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The Concept of Sustainable Development as Applied to the Field of Water

Volume 1
Recommendations
of the French Commission
on Sustainable Development



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FRENCH COMMISSION ON SUSTAINABLE DEVELOPMENT

**The Concept of Sustainable Development
Applied to the Field of Water**

RECOMMENDATIONS OF THE COMMISSION

for

The International Conference, Water and Sustainable Development,
Paris, March 1998

and of the

UN Commission on Sustainable Development
New York, April 1998

February 1998

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Foreword

Water and Sustainable Development

Water is an essential resource for humans and their most basic needs. Its uses are diverse and vital: used in farming it makes producing human food possible, it also contributes to many economic and industrial activities and is an essential link in environmental and biological balances. Thus, water is one of the core issues of sustainable development.

Water is not like other raw materials. It is not distributed equally on the Earth's surface, and is threatened today with unsustainable production and consumption patterns, by the failure to consider the long term and by policies generally focused on mobilizing the supply of new resources. Water resource management must fit into the framework adopted in Rio: fairness, prevention, precaution and integration... the principles of sustainable development are at the core of water issues.

In preparation for the Paris Conference as well as the 6th Session of the UN Commission on Sustainable Development which has included the issue of water on its agenda, the French Commission on Sustainable Development wished to make its own contribution in close cooperation with the French General Planning Commission ("Commissariat Général du Plan CGP") and the Water Academy ("Académie de l'Eau").

The following proposals are the result of this work. The Second Volume presents the major contributions of over 50 experts, who have responded to the consultation carried out by the French Commission on Sustainable Development.

Christian Brodhag
President of the French Commission on
Sustainable Development
Paris, February 25, 1998

The Concept of Sustainable Development Applied to the Field of Water

RECOMMANDATIONS OF THE FRENCH COMMISSION ON SUSTAINABLE DEVELOPMENT

The following proposals were drafted on the basis of a rapid consultation with the actors involved, conducted in cooperation with the French General Planning Commission and the General Secretariat of the French Water Academy. Responses to the consultation are contained in Volume 2 "The References". The consultation questions are at Reference 1.9. A discussion was also organized on January 15, 1998, with partner organizations of the French Commission (NGOs, economic actors, local authorities, experts and government agencies). The French Commission on Sustainable Development, focused, moreover, its plenary session, on February 4, 1998, on a review of the recommendations. This summary document was drafted by Michel Hors, Secretary of the "CFDD".

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Volume 1

INTRODUCTION

Water is not like other raw materials, it is an essential resource for humankind and environmental balances; it is at the core of the issues of sustainable development. Water is not distributed equally on the Earth's surface, and is threatened today with unsustainable production and consumption patterns, by the failure to consider the long term and by policies generally focused on mobilizing the supply of new resources. However, these approaches have now reached their limits.

Many topical initiatives may be highlighted as contributions to new patterns of water management. But the scope and urgency of the stakes involved must lead to deep changes that cannot be limited to the juxtaposition of these few experiments. Likewise, though the major problems are known, we lack the decision-making and governance mechanisms as well as the political determination to take vital measures.

Though water is an economic asset (it must be collected, transported, treated, distributed and purified and potentially reused... all these operations have a cost) and use of this basic asset must be integrated into cultural and social practices. Economic incentives cannot solve everything on their own. A price signal is only effective if consumers are properly informed of methods for tailoring demand and if they can modify their behavior.

Users must be informed in a practical manner and must be able to participate in the management of their water. This requires on the one hand a coherent information system and on the other governance systems (decision-making processes).

France plays a major role on the international¹ level thanks to its **administrative** know-how (Water Agencies, user fees, tools and management organizations at the watershed level, SDAGE (Master Water Development and Management Plans), SAGE (Water Development and Management Plans) and participatory management within the Local Water Commissions) and **technical** know-how (international corporations and Small and Medium-size technological companies). These long-term and recognized skills must be further developed.

Indeed, the context of sustainable development opens new fields for consideration.

Water is probably the most crucial environmental issue in Southern countries. Scarcity is a problem in countries often exposed to desertification. In countries with sufficient supplies, quality is the problem, there is a lack of drinking water because of insufficient sanitation, and due to surface and groundwater contamination.

¹ The history of the role of French policy in the field of water may be found in "*Éléments de Bilan, rapport de la CFDD*", 1996, pp 46-48

This is the reason why the French Commission on Sustainable Development wanted to offer its contribution by recalling a few principles of sustainable development that apply to the field of water and by describing new patterns of governance (Ref. 1.9).

1. Applying the basic principles of sustainable development

Because sustainable development incorporates environmental, economic and social strategies into a long-term perspective it casts new light on the issue of water. It produces new approaches and methodologies that must integrate questions related to water. The objective is to manage a scarce resource fairly, by balancing domestic or production (agricultural or industrial) water uses, or those required for ecosystems to function correctly in relation to regional development (Ref. 1.4).

The weight of the various sectors of consumption are fundamentally different between developed and developing countries. For the latter, water is mostly used in farming and irrigation.

1.1. The environmental aspect

One of the lessons of the Brundtland report is that there is no contradiction between environmental protection policies and development policies. Good environmental management can sustain over the long term economic and social development. For many developing countries, the environment starts with water which serves as the foundation of agricultural production, and therefore of food and of the primary economy.

The quality of this water depends on the human activities carried out at the watershed level; it is closely tied to ecosystem quality. The self-cleaning potential of rivers and streams depends on the characteristics of the aquatic² system harboring aquatic life. Water quality also depends on its exchanges with groundwater and banks. The most efficient method is often to protect and invigorate the capacities of the environment and probably the least expensive one for protecting water resources.

Science can clearly formulate the stakes and offer solutions. However it is difficult to implement integrated and holistic sectoral policies. This problem is not water specific, it can be encountered in a number of fields, and the concept of sustainable development comes closer to furnishing a coherent response to these diverse issues.

² Not only in a river or stream bed, but with water quality. Oxygen content for example, determines pollutant oxidation capacity and its degradation which affects fauna and flora.

1.2. The social, cultural, and therefore institutional aspect

The field of water can be characterized as extremely diverse:

- diversity in water uses,
- diversity of the actors: public and semi-public (mixed economy or associations) and private, on different levels,
- diversity of the disciplines,
- diversity of geographic conditions, even though rapid advances in modern telecommunication means opens prospects that were unimaginable not long ago.

The scarcer water is, more its management is complex. It is a primary commodity, the use of which is deeply ingrained within the administrative context of each country and in cultural and social practices.

The current rapid growth of southern cities, requires different management patterns that have major social consequences.

