to local circumstances thanks to decentralisation since the 1980s.

- The **Water Law of the People's Republic of China (1988, revised 2002)** is the key law defining the nature of water management in China. The State ownership of water is defined in the Constitution and presented again in the Water Law. The State Council, i.e., central government, holds the ownership for the State. Thus, **water right usually refers to right to use of water**, and provincial and lower level governments implement water rights administration as authorized by the central government. The purposes of the Water Law as revised in 2002 are: 1) to undertake the rational development, utilisation, saving and protection of water resources; 2) to prevent and control water disasters; and 3) to conduct the sustainable use of water resources. It reflects current thinking on IRBM. It enshrines the principles that everyone should have access to safe water and that water conservation and environmental protection are a priority, and it focuses on four topics: water allocation, rights and permits; river basin management; water use efficiency and conservation; and protection of water resources from pollution.

For the first time in China, the law defines river basin management institutions and functions, and strengthens the administrative rights of river basin administrations. It provides for coordination and information sharing on water quantity and quality. The law encourages the establishment of water user associations with defined rights of access to water, ownership of water infrastructure, and conflict resolution mechanisms. It requires integration of water resource and economic development planning. Water is identified as an economic commodity, with provision for abstraction charges and cost recovery of user charges. Based upon this law, Chinese Water Policy System has been shifted from development towards management in recent years.

- The **Flood Control Law of the People's Republic of China (1997)** sets the framework for managing floods, preventing and mitigating damages, preserving the safety of people's lives and property, and ensuring that flood prevention is integrated into the national planning process.

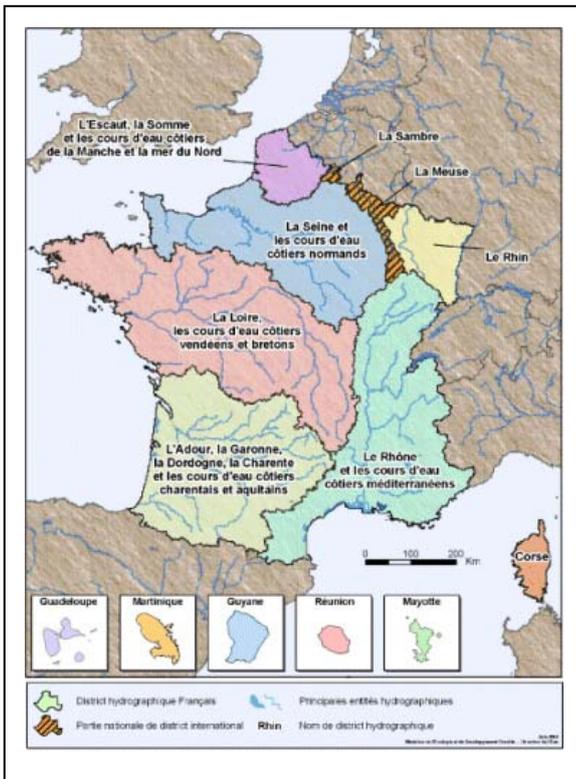
- The **Law on Prevention and Control of Water Pollution of the People's Republic of China (1996)** provides for the spread of urban wastewater treatment. It establishes the framework for industrial and municipal discharge pollution controls and charges. Associated regulations introduce *discharge standards for industry* (in 1996), as well as *water quality objectives for surface waters* (in 2002). As is the case for the Water Law, the WPPC also sets out a system for zoning the environmental functions of river reaches. However, in this and other areas, WPPC conflicts with the Water Law, resulting in duplication in MWR and SEPA line administrations. WPPC is currently under revision.

- The **Marine Environmental Protection Law of the People's Republic of China (1999)** aims to protect and improve the marine environment, conserve marine resources and prevent pollution damages, including from land-based sources. It requires that environmental protection and river management departments (at all government levels) work to prevent rivers from being polluted, so as to ensure the good quality of waters emptying into the sea. It also requires that the competent State Administrative Department in charge of marine affairs works to prevent the marine environment from being damaged by over-fishing or pollution.

These laws are implemented together with secondary legislation and regulations and are supported by State Council decrees. They are enacted in each province by translation into the provincial legislation, a process that can result in some regional variations on interpretation and implementation.

As there are a number of ministries and bureaus involved in China's water policy, this complexity has caused the fragmentation of responsibilities. Conflicts between ministries over policymaking and implementation often take place, and a blurry definition of accountability in some areas creates a policy vacuum in which it is difficult to enforce the laws on water pollution control, and the allocation of water to urban and rural water users. The complicated mechanisms created by nine different water management departments often lead to inconsistent policy and implementation at national and local levels.

## 2. RIVER BASIN MANAGEMENT, PLANNING AND PUBLIC PARTICIPATION



→ **In France**, water policy is defined and coordinated at the national level but decentralized at the river basin level. It takes into account the geographical reality of the resources because “water knows no administrative boundary”. The 1964 Water Law identified 6 large river basins on the metropolitan territory, to which were added those of oversea departments. The large French river basins became “river basin districts” according to the European definition.

