



Integrated Water Resources Management (IWRM) – Introduction to Principles and Practices¹

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1. The Current Water “Picture”

Water is essential to sustain human life. It plays a vital role in many human activities, including industrial production, agriculture, energy, sanitation, and transportation, in addition to sustaining ecosystems that provide valuable services to both environment and human. Although water seems to be abundant on the planet, 97% of the Earth’s water is seawater, making it unfit for most human uses. Of the remaining 3%, 87% is inaccessible, either locked in polar icecaps or in deep underground aquifers. Thus, only 0.4% of all of the water on earth is in a form that is usable and accessible by human beings (CAP-Net 2003).

Out of all renewable freshwater that reaches land by precipitation, most returns to the atmosphere via evapo-transpiration, while the remainder is available as runoff. Thus, while only 8% of total renewable freshwater is being used directly by humans, it is estimated that 54% of accessible annual runoff is currently withdrawn, with higher figures in water-scarce areas (UN WWDR1, 2003).

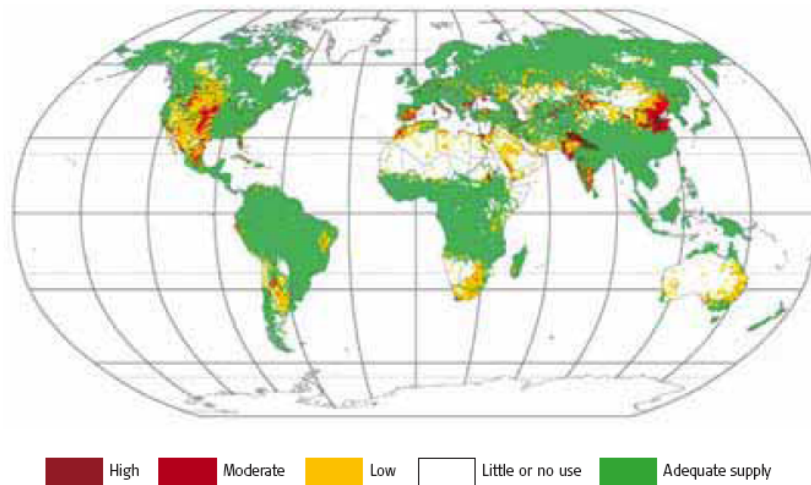
The scarcity of water is being noticed in much of the world. More than two billion people in 40 countries live in river basins under “water stress”, where per capita supply is less than 1,700 m³ per year (Revenga 2000). Population growth and economic development have caused demand for water to increase drastically over the past century. Global population increased by a factor of three during the 20th century, while water withdrawals increased by a factor of seven (GWP 2000). Population growth and economic development contribute to pollution from municipal waste, mining and industry, and agricultural runoff, all of which further degrade water quality and thus the amount of quality water sources, further exacerbating the quantity of usable waters. Already many regions of the world withdraw more water than is locally renewable, either through inter-basin transfers or unsustainable groundwater mining (Fig. 1). As global population is expected to increase from six billion to ten billion people over the next 50 some years, demand on scarce water resources will increase further (CAP-Net 2003).

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Competition for scarce water resources already is a source of conflict in many areas. Potential exists for these conflicts to escalate as water scarcity increases. Conflicts exist between competing sectors that depend on the same water body/river basins. Rivers and lakes that cross international boundaries have potential for conflict, as countries can limit other countries' access to the water resource through over-extraction or pollution. According to UNWWDR1 2003, 263 river basins are shared by two or more nations, indicating that international competition for shared water bodies could be a serious source of international conflict in the future. Conflict also exists among various water use sectors and societies –between urban and rural water users, between hydropower demand and agriculture user, between upstream and downstream areas. Moreover, most of current water management systems undervalue environmental water needs. When vital ecosystem services do not receive the water allocations they need to function, they would impact the communities that depend on them.