“The age-old concept of sharing tends to dissolve with water supply systems, though they ‘create solidarity’ on a technical level among users, they contribute to weakening social ties and especially people’s awareness of them”³.

A crucial question is the integration of the gradual development of modern and efficient distribution systems with collective access systems and a greater responsibility on the part of users, under very different economic and social contexts.

1.3. The economic and financial aspect

The water sector is usually correctly considered as capital intensive. Indeed, it is a sector where financing of infrastructures and their exploitation represents an important stake in every country and in which national and international financial institutions play a major role.

The financial aspects (water cost and price) reflect the crucial relationship between water and money. Both are at the same time mobile, interchangeable and are part of a cycle: the water cycle, the financial cycle, within which economic, environmental and social relations must be organized on a healthy and sustainable basis. (Ref. 1.11)

The multiple uses of water, which all have a cost, are interrelated, each interfering with the others through the water cycle. The same infrastructure may often serve for several purposes: thus, “multiple purpose dams” can, depending on how they are operated, level off floods, compensate for low-water periods, generate energy or create recreational lakes. The various public and private water uses attract different sources of financing, without nevertheless leaving room for competition: the price of water

³ Christian Tamisier, “*En Provence l’eau cachée l’eau cultivée*”, in *Chercheurs d’eau en Méditerranée*, collective work, Edition du Félin, 1991, p20

is not controlled by supply and demand, its rate is often determined by political rather than economic criteria.

Though investment in the field of water is often capital intensive, the unit price, e.g., per liter of this fragile product that concerns health, remains generally very low. Just as paradoxically, one notes the insufficient attention paid to the operation and maintenance of waterworks, though these are costly and take a long time to build, and are so vital to society!

1.4. Operational principles

Water management implies the implementation of general principles of fairness, economic efficiency, preservation of environmental balances, of participation and openness, these being the generally agreed to principles of sustainable development today. Five principles that are more operational must be implemented especially in the field of water:

- **Taking the long term into account and taking care of avoiding irreversible choices.** A number of current water-related problems are the result of choices made several years ago that did not take into account the qualitative and quantitative limits of the resource: unsustainable use in irrigation causing the gradual drying-up of inland seas, the irreversible drop in the level of water tables, salinization, mining operations involving the pumping of drainage water... Therefore we now have to both fix the consequences of former unsustainable choices, often at a higher cost than initially anticipated gains, and avoid causing today damages that future generations would have to manage.

Investments are required to manage the facilities, for which the return on investment lag is higher than commonly accepted for other public investments, and even more so compared with market forces. It is necessary to ensure operational financing, in order to sustain the infrastructures.....

- **Exploiting renewable water:** water is part of a complex cycle that involves many physical, chemical, biological and environmental factors; all of these factors must be taken into account or preserved as such because they influence the resource in quantity and quality. The scope of withdrawals and human needs in some areas also has a major impact on the role played by a "cycle of water-users" incorporating reuse and recycling of wastewater. The latter must take into account and preserve the natural water cycle. This is especially the case with groundwater (Ref. 2.13 and 3.19) which is subject to slow renewal rates or even not renewed, and for which long-term conservation is crucial. However, though the primary focus has concerned surface water, a considerable lag has been observed concerning the protection of groundwater.
- **Implementing integrated water policies.** The complexity of natural water cycles and uses requires a rational and integrated approach. It is not possible to approach, in isolation, a water related problem. This integrated vision is linked to choosing the right decision-making scale, to implementing an information system through, in particular, sustainable development indicators and knowledge to enable identifying the interrelations between problems. It is also part of a decision-making process that mobilizes all the actor for a sustainable water management. ∴

An **integrated approach** also means that policies for regional development, economic development, soil use (farming, forestry, conservation areas...) take water constraints into consideration, while contributing solutions to a better management of the water cycle. In many instances, such integration and prevention can lead to a decrease in costs with double dividend strategies.

- **Favoring the management of demand rather than mobilizing new resources.** In most countries where the water resource is rare, this mobilization has already taken place on a large scale, and even been higher than the natural renewal rate.

The mobilization of the resource may be optimized by focusing the main effort on controlling consumption: such control requires management methods focused on demand, sparing technologies, water friendly production and consumption patterns. The approach involves using new assessment tools that enable showing the avoided costs, and more precise information regarding user and consumers.

- **A diversity of situations requires diverse solutions:** local geographic, economic and social conditions being extremely diverse, no model can be generalized, even if it is considered very efficient in the country where it is applied. The more water is scarce, the more complex are the social and cultural constructions applied to its management in some countries. The need to conceive of water issues on the global level must not result in a standardization of water related practices and values.

Though water is an economic asset its use must be integrated into social and cultural practices. The respective role left for regulating mechanisms: economic (e.g., rates), social (group water management) or environmental (use of natural purifying mechanism) depends on local situations. Conversely, traditional or innovating solutions can offer important contributions far from the location where they are currently implemented. More than the generalization of a model, it is the exchange of networked experiences that must foster international cooperation. Within this framework, each local water community is responsible for implementing suitable solutions.

These principles are strongly interrelated. Demand management requires integrating the issues of water into the full range of anthropogenic activities. The slow pace of change in production and consumption patterns requires anticipating and taking into account the long term. These principles need to be implemented through open decision-making processes, allowing for the participation of the greatest number of actors involved.

2. Managing water problems on an optimum scale

The level at which decisions are targeted is a key-point of sustainable development: each problem has a relevant scale of assessment and solution, however traditions and political structures of countries mean that local authorities play extremely different roles, from Regions to States or at the level of the basins in the field of water. The following proposals must be adapted to each situation.

2.1. The local level: the operational level

In order to ensure long-term access to water for all essential uses and ecosystem equilibrium, the principles stated above can be best implemented from the lower level up. The implementation of new mechanism of governance within the framework of local water communities is a means for applying an integrated approach to the problems. (Ref. 2.9)

At this level, local authorities have a crucial role to play in mobilizing all the actors involved with water⁴: populations and the major partner groups of sustainable development mentioned in Section III of Agenda 21. The Rio Agenda 21 suggests listing the objectives at the community level through local Agenda 21s.

- **Optimizing resource management is a crucial component of regional development.**
(Ref.1.1)

The quality of water depends on its quality in natural environments. Therefore, drinking water resources must be well protected around cities, domestic water sanitation must be strengthened, point-source prevention in industry encouraged, at the quantity level through recycling, and at the quality level by clean processes, springs and groundwater must be preserved on the same basis as large facilities (drillings or dams), and groundwater must not be exploited beyond the levels of resource renewal, investment funding and those that enable maintenance of the water supply systems and waterworks must be balanced. (Ref. 2.1. and 2.3)

The establishment of basin agencies in 1964 was extremely positive for implementing water policy at the local level. But today, a new generation of institutions must be created that manage not only water but all natural resources (water, energy, waste, air, soil), this could be done initially within the framework of the "SAGEs" and "SDAGEs".