Water is managed according to an integrated approach taking into account all the water uses, the needs of the aquatic ecosystems, pollution prevention and the control of natural and accidental hazards. Integrated river basin management allows a **coordinated approach** between upstream and downstream, quantity and quality, surface and ground waters.

The Prefect of the area, where the Basin Committee has its home office, coordinates the State policy for water policing and water management. This Prefect is called “**Basin Coordinator Prefect**”. This coordination allows consistency of actions and homogeneous implementation of the management plan in the entire river basin beyond the administrative boundaries. In particular, the Basin Coordinator Prefect has the means needed for crisis management; for example he can take measures for limiting or stopping water uses to deal with accidents, floods, droughts or water scarcity.

In each large metropolitan river basin, the 1964 Water Law created a **Water Agency**, an administrative public body of the State, under the double supervision of the Ministry of Ecology and the Ministry of Finances. The Water Agencies are financially autonomous (they have their own financial resources) and have a permanent staff from about 100 to 200 people per agency. The Water Agency has two levers for action: an environmental taxation (water taxes levied on water abstractions and the emission of pollutants, which are incentives), a financial assistance (redistribution of the funds to the water users of the basin, should they be public or private, collective or individuals, to support studies and investments).

There is a **multiyear planning, through management plans** which define the objectives and priorities for action, either at the large river basin level in the Master Plans for Water Development and Management (SDAGE) or at the sub-basin level in the Water Development and Management Schemes (SAGE). These plans have an administrative and legal status. They are elaborated in a concerted way, but are then endorsed by the State representatives.

**At the large river basin level, the Master Plan for Water Development and Management (“Schéma Directeur d’Aménagement et de Gestion des Eaux”, SDAGE)** gives the overall orientations of water management in the basin and the objectives to be reached. The SDAGE is prepared from a technical point of view by the Water Agency and the State services and decisions are then made within a River Basin Committee involving all stakeholders. The SDAGE is 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 water law of 1992 and go back to 1996. Each SDAGE is currently being revised to become the “management plan” required by the European Water Framework Directive (WFD).

**At the sub-basin level, the Water Development and Management Scheme (“Schéma d’Aménagement et de Gestion des Eaux”, SAGE)** is a local implementation of the SDAGE. It sets out more precise objectives to be reached on water uses, quantitative and qualitative protection of surface and groundwater resources and aquatic ecosystems, conservation of wetlands, etc. Various types of actions are planned, 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. A SAGE is generally elaborated on a voluntary basis at the initiative of local elected officials, apart from when it is required by the Prefect. When the SAGE is adopted, 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**: industrials, farmers, private owners, should comply with its provisions.

This is a **concerted water planning**, which involves all the users at 3 institutionalized levels:

- At national level, the **National Water Committee** created in 1964 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, gives advice on the draft legal texts, on reforms and draft governmental action plans.
- At the river basin level, a **River Basin Committee**, chaired by a local elected official, 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 and debates on the Master Plan for Water Development and Management (SDAGE).
- At the level of sub-basins (or aquifers, lakes), a **Local Water Commission** can be set up to prepare a Local Plan for Water Development and Management (SAGE) and follow up the local implementation of the SDAGE. It is composed by representatives of local authorities (50 %), users and associations (25 %) and local State services (25 %).

France not only developed stakeholder participation through national, basin and sub-basin committees, but also developed procedures for the **information and participation of the general public**. A 1978 law recognizes a general principle of freedom of access to administrative documents. More particularly, the Water Agencies are given a task of public information and awareness: they manage a documentation service available to the public and disseminate information documents. The public can be consulted through Public Survey procedures on specific projects and a National Commission for Public Debate can organize wide consultations for large scale projects. New methods were implemented to fully apply the EU Water Framework Directive which plans several steps of public participation. For example, a public consultation on the draft SDAGE took place on the whole French territory during 6 months in 2008, entitled "Water is life, give us your opinion": a questionnaire was sent to the 28 million French families and local public meetings have been organized.

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 their implementation and to assess their effects. Although water-related data are plenty, they are often dispersed between several 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** which ensures the harmonization, exchange and accessibility of data ([www.eaufrance.fr](http://www.eaufrance.fr)). 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,... This information system is based on a common reference frame (technically operated by the International Office for Water) allowing easy data exchange between data producers by organizing **interoperability between the systems**.