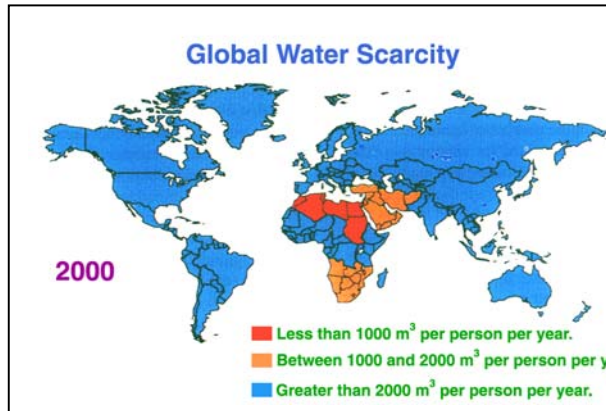
Figure 1. Water use in excess of natural supply (average annual)



Source: UN WWDR2 2006

The vast majority of future population growth will occur in developing countries, many of which already suffer water scarcity problems and lack the infrastructure and institutions needed to provide water services and manage water conflicts effectively. Almost all current and projected countries with less than 2000 m³ annual per capita freshwater availability are located in Africa, the Middle East, and South-east Asia (Figure 2). Half of the population of the developing world is exposed to polluted sources of water (CAP-Net 2003), a situation caused by a combination of inadequate water supply and sanitation infrastructure, poor management of utilities, and lack of regulation protecting water sources from pollution. Despite focused efforts to improve access to sanitation and water supply as part of the Millennium Development Goals (MDG), half of the developing world still lacks access to basic sanitation, and 20% of the developing world lacks access to improved sources of water supply (MDG Report 2006). UN WWDR1 (2003) indicates that 6,000 people, mostly children under the age of five, die every day from water-related diseases. Extreme drought and flood events, which occur naturally but can be exacerbated

by land mismanagement or climate change, are also serious problems in developing countries.



Source: Fischer and Heilig 1997

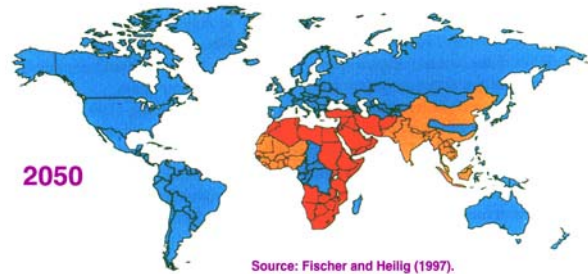


Figure 2 Global Water Scarcity

2. Failure of Existing Water Management Approaches

Current and past approaches of water resources management (WRM) have proven inadequate for the global water challenges. These approaches are mostly sectoral management, where each sector (domestic use, agriculture, industry, environmental protection, etc.) has been managed separately, with limited coordination between sectors. These approach lead to fragmented and uncoordinated development of water resources. Water is by nature a flowing resource, which crosses sector boundaries. Many uses of water have spillover effects on other uses, and water development projects have unintended social and environmental consequences. This is especially true for river basins where upstream water and land practices impact directly the quantity and quality of water in downstream areas. As water becomes more scarce, it is becoming increasingly inefficient to manage water without recognizing the interdependencies between agencies, jurisdictions, sectors and geographical areas.

Top-down approaches have dominated the traditional approaches to WRD, with many central governments directing development of water supplies, provision of water services, and regulation of water uses. This approach has had questionable effectiveness. Central governments have emphasized supply augmentation over demand management, leading to inefficient development projects. Subsidies have encouraged wasteful use of water, and restrictions on water transfers have prevented water from being allocated to the most beneficial use. In many cases, such services would have been more effectively provided by local governments, user groups, or the private sector.

Supply management is dominating the past and current water management. Without demand management, supply management alone has caused negative externalities, making the opportunity cost of water to rise to unsustainable levels. As demand for scarce water resources increases, new sources of water need to be obtained, often at greater cost than previous sources, and with greater potential ecological and social consequences. Water service providers, particularly in developing countries, struggle with financial sustainability, as inefficient

operations and low quality of service create a vicious cycle where dissatisfied users refuse to pay water tariffs, limiting the service providers' ability to maintain infrastructure effectively and causing service quality to decline. Poor service quality in turn exacerbates poor productivity of water, and leads to the depletion of aquifers and pollution of water bodies. Artificially low water prices fail to encourage conservation and efficiency, and allow wasteful practices and inefficient operations to continue.