The establishment of a network of local water managers, would later complement, upstream, the current international network of basin organizations and could be included in the conclusions of the Conference of Paris.

It could, initially, be implemented in cities and rural areas.

⁴ "Local authorities construct, operate and maintain economic, social and environmental infrastructures, oversee planning processes, establish local environmental policies and regulations, and assist in implementing national and international environmental policies. As the level of governance closest to the people, they play a vital role in educating, mobilizing and responding to the public to promote sustainable development." Agenda 21", Rio Chapter 28.1

- **On the other hand, it is essential to involve the population with water policy to a greater extent and to promote participatory democracy.**

To achieve better informed water policies, public awareness-raising with respect to these issues is needed to mobilize and associate it with the implementation of such policies.

How can populations be informed, made aware and mobilized?

Economic incentives cannot solve everything. The “price signal” is only effective if consumers are properly informed about the methods for adjusting their demand. Therefore, users-consumers should be informed in a practical manner and they should be allowed to participate in the management of their water. This can be done on the one hand through a coherent information system and on the other through systems of governance (decision-making processes). (Ref. 2.5 et 2.10)

The user must pay the price of water (mobilization of the resource and purification) resulting from efficient and gradual investment. An effective polluter-pays policy should be implemented in priority in order to achieve this.

However, this principle must be carefully tailored in the least developed countries and for disadvantaged populations, even with investments offering only the strict minimum. Nevertheless, not charging for water is unacceptable, and its price must at least cover maintenance of the investment, even if it is carried out within the framework of voluntary community actions.

Improvement of the situation in the field of water must be closely associated with a process of economic and social progress, with the gradual adjustment of structures in the public sector, characterized in particular by a strengthening of the role of local authorities, as well as in the private sector where it is necessary to “stick with” the modernization industries that generate pollution and waste water, energy and raw materials.

On the information level, indicators of sustainable development should be able to furnish a crucial contribution to such governance and to the integration of water management into all the approaches of planification and sectoral management.

Regarding governance, user participation is a crucial element, as stated in Agenda 21. *“Critical to the effective implementation of the objectives, policies and mechanisms agreed to by Governments in all program areas of Agenda 21 will be the commitment and genuine involvement of all social groups. One of the fundamental prerequisites for the achievement of sustainable development is broad public participation in decision-making.”*⁵

Most national organizations involved in the water field, in particular the technical ministries and their external services, are structured vertically, often on a highly hierarchical mode, expanded over time by entire “sections” one after the other, as a consequence of carving up services or new creations. Resulting in excessive compartmentalization and problems in understanding complex issues holistically and sufficiently quickly, and which require multiple skills: technical as well as economic, legal or social.

⁵ Agenda 21, Rio 1992, Chapter 23.1/23.2

And in today's world, such is the case increasingly often, with respect to urban issues, employment, regional development, the environment, international issues, etc. For these reasons, innovating institutions were established in France, in the past, to deal more effectively with the challenges being considered in the 1950s and 1960s: reconstruction, rapid urbanization, increased industrialization, such as the Planning Commission, the "DATAR" (Delegation for Regional Development and Action), the "OREAM" (Regional Organization for the Study of Metropolitan Areas), the basin agencies, etc. The basin institutions established by the law on water of 1964 and which are still unique, are based on similar concerns.

- **The necessary development of adequate local financing systems.** (Ref. 1.3)

Water has always cost humanity for the effort required to dig wells, build irrigation channels, storage tanks for producing, transporting and storing it. Contrarily to electricity which is easy to transport but difficult to store, water is a local natural resource, often temperamental and expensive to transport, but easy to store. On the other hand, even in the same country, its price may vary considerably (from 1 to 30):

- **for physical et geographical reasons:** water production costs depend on resource location and quality: groundwater is, generally, less costly than water drawn from rivers, because it involves lower production, transportation and treatment costs, since its quality is often better. Because distances between resources and places of use vary, raw and drinking water reserves must often be gathered in order to deal with fluctuations in the resource or needs. Transportation and distribution costs also vary depending on users' geographical distribution. Other elements may enter into play in addition to these natural factors: if resources are insufficient, large and costly works must be built such as multiple purpose reservoir-dams, or waterworks for long-distance transfers.
- **for financial reasons,** the most important price factor is the age of water supply systems, that cost on average ten times that of treatment plants. Indeed, the construction of a water supply system is often financed with 20 year loans, whereas the material life span of a water supply system is around 100 years. Compared with new water supply systems, older ones have very low financial costs, all the more so since depreciation is not generally applied strictly. Another financial discrepancy factor is the great variety in subsidy regimes on the part of the public authorities involved.

What constitutes the cost of water?

It is the objective and normally measurable consequence, expressed in monetary terms, of the various uses of water for the person using it.

The following costs are normally distinguished:

1. internal costs, localized within a management unit (investments and operations);
2. external costs, that appear outside the management system and concern the community as a consequence of water use: external costs are "internalized" by incorporating them into the cost of water incurred by users.

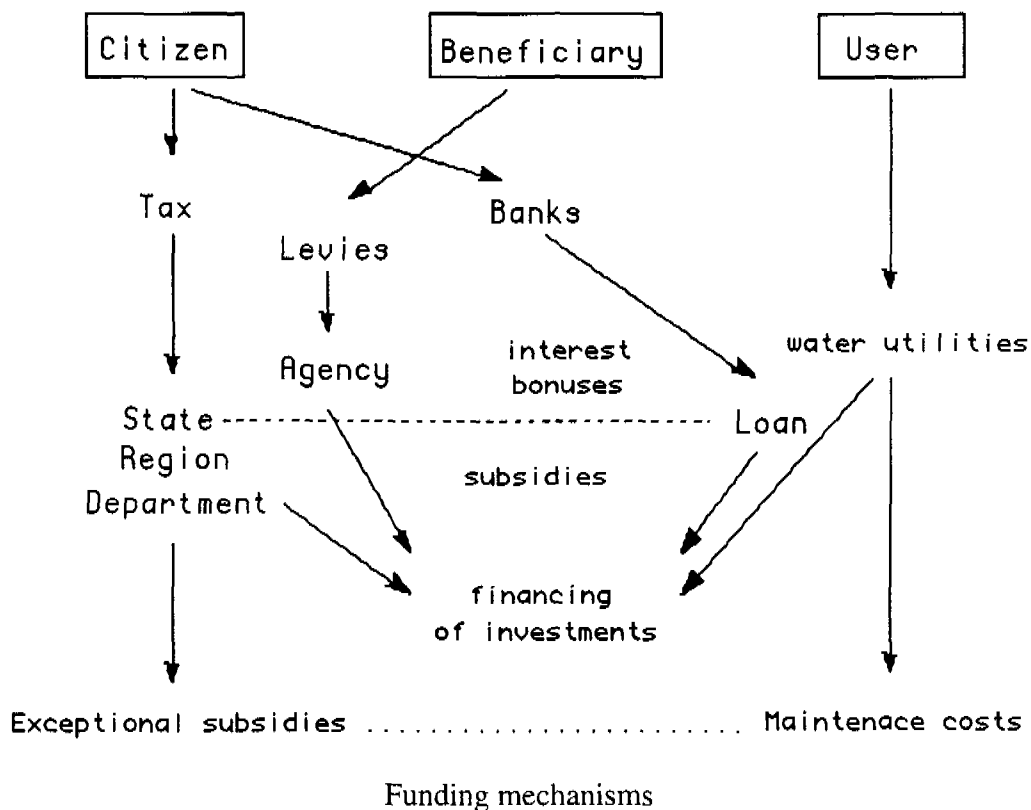
How is the cost of water incurred by the various economic agents?