→ **In China**, the Water Policy System is based on a **centralized top-down process**, with a combination of river basin administration and administrative division administration. The new 2002 Water Law brought significant progress as regards river basin administration: it stated that "river basin organizations established by the competent authority in charge of water in key rivers and lakes at the national level, shall perform their functions of water management and supervision in the areas under their jurisdiction as per the stipulations of the laws and administrative regulations, as well as those delegated by the agency under the State Council charged with water affairs". Under the Ministry of Water Resources, there are **7 River Basin Commissions (RBC)** as representative offices of the Ministry, for each of the seven large river basins: Changjiang (Yangtze), Yellow River, Huaihe, Haihe, Pearl River, Song-Liao, Taihu. Each one covers a number of provinces. They are responsible for water administration on behalf of the Ministry of Water Resources. They have the responsibilities of river basin planning, flood control, water resources allocation, water resources protection, soil conservation, water drawing permission, and management of construction projects financed by the central government. Traditionally RBC have focused on development planning and projects and had little impact or guidance on administration within province. Usually, the water authorities of local people's governments at the county level are in charge of supervision of water resources in their administrative divisions; issues going beyond are administered by the water authority at the next upper level.



Main river basins in China

The Water Law lays down principles for planning and priorities for allocation of water resources. The planning provided in the Water Law covers national strategic planning (new), river basin planning, regional planning, and also the mid-and-long term plan for the demand and supply of water. Master Plans for Integrated Management of Water Environment are being elaborated. Water allocation plans should be formulated in line with these river basin plans and with plans for the demand and supply of water. Annual water allocation plan is also made based on water allocation plan and forecast of water availability. Top priority in allocation is given to domestic water use, and prioritizing is not made for other uses, except in arid and semi-arid areas where ecological needs should be fully considered.

Today, the river basin water management holds a high position in China's water policy system and related quantitative targets were set as part of the National Five-Year Plan for Environmental Protection covering the period 2006-10.

The Chinese Water Law specifies consultation procedures of government agencies and administrative levels, but **no provision for the consultation of stakeholders and even less for the general public**. In fact, public participation in China's water policymaking and implementation was ignored and discouraged by the government until the mid-1990s. Although the Environmental Impact Assessment (EIA) Law of 2002 allows the public to have access to EIA reports, it seems that local Environmental Protection Bureaus are reluctant to reveal the reports to the public. This lack of public participation in environmental policy has weakened the legitimacy of the authorities' law enforcement and triggered public resistance, led by environmental NGOs, to the Nu River dam construction projects from 2004 to 2005. Some local officials are against the disclosure of EIA reports to the public because public consultation may result in the higher cost of the environmental policy process and reduce bureaucratic efficiency over environmental issues. This means that there is no transparency in environmental policy and it discourages the public from becoming a useful non-bureaucratic ally in support of water policy.

### 3. WATER PERMITTING SYSTEM

→ **In France**, the 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**”. It is an administrative mode which requires either a mere declaration or an administrative authorization, according to the characteristics of the project and the thresholds laid down by ministerial decrees. This regulation is defined by the central government at national level and the decisions are made locally by the Prefect. When an authorization is needed, the decision is made after an investigation for assessing the potential impacts 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.

Several departmental administrations being concerned (agriculture, town planning, health, industry, environment, etc.), France organized a coordination of these administrations within the “**Inter-Services Mission for Water**” (**MISE**), under the authority of the Prefect. This unique body permits to jointly examine documents, to make decisions faster in a coordinated way, to take into account all the aspects of the project and all the stakes (health standards, town planning rules, vulnerability of the ecosystems, etc.). It applies 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 in a **cross-sectoral approach**.

The “water police” consists also of a **compliance control with regulations**. The local staff of the National Agency for Water and Aquatic Environments (ONEMA) 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 of the facility for example). In some cases, penal sanctions are necessary: the official report is transmitted to the judge who can inflict a penalty, either financial or a sentence of imprisonment for the most serious cases.

→ **In China**, **water permit is also required for the right to use of water**. The 2002 Water Law stipulates that all water resources belong to the State and that the State will implement a system combining control of total water quantity and management by quota. **The State Council assumes ownership, exercises allocation**, utilizes and claims benefits from water resources on behalf of the State. In other words, local government has no right to allocate or otherwise dispose of water resources in a river basin since that right belongs to the State Council. The allocation of basin water resources is of critical importance because of shortages. The allocation of water resources of the Yellow River, for example, is now governed by an *Ordinance on Yellow River Water Quantity Regulation*, passed and officially implemented in 2006 after a lengthy process to put it in place. This has systemized the allocation and regulatory plan for water quantity in the Yellow River. Since the State began exercising unified allocation of water quantity for the Yellow River in 1999, there have been no further instances of it drying up. This has brought economic, social and ecological benefits.

The Water Law requires that industrial sectors at provincial level shall set **quotas for industrial water use** within their respective administrative jurisdictions. They must also formulate annual plans for water use on the basis of the available water in line with the quotas for water use, economic and technical conditions and plans for allocation of water. These plans control the total amount of the water used annually within their respective administrative areas. Priority is given to water saving and efficient water use. A water quota was set for some ten provinces.