The current water issue is often more a crisis of governance than a crisis of physical scarcity, as scarce water resources are allocated inefficiently, unregulated pollution compromises water quality, weak water service providers fail to serve the public, and social and environmental concerns are left unaddressed. Without a significant shift in the way water resources are managed and water services are provided, the current water crisis will only worsen. Given the above shortcomings with traditional WRM approaches, Integrated Water Resources Management (IWRM) has emerged as a means of addressing the global water problems and working toward a sustainable future for water management.

3. IWRM Overview – Basic Definition

Defined by the Global Water Partnership (GWP)³, Integrated Water Resources Management (or IWRM) is “*a process that promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.*”

A more functional definition is used by the United States Agency for International Development (USAID): “*IWRM is a participatory planning and implementation **process**, based on sound **science**, which brings together **stakeholders** to determine how to meet society's long-term needs for water and coastal resources while maintaining essential **ecological** services and **economic** benefits.*”

The above reference continues to say that “IWRM helps to protect the world's environment, foster economic growth and sustainable agricultural development, promote democratic participation in governance, and improve human health.”

From these definitions, a few key elements (note the bold key words) can be distilled:

- IWRM is a *coordinated* process that *brings together stakeholders*.
- It focuses on both *economic and social welfare and equity* as well as *protecting ecosystems*.
- It uses *scientific data* /tools to provide sound base for judgment.
- It emphasizes *proper governance* involving *democratic participation*.

It is important to note that IWRM is a *process*, not a product, and that it serves as a tool for assessment and program evaluation. IWRM does not provide a specific blueprint for a given water management problem but rather is a broad set of principles, tools, and guidelines, which must be tailored to the specific context of the country or region or a river basin.

³ an international organization dedicated to promoting sustainable management of water resources.

4. The Dublin Principles

At the International Conference on Water and the Environment (ICWE), held in Dublin, Ireland in 1992, over 500 participants representing 100 countries and 80 international and non-governmental organizations, the following principles were recommended to guide global water management and development efforts:

Principle 1 “Ecological”: Fresh water is a **finite and vulnerable** resource, essential to sustain life, development and the environment.

Principle 2 “Institutional”: Water development and management should be based on a **participatory** approach, involving users, planners and policy-makers at all levels.

Principle 3 “Gender”: **Women** play a central part in the provision, management, and safeguarding of water.

Principle 4 “Instrument”: Water has an **economic** value in all its competing uses and should be recognized as an economic good.

Later that same year, the Dublin principles were incorporated into the Agenda 21 recommendations put forth at the UN Conference on Environment and Development (UNCED) in Rio de Janeiro. Since then, these principles have strongly influenced the development of IWRM. The four principles are discussed below, together with how they guide general IWRM approaches:

Principle 1 - “Ecological”: It calls for a holistic approach to WRM, “linking social and economic development with protection of natural systems” (ICWE 1992). Recognizing the catchment area or river basin as the most appropriate unit for WRM, Principle 1 calls for coordination across the range of human activities that use and affect water in a given river basin. IWRM approaches incorporate this principle into its emphasis on integration between all concerned water sectors.

Principle 2 “Institutional”: This participatory approach is to raise awareness of water issues among policy-makers and the general public. It emphasizes *subsidiarity* - management decisions should be taken at the lowest appropriate level, with central government retaining regulatory and support roles. It advocates increased accountability of management institutions and full consultation and involvement of users in the planning and implementation of water projects. The capacity of certain disadvantaged groups may need to be enhanced through training and targeted pro-poor development policies for full participation. IWRM applies this principle through its concepts of decentralization and participation, discussed below.

Principle 3 “Gender”: The approach emphasizes the important synergy that exists between gender equity and sustainable water management. Worldwide, women play a key role in the collection of water for domestic – and often agricultural – use, but in many societies, women are excluded from water management decisions. IWRM includes an emphasis on empowering women in its focus on participatory management and capacity building.