Traditionally, in the field, the following distinctions are used:

1. the citizen, i.e., a person living in a country or a particular local community;
2. the user, as a subgroup among citizens, for which a specific service that can be quantified is supplied and the management system that can transfer all or part of the costs of the service supplied to the user;
3. the beneficiary, finally, is a citizen who takes advantage less directly than the user and in a manner which is harder to quantify, e.g., who shares the same resource inside the perimeter of a watershed (i.e., users in addition to those that are withdrawing and/or discharging directly into the natural environment).

Using **taxation** to finance investments in the field of water results in considering that the service is guaranteed for everyone. This expanded view is rarely found the world over; its disadvantage is to transfer of the costs between those that pay taxes and those who use the works. It leads to waste.

Financing by the users of the service is a fair and equitable solution, which is increasingly applied in many countries. However, it admittedly may lead to costs which are too high, thereby lowering business competitiveness and a country's economic and social development and simply reducing access to water for the poorest. This is why a third hybrid mechanism was created, half-way between taxation and payment for the service performed: it corresponds to an intermediate level of solidarity among all the users of a same surface or groundwater resource unit. All these beneficiaries are subject to user fees, the proceeds of which are allocated to the local authorities and industry as subsidies or soft loans, in order to assist them in carrying out required investments for improving the quantity and quality of the shared water resource. Therefore, this is a healthy and sustainable environmental mechanism used successfully for over 25 years in French basin institutions and is increasingly adopted in other countries.



In reality, these three complementary mechanisms must be combined, since the objectives are multiple, sometimes even contradictory, both financial (balancing the budgets) and economic (avoiding waste), but also social (to ensuring health, public health and guaranteeing access to water for the poorest) and environmental (protecting ecosystems and the long term future).

Even though, as in many countries, local authorities are the ones responsible for urban services, the national authorities must determine the best funding system.

Because of its crucial nature, the water sector represents in all countries a large portion of funding dedicated to public infrastructures (new works and restoration). Admittedly, it is always extremely difficult to obtain exhaustive and precise information on a situation because of a sector's size and diversity, as well as the multiplicity of the funding sources and their terms and conditions.

This situation leads to suggesting the following recommendations:

Recommendations

The issues of water can be best integrated within the sustainable,⁶ development approach at the local level, namely:

- integration of water policy in cultural and social practices,
- integration of water policy in uses, consumption patterns, and primary production practices (farming, industry...),
- integration of water protection in policies for preserving basic environmental balances,
- the development of appropriate economic and financial tools.

This integration results in water being taken into account as a basic component of **regional development** policies.

In this context, a certain number of priority themes become apparent: demand management, cost recovery through the application of the polluter-pays and user pays principles, adjusting the price of water to local conditions and user solvency, the principal of equitable rate structures, preference for financing pollution prevention rather than production and decontamination investments, promoting local financing, changing some consumer behavior patterns.

Furthermore, water problems must be reviewed in a clear and **open** framework, not only for engineers, but also for elected officials and associations.

Close **dialogue** must be fostered between institutions responsible for managing the water cycle and those in charge of regional development. The originality of this policy, which is only in its infancy around the world, results, as was recommended by a Symposium organized in April 1987 by the "Académie de l'Eau" and UNESCO, in advocating the implementation of a system of subsidized sustainable management initiatives, chiefly as a tool for communication and dialogue among authorities responsible for water management, users, developers, associations and citizens currently launching sustainable development projects. Water management should be one of the links in the drafting of local Agenda 21s, because it enables ensuring the integration of water in decisions made as well as sensitization of all the actors. The trading of experiences and cooperation among these local communities should be fostered.

Finally, water must be paid at the "correct" price, covering in priority operating costs, maintenance and upkeep, followed by the costs of investments and the renewal of the facilities, and finally, external costs, with at least part of the financial burden of the consequences of the various water uses being paid for.

⁶ Rio, Agenda 21 Chapter 28.1 [see above, footnote 4, page 11]

2.2. At the level of the States and Basins: improving consistency

Management focused too closely on the field may lead to scattered approaches; therefore coordination with higher levels is needed for consistency: the regional or State level from the political perspective, and basin organizations on the more specific resource management level.

On a larger level States have a role to play in organizing the standards and rules allowing for sustainable water management. They must ensure, possibly with the assistance of the international community, the gathering over time of data on the quality and quantity of water. Their policies and programs with respect to the local authorities must take into account a more global level of water management, and organize solidarities (physical or economic through evening out rate structures...) and conducting incitement policies. (Ref. 1.3)

A watershed is the basic unit for the management of water resources; this is the level at which all the assessments and policies can start being made consistent. Basin organizations are being established in most countries. There is no single model of basin organization, their powers are indeed closely tied to national institutions, to their size or the international location of certain rivers.

It is up to the State to manage the sharing of water uses amongst all economic activities.

Water plays a crucial role in many economic activities: sectoral allocation in developed countries is 13% for households, 41% for industry and 46% for farming; in developing countries it differs markedly, and is 6% for households, 7% for industry and 87% in farming⁷. (Ref. 1.2)

Regardless of this allocation, arbitration among sectors and global optimization of resources must be designed and viewed at the level of the national framework in relation to all the interests, in order to bring supply and demand closer.

In particular, demand management must be optimized before seeking new resources. Water furnishes a certain number of purposes and services, these must be developed as opposed to water consumption. Water use must therefore be decreased for the same service.