The State will now implement a **new system of water use permits and payment** for water resources in line with the new law. Entities and individuals extracting water directly from rivers, lakes, or underground aquifers are now required under the provisions of a water diversion license and payment system to apply for a license to do so from water administration departments or river basin organizations. Extractors will pay water resource fees for the right to use water.

As regards wastewater discharge, while **total load control permit systems** are used for firms that comply with effluent standards, firms that exceed effluent standards are faced with the threat of closure. Firms receive a warning and guidance about their need to comply, but ongoing breach of regulations can lead to closure. Application of the **close-down policy** is closely linked to local development policies. For example, regulators are less likely to enforce closure in areas where local economic development is weak, while closure is more likely where pollution from firms affects important investments such as within the South-North Water Transfer Projects. When the government assessed industrial pollution across different sectors, it identified fifteen categories of enterprises that are defined as serious polluters. By 1997, more than 64,000 "Fifteen Small" enterprises were shut down, accounting for 86 percent of non-complying units. However, strategically important enterprises located in economically struggling regions were allowed to continue operating. The policy encountered significant resistance because of its socioeconomic implications, but from an environmental perspective, the results were encouraging.

#### **4. PROTECTION OF WATER AND AQUATIC ENVIRONMENT**

→ **In France**, since the 1964 Water Law, **river quality objectives** have been set for the main rivers. With the 1992 Water Law, they were integrated into the management plans. The quality objectives are from now on based on the objective of "good status" introduced by the 2000 European Water Framework Directive. France organized a wide monitoring system and a **Water Status Assessment System**.

In order to **limit pollution at the source**, standards are applied to domestic, agricultural and industrial discharges. Local authorities, farmers and industrialists, are incited to comply with the standards and 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. **The wastewater of 95% of the population is treated** (81% in community sanitation, 19% in on-site sanitation).

As regards agriculture, the ministries in charge of agriculture and the environment have launched since 1994 a **Program for the Control of Pollution of Agricultural Origin**: the PMPOA. Specific **agro-environmental programs** are implemented in agreement with the farmers, within the framework of the European Community regulations.

Reinforced measures are enacted in the particularly sensitive sectors, which are the subject of special protection. It is the case, in particular, of **protection areas 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 EU Nitrates Directive, “sensitive zones” according to the EU Urban Waste Water Directive, wetlands, EU Natura 2000 zones, etc. Still efforts are being done to fully comply with the Urban Wastewater and Nitrates European Directives. The most fragile aquatic environments, such as marshes and ponds, low alluvial valleys, estuaries, are the subject of particular protections.

As regards the water quantity used for irrigation, there are Regional Development Companies which allowed the creation of large collective irrigated areas on a wide scale and are now effective operators for water management by **volumetric quotas**, with a contract signed with each irrigator and with a complementary control by the State on account of the “water police”. Like all the significant abstractions of water, those for irrigation are subjected 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<sup>3</sup>/h to 8 m<sup>3</sup>/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**. At the end of 2003, France had an equipment rate of 71% of the irrigators’ farms accounting for 85% of the surface areas.

**As regards the protection of fish populations**, the 1984 Fishing Law obliges to maintain a “reserved flow” downstream of the installations, to guarantee aquatic life and the healthiness of rivers. Fishing activities must fit in with a **Departmental Plan for the Protection of aquatic environments and fish resource Management (DPPM)** implemented in each Department and **local Fish Resource Management Plans** developed for each river. The Programs for the restoration of highly migratory fish developed 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).

As regards **drought prevention and management**, the State has several legal tools in the frame of the “water police”: **declaration or authorization procedures** (the maximum volume, which can be abstracted, is given in the decision on exploiting authorization granted to the industrialists and farmers), **reserved flow** (the operators of infrastructures have to reserve a minimal downstream flow to guarantee aquatic life and safe rivers), **drought decrees** (the Prefect can provisionally limit or even prohibit abstractions by a “drought decree”).

The objective is to preserve the priority use which is the supply of drinking water supply to the populations), **replenishment of low water flows** (the Prefect asks the operators of infrastructures to release water from the dams and lake-reservoirs). Following the important drought which occurred in summer 2003, France also developed a comprehensive **Management Plan for Water Scarcity**, to plan and optimize the use of water resources in the long-term. After a policy rather focused on increasing the offer (building of dams and reserves, increasing water pumping, priority must from now on, be given to the **regulation of the water demand**.

The French hydropower sector is the **highest in the European Union**, providing about 15% of the total energy and 80% of the French renewable electric power production. The dams must **respect the environment**, comply with the reserved flows, the creation of fishways, the conservation of wetlands and strict conditions concerning water releases and draining up of the reservoirs. France developed a high level of technical expertise concerning safety and impacts of dams, which are controlled by a “**dam inspectorate**” belonging to the State.