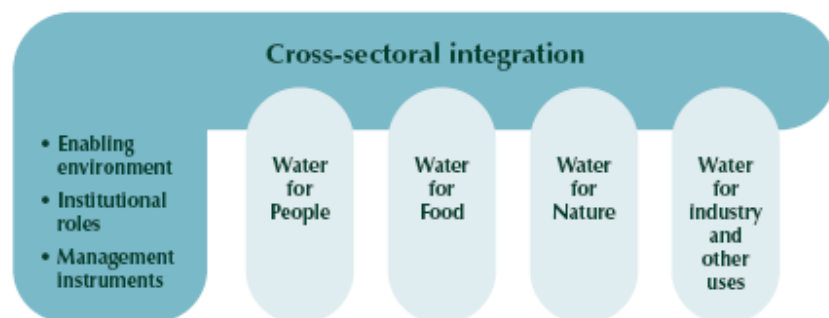
Principle 4 “Economic”: Known as the “instrument principle”, the approach emphasizes the importance of economic tools in helping achieve efficient and equitable use of water resources. The human right to access clean water and sanitation at affordable prices must be recognized, but the scarcity of water demands that economic perspectives should not be ignored. In conditions where water is especially limiting, where supply augmentation is not a feasible option, economic tools should play a larger role in determining how limited water resources should be distributed efficiently and equitably. Managing water as an economic good is also a key to achieving financial sustainability of water service provision, by making sure that water is priced at levels that ensure full cost recovery. IWRM emphasizes on economic and financial sustainability.

5. IWRM Approaches

Seeking to put the Dublin Principles into practice, IWRM emphasizes the key concepts of *Integration, Decentralization, Participation, and Economic and Financial Sustainability*.

Integration - In contrast to sectoral approaches that have largely failed in the past, IWRM’s first approach to the Dublin Principle-1 is by advocating a holistic approach that emphasizes the three goals of economic development, social welfare, and environmental protection and that integrates management of all *horizontal* sectors that use and/or affect water (Figure 3). Recognizing the multifaceted value of water, IWRM demands that social concerns and environmental values be recognized while still emphasizing the need to develop water resources for sustainable economic development. In order to effectively coordinate between water supply and sanitation, agriculture use, energy generation, industrial use, environmental protection, and other sectors, new institutions and policies are required. IWRM advocates creating and empowering basin-level organizations to direct water resource management efforts in a hydrological boundary. In addition to *horizontal* integration between sectors, *vertical* integration is needed to coordinate efforts between local, regional, national, and international water user groups and institutions. To facilitate coordinated water resource management, rigorous data collection and distribution is required for multiple physical and socio-economic measures.

Figure 3. IWRM and its relation to sub-sectors



Source: GWP 2000.

Decentralization - The second approach of IWRM is to place responsibility for water resource management at the lowest effective administrative level, satisfying the subsidiarity priority of the second Dublin principle. River basin organizations, in addition to facilitating inter-sectoral integration, also provide a means of decentralizing management authority from national governments to the basin or sub-basin level, where special attention can be paid to specific local problems and where institutional accountability is greater. The private sector can play a role in providing water services and should be allowed to bring its technical expertise and efficient management practices into areas where central government has struggled to provide sustainable service. The appropriate level of decentralization depends on the nature of the specific water management problem in question, but IWRM seeks to strike a balance between top-down and bottom-up management.

Participation – The third approach of IWRM is to strengthen community-based organizations, water user associations, and other stakeholders to enable them to take a greater role in management decisions. Giving a voice to all user groups and affected populations ensures that social welfare considerations are given proper weight. Full and effective participation requires gender awareness and special efforts to allow women and vulnerable groups to participate in management decisions, in accordance with the third Dublin Principle. IWRM emphasizes broad-based capacity building and support for the formation of user groups and representative associations.