This raises management problems: how can private and public corporations responsible for water supply systems promote the control of consumption? Namely, how can they switch from selling a **product** to selling a **service**? This is linked to the dematerialization of the economy advocated globally at the level of sustainable development as the proposal of factors 4 and 10 that, admittedly deals more with energy and raw materials but may be applied to water⁸.

⁷ Global Change and Sustainable Development, UNCSD, April 1997

⁸ Programme adopted at the Special Session of the UN Assembly 28f: "Changes in consumption and production patterns. Studies should be reviewed that propose a more rational use of resources and consider in particular multiplying by 10 the productivity of resources over the long term and to quadruple the productivity of resources over the next 20 or 30 years in the industrialized countries."

Therefore, reflections must be developed on controlling demand within a system of delegated public services management, on its consequences for rate structures and the sharing of water savings income generated.

Recommendations

- Optimizing water management in all economic activities:

In particular, restore agricultural demand, in rural areas, compared with other needs and at the same time take into account the needs of new farming strategies, of the “greener revolution”

- Promoting the control of demand in the public services management system (delegated or direct) and its implications on the rate structure and the sharing of the water savings income generated.

France has had, over the long term, the administrative know-how (Water Agencies, user fees and management organizations: Master Water Development and Management Plans at the sub-basin level, with participatory management within the framework of the Local Water Commissions). The prerogatives of these structures have been extended to all the factors that influence the changes in rivers and streams: soil use in the watersheds, economic or social activities, relations with biological ecosystems. France is well positioned to propose methods and the framework for optimizing the resources and controlling water demand.

3. Seeking a sustainable development approach for sharing the management of water—an essential asset

The **vital need** represented by basic domestic consumption is an absolute priority. This is why water is not a raw material like others; its management requires a global solidarity effort.

Moreover, applying sustainable development to the field of water is a worldwide approach: situations vary from one country to another, but the application of the concept of sustainable development to water is grounded on a similar methodology.

To concretely carry out a determination to grant priority to the water field, the Commission recommends:

- integrating water issues within International Conventions related to sustainable development,
- increasing our knowledge and sharing it to a greater extent,
- mobilizing research,
- being solidary with the countries in the South and East and facilitating transfers and exchanges.

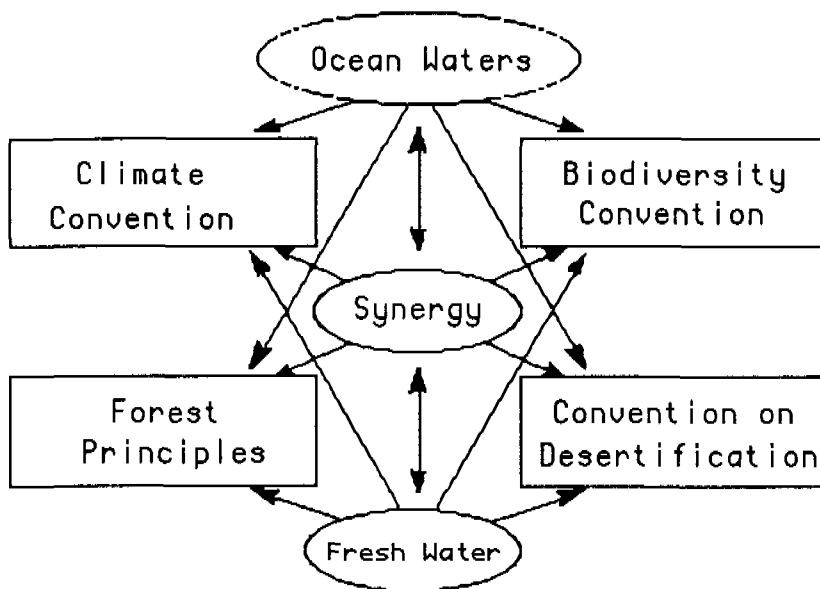
3.1. Integrating water policies within major international environmental issues

At the international and institutional levels, water issues are tied to the capacity for coordinating various International Conventions and major international environmental issues: biodiversity, forests, desertification, climate and water... (Ref. 2.14, 3.1, 3.3, 3.7 and 3.8)

Even though these themes are interdependent, management structures of these International Conventions are specialized and leave little room for cross-sectoral visions that are coherent among each other.

Experts involved in defining international, national, regional and local policies should be encouraged to work in an interdisciplinary manner.

Coordination among the various International Conventions and their implementation mechanisms should be strengthened in order to find the maximum amount of synergy (doubly winning strategy).



Water issues and International Conventions

Recommendations

The implementation of a specific International Convention on water remains controversial, but a mechanism should be implemented fostering synergy between measures advocated by the various International Conventions, as well as transferring this synergy to the core concerns of development organizations, the first of which are the FAO and the UNDP.

Coordination among the various International Conventions and their implementation mechanisms should be strengthened in order to find the maximum amount of synergy (doubly winning strategy). A system of sustainable development monitoring indicators would be effective.

3.2. Strengthening knowledge concerning water resources and their use and supply systems

Serious gaps exist in our body of knowledge regarding water. Thus, scientists as well as economists regret the lack of sufficient knowledge on water uses.

Regarding monitoring systems for water quality and quantity, they only have meaning over time. Too often, we only have limited chronological series available or topical campaigns in which the data cannot be easily used or interpreted.

Knowledge of water resources and uses

Preparatory work for the Conference of Paris has produced sensible, but rather standard recommendations to improve knowledge of the resources and water use.

Moreover, the importance of **prospective studies** must be stressed in the sustainable development approach, whether dealing with the resource or demand trends in quantity or quality, which are key parameters in terms of development and regional planning.

The that information on sustainable development is of a more global nature should also be included, thereby taking into account socio-economic data. The possible deterioration in the quality of the resource must also be noted under the effect of pressures such as demography, regional planning policies, economic and social development. Production and consumption patterns and their impact on the water demand of various users, which plays a crucial role on the quality of the natural environment and for human health, will be carefully "monitored".

Finally, it may be useful to strengthen the mechanisms for monitoring and field measures as well as international research in order to assess the **long term risks** and identify crisis situations, in particular impacts on **climate** trends.

Information gathered will thus serve, among others, to built **sustainable development indicators**, by incorporating studies underway ("IFEN" the French Environment Institute, for France, and the UNCSD at the international level). (Ref. 1.4)

The United Nations Commission on Sustainable Development adopted in 1995 a working programme on sustainable development indicators. An initial proposal covered 130 indicators, including 17 that directly concern water (see Ref. Y). Monitoring indicators in the field of water must be built reliably and maintained constantly, based on concrete cases.

