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Rethinking Water Law
The Italian Case for a Water Code

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FOREWORD

This work, devoted to water law, is divided into four parts.

The first part introduces the issues involved on an international level and the general paths proposed for dealing with them. It highlights the relevance of the role that water law must play, the difficulties water law might encounter, and the need for integration with other fields.

The second part, also discussing issues on an international level, deals with water problems on the one hand, and priorities and principles that should be set in order to solve those problems on the other hand. Water problems are divided into physical problems and political problems, and accordingly classified. Priorities are divided into “utilization” priorities and “action” priorities. The analysis of problems and priorities leads to some general principles, which should direct the efforts of national legislators.

The third part takes into consideration the Italian legislation regarding water as a case study, demonstrating the links with international frameworks, the problems and the priorities at a national level, and the basic characters of Italian water law. It emphasizes the traditional approach the Italian system has adopted so far and the ineffectiveness of this approach.

The fourth part puts together the scattered legislation regarding water in Italy, trying to put forward a proposal for a water code that consolidates the vast amount of regulations affecting water. This «water code» might represent a case for comparative studies between countries, a first step in order to pursue a better integration on an international level.

PART ONE - INTRODUCTION: EMERGENCY

1.1. FACTS, OBJECTIVES AND PATHS

1.1.1. Situation

We need not wonder why the growing lack of access to clean water worldwide is such a pressing issue today, and why it will be such a critical issue in the future. Clean water is essential to life, but the world supply of available fresh water is limited, representing only a small fraction of the earth's total water supply.

As the earth's population increases, and the global economy expands and continues to industrialize, the demands put on this finite resource multiply. Aside from meeting our most essential human needs, for drinking and sanitation, it is a necessary input to almost every sector of the world economy: food production, industry, trade, and the generation of electric power. But as the demands have increased, the available supply of this already limited resource is progressively eroded by pollution, which renders a great deal of otherwise fresh water unusable. In addition, the world's fresh water supplies are not evenly distributed, and overexploitation of surface and groundwater sources in naturally water-stressed regions has already created serious conditions of scarcity, making those communities ever more vulnerable to droughts and other effects of climate change.

We appear set on a destructive course, which seems hard to reverse. But the vast social and economic implications of a worldwide water shortage require us to act now to alter this course. The detrimental situation facing the world's water supply requires that we develop suitable regulations, which can be applied in ways to guarantee prompt action. The implications of the current and impending water problems are so serious that our most immediate concern must be about what can be done now.

Traditional approaches to the management and allocation of water resources contain too much embedded inefficiency, which we can no longer afford. Wasteful water use practices, unchecked pollution from point and non-point sources, irrational subsidies and inequitable allocation schemes have led to the large scale disruption of natural water ecosystems, placed bio-diversity in jeopardy, altered the natural water cycle, and more. Nevertheless, these negative trends can be changed.

The problem of effectively managing and allocating scarce water resources is already an issue of first order in the public policy arena both on the national level and international level. The process, however, is complicated by the fact that there are often too many different public and private interests involved, and they are closely connected, altogether interlaced and often conflicting.

In these terms, water law must cover a basic role, as only a reliable legal framework can provide effective instruments to deal with water problems. Another reason for considering a re-organization of water law is its current complexity, concerning both its very objectives and its rules.

The relationship between the management of water resources and laws relating to that management is particularly complex for several reasons. First, a great number of public and private interests affect, and are affected by, policies regarding management of water resources. Second, the legal status of water is often ill defined with regard to whether it is an excludable private commodity or a non-excludable public good. Third, different legal criteria and terminology are used in domestic and international regulations.

As it encompasses so many diverse interests, one of the main goals of our effort should be to identify guidelines suitable for providing a comprehensive approach to the field.

First, it is not easy to define what water is from a legal point of view, as no single traditional legal criteria alone can define it. Secondly, questions that relate to the ownership of water and whether property rights rest with the public powers or with individuals are carrying great economic

and legal liability implications. Even if ownership should not be a primary concern, the point is that until this matter has been adequately addressed, other dependent issues may be difficult to resolve. Moreover, the diverse interests affecting and affected by water are broad and vary remarkably according to time and place. Defining the relationship between them and establishing an effective hierarchy between them represents the core of water law.

Furthermore, water can no longer be considered in isolation, solely as any nation's domestic problem. It is a worldwide issue; it involves coordination at both regional and international levels, requiring a more unified international legal system. Developing appropriate legal criteria and terminology, to reflect the global nature of an integrated legal approach to the water issue should not present an insurmountable obstacle.

Finally, and consequently, further integration is required with different fields, including economics, social science, political science, physical sciences, education and media. The field of law alone can not solve water problems, and legal experts must establish ongoing working relationships with experts in other fields.

1.1.2. Ethical dimensions

Apart from the material significance of water problems, the law, as it is applied to the complex issues of water use, embodies a more fundamentally human dimension, not generally identified with other branches of practice, that is a certain spiritual quality.

On its most fundamental level, access to clean water concerns both people's very lives and their basic dignity as human beings. In addition, in many cultures water has religious significance, and is often seen as a living entity in its own right, to which human beings are inextricably connected. Ancient civilizations have gone extinct due to lack of water.

Water is a fundamental component in maintaining the economic and social fabric of every nation. Water is, thus, a basic need for everyone, and, to a certain extent, access to clean water should, and must, constitute a basic human right[1].

Water has been, is and will be a catalyst for conflicts, both at a domestic and at an international level. Upstream – downstream riparian conflicts, pollution conflicts, diversion conflicts, appropriation conflicts and other conflicts arise frequently. Sometimes it is a conflict between the rich, sometimes between the poor, sometimes between the rich and the poor. When the rich are involved, the conflict is about welfare and economic aspects; when the poor are involved, the conflict is about life and dignity.