→ **In China**, regulations were published in 2002 concerning *water quality objectives for surface waters*. China must face an important pollution of water resources. Particularly, the wastewater treatment rate is about 22 % only. The 2006-2010 National Plan sets quantitative targets to: improve surface water quality and meet required standards in over 60% of Chinese cities; treat 45% of household sewage in urban areas at a waste water treatment plant; treat 60% of sewage from large-scale poultry farms; meet required standards for drinking water from public water supplies; meet required standards for irrigation water; and improve food safety. Other key water management objectives of the Plan are: to restore water quality in the upper reaches of the Yangtze river, in the middle reaches of the Yellow river and in the whole Songhua river basin; and to make all efforts to prevent water pollution in the Three Gorges dam reservoir area (on the Yangtze) and along the proposed south-north transfer route (from Yangtze to the Yellow river).

In 2005, the Chinese State Council set the key objectives of water policy as: strengthening river basin management, protecting drinking water sources, addressing trans-provincial water pollution, enhancing water saving in agriculture, and achieving 70% urban waste water treatment by 2010. Key water management objectives are to: reduce the total discharge of major pollutants by 10%; reduce water consumption per unit of industrial value-added by 30%; maintain irrigation water at current levels; retain 120 million hectares of farmland area; and increase forest cover to 20%.

Since the late 1990s, a transition has occurred in water pollution control policies towards a **total effluent control policy**. In particular, the State Environment Protection Administration (SEPA) worked to effect four transitions: from point pollution control to regional and basin-wide comprehensive prevention and control; from terminal management to control of pollution sources and the whole process; from control of pollution concentration to integrated control of discharge gross and concentration; and from single pollution control to combining pollution and ecological protection. Stronger cross-sectoral cooperation will be vital to realizing the above and making pollution control in China more effective. But despite the legal regulations on basin-wide pollutant gross control, the regulations are not in fact implemented over a whole polluted water body, nor are specified enforcement rules or detailed action plans made by SEPA.

For the period of the 11<sup>th</sup> Five-Year Plan, a compulsory target to cut 10 % of total effluent emissions of main pollutants was set by the State, complemented by a National Plan for Effluent Total Control of Main Pollutants determining the COD cut quota for each provincial-level jurisdiction.

Since 1988, a number of major **ecological restoration projects** have been implemented, such as Green for Grain, Natural Forest Protection Programme, and Returning Cropland to Lakes. This has had benefits for soil and water conservation and ecosystems. In addition the policy and measures adopted for integrated management of small basins aimed at soil and water conservation have been effective. **Bans on fishing and sand extraction and allocation of environment flows** have been introduced in many basins. These have helped to rehabilitate freshwater ecosystems and restore damaged ecosystem functions. For instance, a seasonal ban on fishing has been in force in the Yangtze River Basin since 2003, covering 10 provincial-level divisions a-long 8,100 km of the river's reaches including the main river course and major tributaries starting from Deqin County in Yunnan Province down to the river estuary and including Poyang and Dongting lakes. The ban period covers February to April each year in the area above Gezhouba Dam and from April to June in the area between Gezhouba Dam and Yangtze estuary. The ban has mitigated the drastic decline of fishery resources in the Yangtze.

*The Water Pollution Prevention and Control Law (1996)* requires **centralized treatment of municipal sewage**, i.e urban wastewater treatment plant and its pipeline sewerage network, as opposed to treatment infrastructure only for specific firms. Users are charged a wastewater discharge fee for sewage treatment services, and those who pay should be exempt from separate pollution discharge fees. Revenue from these fees is used exclusively for construction and operation of facilities for central wastewater treatment. However, many cities are still quite far from the situation envisioned in this municipal wastewater management policy, which includes the development of sewerage systems and large treatment plants. In many places, sewerage and treatment facilities are either absent or very partial, and industrial enterprises have to treat their own emissions. The development of the required sewage and wastewater treatment facilities is a difficult process, and planning, coordination, and timing have all been stumbling blocks. It has raised a number of issues, among them the need for effective cost recovery systems such as user fees.

A *Cleaner Production Promotion Act* was enacted in 2002 to promote **clean production** and reduce pollution, including the establishment of product labeling systems and “naming and shaming” heavy polluters. The relevant government departments have started to implement an industrial policy based on cleaner production and given guideline standards for cleaner production in their respective sectors.

But a major problem with respect to water pollution management in China is that well-designed policies are often poorly enforced. Further complications exist in areas where rivers cross administrative boundaries, between municipalities or provinces, because agencies pay more attention to protection of water resources that affect their clients than to discharges transported out of their area of responsibility. This behavior causes conflicts between upstream and downstream administrative units.