Economic and Financial Sustainability - The increasing costs of water supply and the widespread inefficiencies in water service delivery in many parts of the world demand that proper attention be given to the *economic value of water*. To achieve long-term economic sustainability, water must be priced at its full cost, accounting for the cost of withdrawing and delivering the water, as well as the opportunity cost and both economic and environmental externalities associated with using that water. Laws and policies should establish clear water use rights and create markets for these rights to be traded, allowing water to be used by those sectors for which it has the greatest value (while still protecting social and environmental concerns). These are easy to say than done – they are applied currently only to few countries – due to many reasons (legal, institutional, infrastructure, etc.). To achieve financial sustainability of water service delivery, user fees should at a minimum cover O&M costs of service provision, so that water service providers can achieve full cost recovery and satisfy the public water needs. Often, short-term policy targets must be limited to financial sustainability of water services, but full economic sustainability is the long-term goal of IWRM.

6. IWRM Tools

The Global Water Partnership has created an IWRM toolbox designed to support the development and application of IWRM approaches. Because IWRM is such a broad process, requiring change in multiple sectors and at multiple levels, there is no specific blueprint that can be applied to any given situation. Consequently, GWP's toolbox aims to provide IWRM practitioners with a wide range of tools and instruments that they can select and apply according to their needs. The tools fall into three main categories: (a) Enabling Environment, (b) Institutional Roles, and (c) Management Instruments. Each category has several sub-categories, which in turn consist of several tools, with 49 tools in all (GWP 2003a).

(a). *Enabling Environment.* This category consists of three sub-categories: Policies to set goals for water use, protection and conservation. Policy development is important for setting national objectives for managing water resources and delivering water services. Policies should embody the IWRM concepts of integration, decentralization, participation, and sustainability, taking a holistic view of water's value and considering potential users of water, land uses and water quality. Legislative framework to translate water policy into law. This covers ownership of water, permits and rights to use water, and the legal status of water user groups. Financing/incentives to allocate financial resources to meet water needs. Financing and incentive structures are needed to fund capital-intensive water projects, support water service delivery, and provide other public goods such as flood control and drought preparedness. They can be resources from the public sector, private finance, and joint public-private partnership.

(b). *Institutional Roles.* This category consists of two sub-categories: Creating an organizational framework. Tools focus on developing the institutions needed to manage water resources within an IWRM framework, shifting from top-down, centralized management to decentralized and participatory management. Such institutions include river and lake basin organizations, regulatory bodies, enforcement agencies, coordinating apex bodies of user associations, and public and private service providers. These organizations need to be given clear rights and responsibilities, and allow integration between them. The accountability of these water management organizations must be ensured, with attention given to gender issues. Building Institutional Capacity: Developing human resources is an integral part of developing effective water institutions at all levels, as regulatory bodies, civil society organizations, service providers, and central and local government officials will all need to be educated in IWRM principles and trained in the skills and tools of effective water management. Capacity-building should focus particularly on strengthening the ability of women and other disenfranchised groups to participate in water management.

(c). *Management Instruments.* Once the proper enabling environment and institutions are in place, these instruments address specific management problems. This category consists of eight sub-categories:

- Water Resources Assessment to understand resources and needs, involving data collection and analysis in order to inform decision-making with a comprehensive view of water resources and water users.
- Plans for IWRM to combine development options, to assess impact of resource use and human interaction. They can be national, regional, sectoral and basin plans.
- Efficiency in Water Use to manage demand and supply, to improve supply efficiency, increase water reuse. Subsidies and regulation to encourage technology improvements, price signals, improved metering, and public awareness campaigns to change user behavior are all instruments that can be used to improve efficiencies.
- Social inclusion to promote general public awareness, stakeholder participation, and transparency of institutions, in order to better enable the public to take a participatory role in IWRM.
- Conflict Resolution to manage disputes and ensuring sharing of water benefits
- Regulatory and economic instruments to allocate water, set water use limits, use prices for efficiency and equity. Regulatory tools include emission standards, technology

standards, and price controls, while economic tools include pollution charges, targeted subsidies, and markets for water use rights or pollution permits

➤ Information Management and Exchange to share knowledge for better water management.

The above IWRM tools illustrate the multifaceted approach by IWRM in order to put the Dublin Principles into practice. Many of the tools are complementary, and successful application of one tool to a given problem may depend on simultaneous application of a number of other tools. For example, successful implementation of emission standards or fees will depend on a fully empowered monitoring and regulatory agency.