The diagnosis of the condition of water resource quality as well as interactions between extremely complex phenomena, requires a strengthening of international research and monitoring and of field mechanisms in countries that do not always have the necessary technological and financial

capacities. The data must be integrated at the world level into the framework, in particular, of programs such as GTOS⁹, but also made available at the national and local level, to the actors concerned with water management and activities that depend on water.

Coordination among the various International Conventions and the implementation mechanisms should be strengthened seeking maximum synergy. Monitoring systems, in particular through sustainable development indicators, will be integrated into this approach. (Ref. 1.4)

Recommendations

Develop knowledge systems concerning uses, impacts on health and the environment, and the economic aspects; these systems require coordination over time, based on current scientific means as well as network implementation.

This should assist scientist and economist in building a series of sustainable development indicators and moreover, enable them to identify long-term risks and forecast crisis situations.

⁹ Global Terrestrial Observing System

3.3. Mobilizing research on the priorities of sustainable development

The globalization of water issues, their integration with all natural resources, taking into consideration new parameters related to soil pollution, the prevention of the impacts of the greenhouse effect, the ozone hole, biodiversity loss, desertification, all compel increasing research, establishing priority programmes, and cooperation at the international level. (Ref. 1.6)

Applied research in the field of water today in France is, for the most part, carried out by industry, since major corporate groups having research centers, by water agencies and cities. Moreover, France is characterized by extensive upstream multidisciplinary public and semi-public research (in scientific fields dealing with water such as biology, mechanical engineering, Earth sciences etc...) thanks to organizations such as the "CEMAGREF" (French Institute of Agricultural and Environmental Engineering Research), the "CIRAD" (French Center for International Cooperation for Agricultural Science and Development), the "Muséum d'histoire naturelle", the "INRA" (National Agronomic Research Institute), the "CNRS" (National Center for Scientific Research), the AEC, the "ORSTOM" (Overseas Territories Scientific Research Institute...) (Ref. 3.13)

Priority general interest programmes, strengthening the efforts of all the actors, should be implemented.

The themes of these programmes could be the following, for example:

- Measuring exactly consumption and water loss in farming, in industry and in domestic use. Studying environmental impacts of irrigation in farming and industrial uses. Studying the quality and health impact of domestic uses. (Ref. 3.4 et 3.20),
- Developing technologies optimizing both the efficiency of the water resource, and the return generated by the relevant economic activities. (Ref. 3.5),
- Developing economic and financial tools fostering "water management through demand",
- Developing research and technologies on desertification, the greenhouse effect and biodiversity,
- Studying the impacts of the greenhouse effect on water resources. As an example, the increased presence of carbon dioxide in the atmosphere affecting surface temperatures will increase the demand in water for crops. This issue is of concern in regions like the Mediterranean basin, where withdrawals from groundwater are already excessive. Greenhouse effect impact simulations must be made more specific allowing for strengthening prevention and preparing right now for remedial solutions protecting the water resource: irrigation techniques, winter crops, developing varieties resistant to draught.
- Pursuing the development of sparing and clean techniques in particular in the following fields:

- maintenance of water supply systems to eliminate leaks,
 - recycling and closed-circuits for industrial water,
 - sparing irrigation techniques such a drop irrigation,
 - recycling treated wastewater,
 - “water harvesting” techniques.
- Integrating water in biodiversity industrial research strategies. The selection of plant and animal species is now globalized, the major role being played by large multinational groups; the species that are the most adapted to local climate conditions with respect to water availability, must be encouraged.
 - Develop research on sustainable development criteria.

Recommendations

- * Mobilizing research according to a sustainable development approach on water issues. Taking into account new threats on the global environment (*climate change, desertification, soil conservation, decrease in biodiversity*).
- * Developing prospective studies as well as economic and financial tools enabling long-term water management.
- * Making water research a priority objective for transfers and exchanges of know-how with developing countries; helping them acquire technological, scientific and organizational capacities to receive and adapt our know-how and develop their own know-how.

3.4. Developing transfers, exchanges of know-how, as well as adequate economic and financial tools, with and among the countries of the South and the East

The industrialized countries have a duty to assist developing countries, especially when dealing with a **vital** asset such as water. This means transfers and exchanges of know-how in the field of demand organization and management; as well as with sparing techniques, taking into account local conditions, avoiding nevertheless costly or useless sophistication. (Ref. 3.6)

For this purpose, the framework enabling transfers and exchanges with countries of the South and East should be strengthened, as well as exchanges of experiences among all these countries. (Ref. 3.10)

Simultaneously, the quality of French services offered should be adjusted or strengthened these at the level of:

- State action
- decentralized cooperation
- industrial action.

State action

The quality of French services offered could be improved. The parliamentary mission led by J. P. Fuchs (Ref. 1.5) recommended in particular:

- that French efforts be strengthened and focused on a few challenging programmes, relying on a sustainable development strategy. Increasing dialogue among the actors involved in research, industry and, in particular, small and medium size businesses (SMBs), NGOs and lenders (Ref. 3.17)
- Sensitize, better inform and assist the French actors involved in a sustainable development approach: strengthening French presence on location in developing countries, as well as in international organizations, in order to better fulfill French bilateral and multilateral commitments and organize feedback on French sustainable development actions. Implementing an assessment system for French cooperation actions. Improving the integration and support of the action of efficient NGOs. (Ref. 3.15)

Decentralized cooperation

During the 1990s, cooperation with developing countries has changed substantially. From a model of cooperation between States relying on the transfer of national know-how, the trend is moving towards **decentralized cooperation**, cooperation among cities, and even among rural areas. The concept of **twinning**, which consists in financing topical actions such the drilling of a well, should be supplemented today by a larger form of **partnership**, organized over the long term, among local authorities, in particular the relevant populations and communities. (Ref. 3.11)

Decentralized cooperation proves to be extremely effective in assisting developing countries to control the entire water management sector, and supplying populations with enough water in quantity, quality

and on a **regular** basis. For example, particular focus should be paid to “irregular supplies”, which entail high social and individual costs. (Ref. 3.14)

Industrial cooperation

Importing industrial water management models into developing countries is not always easy or desirable. French SMBs in the field should be more active on the international level. French models must be thoroughly adapted to local contexts. Based on its experience, in particular in Africa (Ref. 3.16), French industry has learned a few principles to be followed:

- Taking into account regional **cultural values** in the management philosophy of the company. These reflections must be coordinated with local associations.
- Most of the **supervisory personnel**, without forgetting foremen, must be nationals of the **country involved**. Training should be developed. Women should be hired. Implementation of social funds and a system of micro-credits.
- **Increased empowerment for local actors**. A progressive rate structure for consumers must be adapted, ranging from free water, accessible from certain points only, to individual metered service. Profit-sharing must benefit the personnel. A quality assurance approach, with the prospect of ISO 9002 and 14001 certification should be sought.
- Transfer of our scientific knowledge and, if need be, adaptation of our technologies if they allow for a good **service performed/cost** ratio.