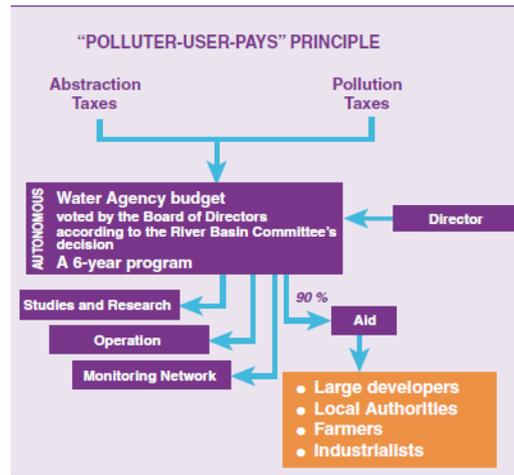
## 5. FINANCING WATER POLICY AND WATER PRICING

→ **In France**, there is a **mobilization of specific financial resources for water**. It is the vocation of the Water Agencies to collect specific funds, according to the “**polluter/user-pays**” **principle**. They 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. The water taxes are levied from water users only and this differentiates them from the income tax. They are levied through the water bill and are part of the water price. The tax rates are surrounded by the Parliament and then precisely modulated by the River Basin Committee according to the uses and to the fragility of the environment.

7 different taxes can be levied according to the user's pressure on the water resource: tax on water pollution, tax for modernization of the wastewater drainage systems, tax on non-point agricultural pollution, tax on water abstraction, tax for water storage in low flow periods, tax on obstacle on rivers, tax for the protection of aquatic environments. The aim is to **integrate environmental cost**, with an incentive for the water users to support the costs, in order to promote water saving and preserve water quality. But, although this integration of environmental cost is quite well realized concerning domestic and industrial uses, the polluter-pays principle is harder to enforce concerning agriculture. The level of water taxes remains quite low for agriculture: the true cost of withdrawal or pollution is not reflected. This is indeed a sensitive political issue and the sector is economically fragile. To integrate the cost of non-point agricultural pollution, a new tax was created by the 2006 Water Law but it is paid by the producers of phytopharmaceuticals, not directly by the farmers.

The amount collected is redistributed through a **multiyear investment program, the Action Plan of the Water Agency** which is drafted for a six-year period in a concerted way by the River Basin Committee. Each plan is different and adapted to the basin priorities. It is then validated by the Basin Coordinator Prefect. The 9<sup>th</sup> Action Plans of the Water Agencies (2007-2012) came into force on 1<sup>st</sup> January 2007 and amount to a total of 11.6 billion euros up to 2012. 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 performance of the treatment plants. It also supports scientific and economic studies, as well as actions for awareness, facilitation and information in the river basins.

Since the 60's, the financing system by Water Agencies has contributed to install and upgrade the infrastructures for water supply and wastewater treatment. From the 60's to the 2000's, it has been only concentrated on financing networks and treatment plants. There has been an important evolution with the implementation of the 2000 Water Framework Directive and the 2006 Water Law: the actions of the Water Agencies have evolved to the financing of integrated water resources management and the protection of aquatic environments. This financing system is also currently evolving from a financial logic (spending money, executing the investment programme) to a more cost-effective and environmental logic (optimizing the investment of each euro, reaching the water “good status” objective of the WFD).

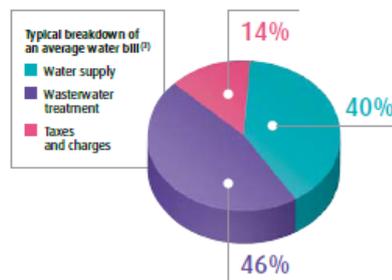


Collection of water taxes and related investment programme of the French Water Agencies.

Other bodies contribute to the financing of water policy: the State and its public bodies, the General Councils, the Regional Councils, the municipalities, the European Union.

As regards the **water price**, in 2004, the water bill amounted to 177 euros per capita and per annum and the average cost of 1 m<sup>3</sup> of water amounted to 3 euros. The part of the water service expenditure has remained marginal and stable since 1996: **0.8% of the household budget**. This expenditure still remains significant for the poorest users, for whom solidarity measures are applied. The water price is **defined locally** and can vary a lot from one municipality to another because the costs supported by the utility depend on local characteristics.

The water bill includes: the cost (investment + operation) of the drinking water supply service and of the sanitation service, the taxes levied by the Water Agencies and the VAT. The water bill compulsorily includes a fixed part and a variable part. The fixed part gives right to drinking water and to sanitation and is justified to cover the fixed management costs. On the average, it amounted to 56 euros in 2004 per annum. The fixed part is surrounded by ministerial decree. The variable part strictly depends on the consumed volume measured with the meter.



Typical breakdown of an average water bill in France.

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.

→ In China, **charge for abstraction and charge for supply** of water are the two main economic instruments for water administration in China. This is one area of water policy in China where great improvement has been made. In the era of the planned economy, water resources were very cheap or even free. Any payment was well below the commercial value of the water, and lower even than the engineering cost. Water was used intensively with a great deal of waste. In the post-reform economy, water pricing has gradually changed in line with the transition in economic system. The new 2002 Water Law established principles for water price reform and for appropriate charges. However, an implementation process is yet to be established. A water pricing system is taking shape with a gradual increase in general water prices and the introduction of flexible water pricing aiming at improving water saving. The reform of water pricing in China is transitioning **from free or cheap provision in the collective era to commodity pricing**. The introduction of a sensible water pricing mechanism will help optimize the allocation of water resources, enhance water use efficiency, promote water saving, improve the ecosystem and control water pollution.