7. The Case of France: IWRM Implementation under River Basin Context⁴

France has been practicing IWRM since its 1964 Water Law, which established river basin agencies in the country's 6 major river basins. The French experience illustrates the strengths of basin-level management and application of IWRM tools and concepts - such as stakeholder consultation, economic instruments, and appropriate regulation.

Demand for a basin approach. Following the 2nd World War, there was a huge economic boom for about 10-15 years, with GDP growth at about 5% per year. The fast development led to drastic deterioration of water quality and caused water stress as the "water issue" was nowhere a priority for agricultural and industrial sectors. Industries - paper mills, sugar industries, wine-production plants, oil refineries, etc. - covered the streams with thick scum from their discharges. Dissolved chemical and organic matters from agriculture polluted progressively most watercourses used for water supply.

At the end of 1950s, the deteriorating situation led the then "Water Planning Commission" to realize that water resource management was not sustainable and that the existing regulatory actions alone could not address the real water management and conservation issues.

How are the IWRM principles reflected in the French Water Law? The decisive change in water management in France was brought about by the 1964 Water Law (after intensive debates). The Law laid the basis for modern WRM. Comparing the 1964 French Water Law and the 1992 Dublin principles, there are striking similarities – note that the law was more than 25 years before the Dublin IWRM principles.

⁴ Based on a case study of WBI in 2003 "The French Water Agencies", jointly with International Office for Water, France. Reference is also made to a paper "A Tentative Description of water management organizations in France", April 2006, by Lionel Robaux, INBO.

Dublin Principles	French Water Law	Reality
1 st - "Water as a finite and vulnerable resource, essential to sustain life, that must be managed within a global framework in a river basin: soil and water"	Water management is decentralized at the level of large river basins. RBAs in charge encompass territories different from those of the usual administrative units.	Led to the creation of 6 basin water agencies in France, corresponding to the main river systems of the country.
2 nd - "...participatory approach to water management, involving users, planners and policy-makers at all levels"	The law created (i) National Water Council at national level, consisting of user groups, elected officials and representatives of the State, and (ii) Basin Committees, (iii) basin Water Agencies, which are the executive bodies.	(i) NWC (<100 members, 100 substitutes); (ii) 6 Basin Committees (>100 members, 100 substitutes); (iii) 6 basin Water Agencies (originally Financial Basin Agencies), located in their own basins.
4 th - "Water has an economic value in all its competing uses and should be recognized as an economic good"	Water management, especially relating to pollution control, is facilitated by establishing an incentive financial system that complements the existing policy of repressive regulation.	Created a tax and aid system, and implemented "user pays", "who pollutes pays, who removes pollution is helped". Income is used to support works of anyone for improving the resource.

Transition to a basin approach: Right after the law was passed in 1964, over 30 degrees (and ministerial and inter-ministerial orders) had to be prepared in 1965 to properly implement the law. In 1966, the State set up "Technical Missions for Water" provisional bodies to help set up the basin agencies. They liaised with various authorities and users, collected data for basin development plans, facilitated the establishment of the water agencies, after which the Technical missions were dissolved, in 1968, into basin bodies that coordinate with the central administrations. Several years were required for effective set-up of the basin organizations and their normal operation. But for year-1 operation of the basin agencies, they received an exceptional allocation of funds from the State in order to have operation funds before they started to collect levy at the end of year-1. After that, the aid from the State diminished. The institutional framework is illustrated in Figure 4.