An example of a priority cooperation objective

Social inequality in access to water: promoting an equitable rate structure

Inequality in access to water is one of the major social inequalities. The vital need of basic domestic consumption is a priority. Therefore, the intervention of the State and public authorities is justified with respect to controlling, in particular, health quality, environmental control and optimization of management through *ad hoc* taxation and an equitable rate structure.

Regarding the latter point, the principle of social equity leads to guaranteeing access to the poorest through an **equitable** structuring and adjustment of rates.

In the Southern countries, with a dual economic system, the supply of water to disadvantaged populations, outside the economic system, calls for special technical, financial and institutional solutions. Indeed, in some areas not connected to the water supply system, the poorest pay a very high price for their water, because they depend entirely on middlemen.

Delegated management is spreading in many cities. French companies are present on these markets, they could contribute to new thinking on rate structures and sustainable management methods adjusted to the local environmental, economic and social conditions.

How can an equitable rate structure be implemented that would charge less for the initial m³ covering basic needs? What appears at first sight to be uneconomical (economies of scale lead to charging large consumers less) could be adequately incorporated into utility concession agreements. How can the implementation of a standard commercial system be supplemented with a local set-up for community management?

The working group "Economic Approaches to Sustainable Development" jointly shared with the French Commission on Sustainable Development and the General Planning Commission, is participating in efforts to answer these questions (Ref. 1.11).

Recommendations

Deep changes must be made. In terms of international cooperation, the action of the State, which is predominant today, must be maintained at its current level, redirected and broadened:

From a model of cooperation essentially between States, based on a transfer of national know-how, adjusted to local conditions, a move must be made to a broader form of decentralized cooperation, relying on local communities, NGOs, and industrial know-how (Major groups and SMBs).

The role of the State remains crucial to assist, including financially, the actors of decentralized cooperation and to implement the framework of sustainable development, coordinate cooperation actions and ensure that the concept of sustainable development is followed appropriately.

In every country there is a need for a new model of water management, enabling a control of health quality, environmental control and optimizing management and compliance with an equitable rate structure.

France, which distinguished itself through its marginalist economists within the framework of the public services and undertook an asset-based approach, can offer to the international community its contribution to defining the intervention of the State and the public authorities for this vital need. Strengthened through its time-honored and diversified experience, in particular in developing countries, France is capable of proposing examples and methods, for optimizing resources and controlling water demand (e.g., in the area of equitable rate structures for the poorest or of local funding mechanisms).

Multilateral, regional and bilateral funding agencies must continue to play a very important role, in particular groups in the World Bank, (BIRD, IDA, SFI, MIGA).

Public development assistance in the water field would gain by focusing in a concerted manner on structure-building or social investments, in order to contribute to solving the real issue of water: **permanent access to drinking water for the two billion people living on the planet that currently do not have it.**

SUMMARY OF THE RECOMMENDATIONS

The French Commission on Sustainable Development believes it necessary to apply a sustainable development approach to water. This approach is based on a few principles, such as taking into account the medium and long-term, a global approach to all the sectors and uses concerned, mobilization and dialogue among all decision-making partners, in both advantaged and disadvantaged areas. This implies strengthening the various levels of local, regional and international solidarity.

The Commission considers that the application of this approach leads to carrying out several deep changes in current policy, and to developing a new strategic framework as well as the regulatory, institutional, economic and fiscal tools.

Observing the importance of water in human activities and the planning of space, it recommends optimizing water management in all socio-economic sectors, integrating water policy and regional planning, associating the population with water policy through participatory democracy.

Taking into account the vital nature of water, the Commission advocates combating social inequality in water access, by practicing, in particular, equitable rate structures, improving our knowledge, putting it on networks, designing sustainable development indicators, integrating water policy with major international environmental issues, mobilizing research on sustainable development, generating solidarity with countries in the South and East, by developing transfers and exchanges.

CONSULTATION ON THE APPLICATION OF THE CONCEPT OF SUSTAINABLE DEVELOPMENT TO THE FIELD OF WATER

List of contributions

References to the contributions are mentioned in the text

1. Fundamental principles of sustainable development

- 1.1 “Académie de l’eau”: François Valiron - Secretary General - *“L’eau et le développement durable”*.
- 1.2 World Water Council: René Coulomb - Vice President - *Note de réflexion sur le thème “Eau et développement durable”*.
- 1.3 French Ministry of Infrastructures: Jean Louis Oliver, *Ingénieur en chef des Ponts et Chaussées* - *“L’eau et le développement durable”*.
- 1.4 “CFDD”: Christian Brodhag - President of the Commission - *“Quelques réflexions sur l’eau dans le cadre du développement durable”* - September 1997.
Annex 1 : *“Les conclusions du sommet de la Terre” Rio + 5*
Annex 2 : *“Les indicateurs de développement durable, des Nations Unies, concernant l’eau”*.
- 1.5 French Parliamentary Mission *“Pour une coopération au développement durable”*
Jean Paul Fuchs. June 1997. Rapporteur P. Lelourd - *“Conclusions et recommandations pour l’eau et le développement durable”*.
- 1.6 “Conseil Général du GREF”: Jean Dunglas *“Développement Durable, géoéconomie de l’eau et effet de serre”*
- 1.7 “Programme Solidarité Eau” *“Un lieu privilégié d’échanges et de concertation”*
- 1.8 Symposium on Water, the City and Urbanism - Paris 10 avril 1997 *“La déclaration de Paris”*
- 1.9 Consultation on the theme *“Le concept du développement durable et l’eau”* launched jointly by the French Commission on Sustainable Development and the General Planning Commission
Questionnaire of the consultation.
- 1.10 Discussion of January 15, 1998 on *“L’application du concept du développement durable au domaine de l’eau”* Agenda and report.
- 1.11 Group “Méthodes économiques” of the “CFDD”. Contribution of the group attached to the “CFDD” and the “CGP” *“L’économie de l’eau: quelques méthodes économiques pour aller vers le développement durable”* R. Abord de Chatillon.