Enterprises and institutions that discharge pollutants into a water body have to obtain discharge licenses and pay a **pollutant discharge fee**. If their discharge exceeds the limits set by national or local standards, an extra fee is levied on this excess. But the rate of urban sewage treatment was as low as 35 percent in the seven major river basins in China, which led to generally low treatment fees. In order to improve the treatment ratio for urban sewage, and achieve the target for pollution cuts, the SEPA introduced a **policy of raising effluent treatment fees**. Collecting negotiated fees or fixed fees will be prohibited. Discharge fees shall be collected for all urban sewage and fee rates raised. They are not to be less than CNY 0.8 per ton. National preferential policies on land and tax are applicable for construction of sewage treatment facilities. Finally, reform of urban sewage treatment agencies will be accelerated, rights franchised and improvements made to supervision and monitoring. The policy of collecting sewage treatment fees needs to be actively implemented. At the same time, management of collecting the effluent discharge fee needs improvement.

At the time of the first Chinese water pollution policy, which was formulated in 1972, the focus was on abatement of point-source pollution. A **pollution levy system (PLS)**, initially established in 1982, has become the most important economic instrument for environmental protection. The PLS not only serves as an incentive to change polluters' behavior, but it is also a source of funding for investment in pollution management and capacity building for environmental protection agencies. In 1999, total water pollution charges amounted to about 0.3 billion Yuan, about 5 percent of total environmental charges. But the legal system has been focused on industrial sources and has been unable to account for "new" water pollution problems, such as agricultural non-point and municipal sources. The new pollution levy system was initiated in July 2003. The main change is the shift from a concentration-based **to a total load charge system**. Under the old system, charges would only be levied against the most significant element of pollution in excess of the effluent standard. With the 2003 revision, however, there are charges for all elements, e.g. COD is charged at 1.2 Yuan per Kg. The charge basis covers more than 100 pollutants, affecting water, air, solid waste, noise, and radioactive pollution.

The pollution levy is collected by local Environmental Protection Bureaus (at city and county levels) which are responsible for allocating fines and selecting projects. In order to strengthen the effective utilization of pollution levy revenues, 20 % of the total revenue is allocated to the central financial body, the Ministry of Finance. Provincial governments might also set aside a portion of the pollution levy revenue to fund projects of provincial significance.

Recently the Chinese government has stepped up **price reforms** aimed at resource saving and environment protection. Water course use and sewage treatment fees are now levied in most cities in China. In Beijing, which has the second highest average per capita consumption rate (248 l/day), water prices have been increasing over the last few years. The latest increase, in May 2005, was from 3.7 Yuan to 4.5 Yuan (0.55 USD) per m<sup>3</sup> for residential consumers. This rate is one of the highest in China (Kunming is 1.8 Yuan/m<sup>3</sup>) and compares to urban disposable income levels of 15,637 Yuan/year (Beijing Municipal Statistical Bureau, 2005). About ¾ of this price is used to cover water supply, and one-quarter is assigned to cover sewage disposal costs.

Public finance plays an important role in the promotion of IRBM, especially as regards urban waste water treatment. In China's public finance system, basin development and protection involves both central and local funding. Although there is no specific basin item in the central finance budget, funds from national level are transferred to river basin organizations. This has boosted the development of basins. In addition, private and international funds are invested in basin development. But, due to the **lack of an overall basin funding mechanism**, these various funding sources are not well coordinated at the basin level. And, despite rapid growth of national revenue, funding for environmental or basin management has not increased accordingly. During the period of the 8<sup>th</sup> Five-Year Plan, financial expenditure by government at various levels for environmental and resource protection amounted to CNY 65 billion, or 2.67 percent of total central expenditure for the period. But, beginning 2007 environmental protection has been included as a **budget item in national public finance**, including administration costs and the monitoring and supervision of environmental protection, pollution control, and nature conservation. This marks significant progress in public finance for the environment. Future basin management will be expected to attract more private capital under the new policy framework to go along with increased public finance and rationalisation measures.

## **CONCLUDING REMARKS**

China developed legislation, regulations and financial tools to improve water management and there is also a growing environmental awareness in China. However, due to significant pollution problems and to a rapid development which brought new issues for river basins, the implementation of integrated river basin management in China faces many challenges. Problems include: no clear assignment of responsibilities for various government ministries and agencies, lack of effective mechanisms for cross-sectoral coordination between administrations, no clear basin-wide policy structures and systems, no clear legal authority for river basin master plans, insufficient implementation of the legislation and of the polluter-pays principle, lack of overall basin funding mechanisms; low level of stakeholder and public participation in river basin management.