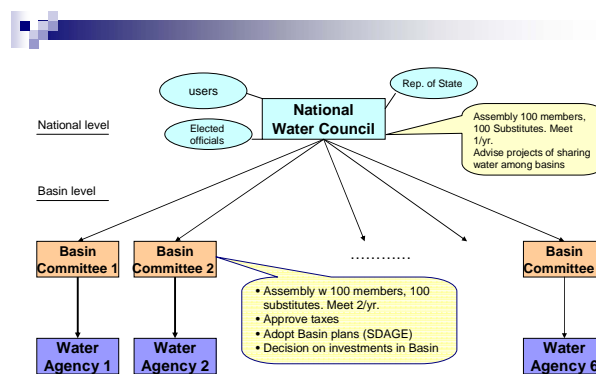


Fig. 4 France: River Basin Management Framework

Full cost recovery is not only a policy of the French government but also that of the EU. The French law allows the basin Water Agencies to levy charges on all water withdrawals and discharges, and they don't have any other financial sources, nor do they own or operate any water facilities. Major financial decisions of the agencies have to be endorsed by the Ministry of Finance. By law, only up to 7% of the collected water fees can be used for internal administration cost (such as staffing, etc), and 93% must be used for water management purposes. To avoid imbalance, taxes and aids were subject to contracting between the agencies and users/polluters under a nation-wide standard across all basins. These contracts were directly negotiated with the Prime Minister's Permanent Secretariat for Water Issues that was supervising the basin agencies at that time.

Enforcement of the Water law is a State responsibility, while the basin Water Agencies (renamed since 1989) are public administrative bodies with legal status and financial autonomy. The water agencies are managed by board of directors – about 30 some each, including 1/3 from users, 1/3 from local governments, and 1/3 from State government, plus a staff from the agency itself. Both the board chairman and the head of the agency are appointed by the state government.

Some other features of the French case include (i) 5-year planning, at the end of which incomes and expenditures of the basin agencies are checked. (ii) special arrangements in fees for irrigators, who are big water consumers but carry vulnerable economic activities with low profitability. (iii) levy thresholds not to overload tax charges from payers whose income is insignificant.

Since the 1964 law, legislation has been constantly updated. Revised law in 1992 set the stage for master plans for water development and management (SDAGE, update every 6 years) at large basin levels to be prepared by the Basin Committees with public participation, and water development schemes (SAGE) at sub-basin levels.

Following the pass of European Union's 2000 Water Framework Directive, the law was revised in 2003 to reinforce the basin agencies and bring them in line with the EU requirements, which require all inland and coastal waters of member states to reach strict water quality targets by 2015. Thus, SDAGE and SAGE have to comply with these requirements, including urban planning Code.

The six major river basins have different characteristics and challenges (Chart). The formation and strengthening of basin agencies has facilitated the application of IWRM concepts and tools to address the unique challenges faced in each basin.

TABLE 1 : COMPOSITION OF RIVER BASIN COMMITTEES

Representative River Basin ↓ ↓	Regions (1)	Counties (2)	Municipa- lities (3)	Total elected (1+2+3)	Users & specialist	Socio- Profes- sionals	State Adminis- trations	TOTAL
Adour- Garonne	6	18	6	30	30	6	18	84
Artois- Picardy	3	17	5	25	25	2	14	66
Loire-Brittany	8	28	6	44	42	8	22	114
Rhine-Meuse	3	14	5	22	22	3	14	61
Rhone-- Corsica	6	28	6	40	40	6	21	107
Seine- Normandy	7	25	6	38	38	7	20	103

The Adour-Garonne Basin, for example, includes 40% of the total irrigated area in France, and has struggled to properly allocate irrigation allowances during low-flow periods. Consequently, the basin agency consulted all relevant stakeholders in devising low-water management schemes, which set rules for allocating limited water resources at the basin scale and specifically in water deficit areas. The agency's efforts have also improved dialogue between stakeholders, reduced low-water crises, and encouraged rational water use practices. Nevertheless, large government subsidies for irrigation compromise the sustainability and efficiency of irrigation services in the region.

The Rhone-Mediterranean faces different challenges, as the Rhone River is dotted with dams that provide 64% of national hydroelectric power in the country. These dams provide flow regulation and water supply for drinking, irrigation, navigation, and recreation, but they also divert more than 80% of the river's flow, disrupting aquatic ecosystems. The basin agency has developed action plans seeking to increase water flow in certain sections of the river, with mixed results. Eutrophication has decreased, and biodiversity has increased in the river, but efforts to restore fish movement through the river have not been successful.

Other basins in France face problems as varied as industrial and mining pollution, groundwater depletion, and nitrate and pesticide pollution from agricultural and urban runoff, which basin agencies have addressed through pollution and groundwater abstraction charges, constructing treatment plants, and subsidizing pollution prevention technology.