2. Managing issues at the optimum scale — Regional planning and development

- 2.1 Loire-Bretagne Water Agency: Mission Brittany Clean Water - *“En zones rurales, agir ensemble pour la reconquête de la qualité de l'eau”* Note on the issue *“Eau et développement durable”* J. P. Rideau - P. Operiol.
- 2.2 Implementation of the Charter Water-Solidarity : *“Lettre du gouvernement N° 35”* December 1997.
- 2.3 “CNJA”: National Center for Young French Farmers”. Operation “Irrimieux” (bringing together the actors of the sector to manage water equitably and sustainably)
- 2.4 European Union PACTE Programme *“Vers un développement durable Expériences et recommandations de sept régions européennes”* Rhône-Alpes region - *“Le contrat de rivière Drôme”*
- 2.5 “UNAF”: *“Union Nationale d'Associations Familiales”* - *Departement habitat-cadre de vie -environnement.* (Housing-Surroundings-Environment Department)
- 2.6 “UFC : Que choisir ?”: *“Le concept de développement durable et les problèmes de l'eau”*
- 2.7 “EDEPI”: European Center for Development and Innovation - Claude Holl *“Rivière - partage de l'eau”*
- 2.8 “A.I.U. : Association internationales des urbanistes” - Dr. Hari Baral, Vice President - *“L'eau, la ville et l'aménagement du territoire. Quelle perspective pour le développement durable”*
- 2.9 “Cercle Français de l'eau”: Jacques Oudin, President. *“Politique régionale de l'eau et aménagement du territoire”*
- 2.10 “Familles de France”: Mme R. Lorenceau *“Réflexions sur le système de gestion de l'eau français”*
- 2.11 “Environnement et développement alternatif”: Nord Pas de Calais region - Group document - Conclusions de *“l'eau, enjeu du 21 siècle”*.
- 2.12 “Agence de l'eau” - Adour Garonne *“Eléments de réflexion sur le développement durable et l'eau”*.
- 2.13 “Conseil Général des Mines”: Yves Martin *“Rapport sur la gestion durable des eaux souterraines”* January 1996 - Proposal abstracts.
- 2.14 “BRGM” : D. Poitrinal Directeur du centre de l'eau « Eaux souterraines et gestion durables des ressources en eau »
- 2.15 “Cercle Français de l'eau”: Jacques Oudin - President - Summary of the Colloquium *“Quelle politique de l'eau à la veille du VII^{ème} programme des agences de l'eau”*. June 1996.

3. Water is a vital asset: search for a sustainable development approach for sharing and managing water

- 3.1 "ORSTOM": P. Ribstein - "Département ressources, environnement, développement." *"Changement climatique, eau et développement durable"*.
- 3.2 "ECRIN": Contribution of the "ECRIN" association to the theme *"Le concept de développement durable et l'eau"* - "Club environnement et club matériaux pour le génie civil".
- 3.3 "CNRS": Georges Vachaud - "Laboratoire d'étude des transferts en hydrologie et environnement". (Laboratory for the study of hydrological transfer and the environment) *"Changements climatiques et évolution des ressources en eau souterraines en zone de culture irriguée du bassin méditerranéen"*.
- 3.4 "CEMAGREF": Christophe Besacier - "Services des relations européennes et Internationales" *"Enjeux et marges de progrès pour l'agriculture irriguée"* - With three fact-sheets on experiences in Morocco and Jordania.
- 3.5 "Chercheurs d'eau en Méditerranée" - *"Pratiques et représentations de l'eau dans l'espace méditerranéen"*. Editions du Félin - Foreword by Chantal Aspe, sociologist.
- 3.6 "Conseil Général des Ponts et Chaussées": Jean Fried - "Professeur des Universités - Association pour le co-développement durable". *"Gestion durable de l'eau et co-développement durable"*.
- 3.7 'ORSTOM': Christian Lévêque - "Directeur de recherches" *"Gestion durables des hydro systèmes et biodiversité"*
- 3.8 "ORSTOM": Christian Lévêque - "Directeur de recherches" *"Biodiversité et gestion des systèmes aquatiques continentaux"*
- 3.9 UNESCO : "Symposium on water, the City and Urbanism" - April 10 and 11, 1997 - "La déclaration de Paris" (Cf. Reference mentioned at 1.8)
- 3.10 "Plan Bleu": *"Les futurs de l'eau dans le développement durable en Méditerranée"*.
- 3.11 "Cités Unies": Marie Claude Tabar Nouval - *"La coopération décentralisée"*
- 3.12 "Peuples solidaires": Georges Duriez *"Pour que le monde et l'Agenda 21 rentrent à l'école"*
- 3.13 ICSU: (International Council of Scientific Unions) SCOWAR (Scientific Committee for Water Area Research) *"Orientations et besoins de recherche en 1997 dans le secteur des ressources en eau"*
- 3.14 "Centre de Sciences Humaines à New Delhi": Developing cities - December 1997. Marie Hélène Zerah *"Le vrai prix de l'eau"*.
- 3.15 "Assemblée Nationales": Mme Christiane Taubira-Delannon - Deputy of French Guiana *"Le plateau des Guyanes, unité hydrologique fonctionnelle"*

- 3.16 “SAUR”: Michel Maruenda *“Eau et développement durable: L’expérience africaine d’un opérateur privé”* January 1998.
- 3.17 Water Agency: Loire-Bretagne : J. F. Talec *“Les agences de l’eau et l’action internationale » et fiches sur la coopération franco-indonésienne”*.
- 3.18 “Académie de l’eau”: City survey - Fact-sheets on Casablanca, Marseilles, Lyon and Annecy. François Valiron
- 3.19 “CEA” : French Atomic Energy Commission - Gilles Guerin - Environmental Mission *“Développement durable et problèmes de l’eau”*
- 3.20 “ORSTOM”: Thierry Ruf - Agricultural studies laboratory *“Implications sociales locales et globales”*
- 3.21 “I.M.E” Mediterranean Water Institute. Georges Lacroix. President of the Steering Committee: *“Note de recommandations méthodologiques pour la coopération”*
- 3.22 “Conseil Général des Mines”: Paul Henri Bourrelier, *“La Houille Blanche n°2 1998”, “l’eau dans le monde : la nécessité, le plaisir et les risques”*.

LIST OF ACCRONYMS

FRENCH	ENGLISH TRANSLATION
AE	French Water Academy
BRGM	French Geological and Mining Research Bureau
CEA	French Atomic Energy Commission (AEC)
CEMAGREFF	French Institute of Agricultural and Environmental Engineering Research
CFDD	French Commission on Sustainable Development
CIRAD	French Center for International Cooperation for Agricultural Science and Development
CGP	French General Planning Commission
CNRS	French National Center for Scientific Research
DATAR	Delegation for Regional Development and Action
IFEN	French Environment Institute
INRA	French National Agronomic Research Institute
OREAM	Regional Organization for the Study of Metropolitan Areas
ORSTOM	French Overseas Territories Scientific Research Agency
SAGE	Water Development and Management Plans
SDAGE	Master Water Development Plans
SMBs	Small and Medium-size businesses
UNCSD	United Nations Commission on Sustainable Development