Conventional water governance will find it hard to adapt to solve the increasing basin-wide challenges as China's economy continues its breakneck development. Evolution of water governance is necessary all the more that basin-wide problems in China are more complex than those in any other part of the world at a similar level of development. Of the many IRBM issues, cross-sectoral and trans-jurisdictional coordination is the most crucial. It will be impossible to solve complicated water issues by a sole sector or through a single river basin organization, technology or policy. The existing river basin management system is not suitable for the new situation. The IRBM concept and approaches need to be introduced to bring a more integrated approach and increased stakeholder and public participation in river basin management. Yet implementing IRBM, even in developed countries, is no easy task, and still developing China is no exception. To move from conventional water governance to IRBM will mean overcoming many far-reaching and complex issues such as those noted above.

Legislation is crucial in the promotion of IRBM, yet there are no Chinese laws addressing water use, water pollution control and ecological conservation in an integrated fashion at the river basin level. Some key legal systems related to IRBM have been established under existing laws and regulations, despite these legal systems having been developed under a sectoral framework or by different administrative authorities. Some modest achievements have been made in legislation with respect to river basin management. One of the best practices is the new 2002 Water Law, which represented a significant improvement to guiding principles, administrative systems, methods and legislative approaches. It improved the administrative structure for water resources and officially recognized the legal status and functions of river basin organizations. China has a good set of water related laws and regulations compared with many other nations. The issue is that the existing laws are not properly enforced. The non-enforcement of the water laws continues to put China's water assets in serious danger, and raises questions about the State's capacity to tackle water problems.

The main lessons that can be learnt from French experience are: decentralization of water management; clear organization of integrated river basin management; intersectoral coordination between administrations; participative management; compliance control of regulations by a "water police"; application of the polluter-pays principle; overall basin funding mechanisms through Water Agencies; ... But it must be underlined that this system is probably not perfect and has not been done in one day: the last 45 years have seen a continuous strengthening of political-institutional mechanisms and the last 10 years have seen an important evolution towards integrated river basin management. Another point is that this system is operating in France but cannot be exported as such in other countries without taking local specificities into account. However, the method and principles 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 management.

The International Office Water (IOWater) and the International Network of Basin Organizations (INBO) can help in this process. IOWater was created in 1991 to assist all the countries wanting to modernize their water management. It intervenes abroad in the following fields: integrated water resources management; management of public drinking water supply and sanitation utilities; water management in agriculture; development of vocational training; legal and institutional reforms; water information systems. As regards the vocational training, IOWater has developed a National Water Training Centre based in Limoges (centre of France), which is the main training centre for water in France with around 6,500 trainees annually. End 2008, it created also an International Network of Water Training Centres (INWTC). The International Network of Basin Organizations (INBO), created in 1994 in France and currently present in 68 countries, aims at facilitating exchanges between basin organisations to better implement IRBM. The Permanent Technical Secretariat of INBO is operated by the International Office for Water.

The EU/China River Basin Management Programme (2007-2012) is a very good example of an interesting co-operation programme on river basin management. It concerns the Yellow and the Yangtze river basins and aims at using the European experience without duplicating it exactly, as the context is very different. At this stage, 500 Chinese experts were trained thanks to this programme. But cooperation should be strengthened and the authors underline the necessity to launch a specific cooperation project to increase capacity building of the Chinese river basin organizations, particularly through the implementation of performance indicators.

## **BIBLIOGRAPHY**

### **Documents**

- International Office for Water. *Organization of water management in France*. August 2009 ([www.iowater.org](http://www.iowater.org)).
- International Network of Basin Organizations and GWP. *Handbook on Integrated Water Resources Management in Basins*. March 2009 ([www.inbo-news.org](http://www.inbo-news.org)).
- International Network of Basin Organizations and GWP. *Issue Brief "Developing and managing river basins"* ([http://www.gwpforum.org/gwp/library/River%20basins\\_Brief%20IWMI\\_GWP.pdf](http://www.gwpforum.org/gwp/library/River%20basins_Brief%20IWMI_GWP.pdf))

### **Websites**

- French Water portal: [www.eaufrance.fr](http://www.eaufrance.fr)
- French Ministry of Ecology: [www.developpement-durable.gouv.fr](http://www.developpement-durable.gouv.fr)
- International Network of Basin Organizations and its regional networks: [www.inbo-news.org](http://www.inbo-news.org)
- International Office for Water: [www.iowater.org](http://www.iowater.org)
- International Network of Water Training Centres: [www.inwtc.org](http://www.inwtc.org)
- Chinese Ministry of Water Resources: [www.mwr.gov.cn](http://www.mwr.gov.cn)
- Chinese Ministry of Environmental Protection: [www.zhb.gov.cn](http://www.zhb.gov.cn)
- Yellow River Conservancy Commission: [www.yrcc.gov.cn](http://www.yrcc.gov.cn)
- EU/China River Basin Management Programme: [www.euchinarivers.org](http://www.euchinarivers.org)