What can we learn from the French case? In conclusion, the implementation of the IWRM principles in France has produced very positive outcomes, regarding to water quality improvements, water resources development and protection in the 6 river basins.

1. *Decentralization of decision making at the river basin level (principle-1), with overall directions from the national level, should set the baseline for water policy and planning. The State representatives at the basin are responsible for ensuring the basin policies are in line with those of the State.*

2. A basic prerequisite for true participation of all users (principle-2) is a *good updated database*, available to all, about the physical quantitative and qualitative status of the basin⁵, so that people have a common reference of the basin resources to judge and make informed choices. Even principle-4 “economic instruments” is based on such a good database which constitutes the basis of the taxes paid by the users. The database is the real monitoring instrument of IWRM.
3. It is essential that basin entities can rely on their own *financial resources*. The amounts collected, in the form of water taxes, are totally reinvested in water policy implementation, water development and management (principle-4) and tax payers are aware and agree to finance IWRM in their basin.
4. To implement IWRM, a country needs (i) a strong political will at the top; (ii) to overcome the difficulties of making people with very different interests and concerns to work together; and (iii) to train the people involved in basin decisions so that they become aware of their possibilities to intervene in water policies and investments.

8. General Lessons from IWRM Applications

A broad base of support is needed for reforms. The changes required by IWRM can be sometimes revolutionary, and involve drastic modifications of the current ways of doing business. They may risk oppositions from those interest groups who benefit from the status quo. Top-level political support is critical, as well as a broad base of popular support for any large-scale changes to take place. The factors that could trigger demand for water reforms include financial struggles of government administrations, water scarcity and droughts, natural disasters, water quality /pollution crises, and dissatisfaction of users with water services. Initial reform should target those areas of greatest needs. Ultimately, however, all affected stakeholders must be convinced of the value of IWRM and any reform brought by it. Stakeholder consultations that give voice to all concerns and that provide clear justifications for reforms, backed up with solid data, can help build support for IWRM.

Pick the low-hanging fruit. Success breeds success, and the sustainability of the IWRM process depends in large part on the ability to demonstrate on-the-ground benefits. When prioritizing a list of reforms, it is important to first target those areas that will quickly and easily demonstrate success of IWRM policies and practices, can build political support for the overall process. The political pressures faced by most decision-makers discourage risk-taking behavior, so there should be immediate rewards to encourage implementation of large-scale changes required by IWRM. Low-hanging fruits so just that.

Context matters. While the IWRM principles provide general directions, the institutional context of a given water management problem must dictate the specific approach used. For example, treating water as an economic good and achieving full economic sustainability may not be possible if supply infrastructure requires expensive rehabilitation or if beneficiaries of water

⁵ in France, a water quality inventory is carried out every 4 years.

services are unwilling or unable to pay full-cost tariffs. Numerous gradual steps must therefore be taken to break the vicious cycle of poor water service delivery and low willingness-to-pay, involving loans for rehabilitation, targeted subsidies, institutional reform to remove political influence, formation of user associations and capacity-building, improved stakeholder consultation and participatory management, and private sector participation. Even countries with similar water management problems will have vastly different institutional capacities, so each country's IWRM approach must focus on building on existing strengths and fixing weaknesses. There is no one magic solution that fixes all problems.

Progress may be slow - Have patience. Past experience shows that implementation of IWRM is a process that could take several decades. France took near 30 years to reach to today's stage of river basin management, while Spain has spent over 20 years to implement IWRM. Success in some areas may be accompanied by continuing challenges in others. Certain goals such as full economic sustainability and reconciling human water needs with the needs of ecosystems will require substantial changes to current practice and culture, and will therefore take even longer to achieve. Given the short-term focus of politicians and policymakers in most areas, there is always the temptation to seek quick solutions and abandon the IWRM process if immediate gains are insufficient. But persistent, patient progress on multiple fronts is necessary to achieve the ultimate goals of IWRM. It is important to develop a sequenced, prioritized list of reforms to avoid getting bogged down in partial implementation of too many reforms.

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