The conflict could be among individuals, communities or municipalities, countries or states, economic models and cultures[2]. Water means not only life and welfare, but also power. In any case, choices about water are choices about fundamental interests.

It is true that so far few conflicts over water have arisen, considering its great importance. Nonetheless water is often a resource leading to disagreements between countries. We can not be so sure that water will not be the cause of future conflicts.

This leads to the question of whether water law should have its own ethical code. I believe it should. It is disturbing, although unfortunately not surprising, to find people dying from lack of access to clean water in some parts of the world, while in others, surpluses are wasted.

It is true that, as a practical matter, the water wasted in water-rich areas might not be easily delivered to those in water-poor areas. It is nonetheless a matter of ethical and moral outrage that worldwide, on average, millions of people die every year from drinking contaminated water. Therefore, lack of water may have deadly effects.

However, not only lack of water can be deadly, but a plentiful amount of it can also be deadly. Floods for instance, have always had tragic effects, and no matter how technology has improved, they still do, as even recent events worldwide have shown. Thus water is a source of life,

[1] **1997, MCCAFFREY, *Water Scarcity***, pp.54 *et seq.*
[2] **1993, RUBIN, FAURE, *Water Resources***, pp.57 *et seq.*

but it may also be a source of death. It is important to respect the dual power of water in its impact on human life.

It is in the inextricable connection that exists between the water resource, human life and the fabric of society, that we find the inherent ethical basis, and even moral imperative, in our approach to the just management and allocation of water for people within our global community.

1.1.3. Target and steps

This work sets out to find what can be done from a legal point of view. Since the first general task of the law is to set up a hierarchy among opposed interests, solving in advance possible conflicts, the primary concern is to settle disputes by providing an effective legal framework of standards and procedures[3].

The vital and ethical value of the subject must, nonetheless, seek to avoid reflecting demagogic or utopian positions. Incremental, short-term solutions must be pursued in conjunction with longer-term, sustainable solutions. Nor can the new discipline afford declaring just general principles. Instead, effective provisions must follow.

The target of this work is therefore very simple and, at the same time, very complex and ambitious. It is simple, in that it aims to develop a coherent and unitary basis of water law. It is complex, as it must deal with many unresolved and controversial issues. It is ambitious, as it does not address a single water issue, but seeks to deal with the entire, interconnected network of global water problems.

My basic assertion, therefore, is that the development of a unified and coordinated field of law, devoted solely to water issues, is timely and necessary. So far, water law has primarily served a collection function, gathering statutes and regulations affecting water. What I believe is that it should take on a more active role as well. Apart from providing greater efficiency, a separate branch of law on water could have a positive impact on the problems law itself is tackling.

In other words, this work is not intended as a mere picture of what has happened or what is happening, but as an attempt to change the present negative trends and boost the positive ones through a different consideration of law.

The first step of this work is the identification of problems. Unfortunately, it is not a difficult task, as problems are often dramatically evident, even if they are remarkably different from country to country. Nevertheless, they can be considered in a different way, making a connection between them and the interests they affect.

The second step, therefore, is the identification of priorities, that is, which law should be applied first. This is an essential and controversial task, since so many perspectives are possible. It requires a complex comparison among the different interests involved.

The third step is the identification of principles. Setting up a new branch of law initially requires basic principles, which will influence the enactment, the interpretation and the enforcement of the regulations. Mainly, they should focus on legally defining what water is, establishing whose water it is, and identify with whom the responsibility for decision-making rests.

The fourth step is the analysis of the present state of the discipline, on both a national and international level, comparing what is in force with what should be done, and highlighting the most relevant faults.

The fifth step, that is the real purpose of the work, is to propose some solutions to the water problems, from a legal point of view.

1.1.4. Legal questions and other questions

There are some basic questions that water legal experts should ask themselves.

[3] **1997, KISS, *Legal Procedures***, pp.62 *et seq.*

The first question is about water law itself and it is whether water law exists as a separate branch of law. I believe water law probably does not exist as a separate branch of law, since it is often less a comprehensive body of laws, than a sum of different laws. In addition the laws simply exist as a sub-section of another branch.

The second question naturally follows, and it is about whether a separate branch of water law should exist. I believe it should, as water is a peculiar and relevant «thing», with a peculiar and vital value, and with peculiar and complex rules. That said, it is a question of defining its object, its principles and its structure.

Other questions concern the decision-making process and allocation, by locating the most suitable level of public organization for considering water issues and by defining the respective role of international organizations, countries, states, regions, and municipalities.

In an effort to facilitate integration with other water experts, operating in different fields, questions represent the first step in order to understand the nature of each field and its relationship to water.

With regards to economics, a main problem is incorporating current economic thinking regarding management and allocation of water resources into the legal analysis. In particular, it would be important to know how economics deals with a commodity, which is a basic social necessity as well, and to ascertain what economists expect from water law. More specifically, economists can answer questions about water pricing, water management, fiscal policy, water market and economic standards applied to water management.

With regards to political science and the other social sciences, the first question concerns who should be responsible for making the fundamental decisions about water, which leads to other questions about international water conflict resolution and regionally shared watercourse management. At the same time it would be important to clarify different points about the relationship between water and users: how can participation of the public be guaranteed in the water decision-making process, and how can social and public interests be matched with economic and private interests. Moreover, there are general questions about the essence of the water field, about a water culture, about ethical principles guiding the water sector, and about what the idea of sustainable development refers to, within the context of water demand.

With regards to the technical fields, which are supposed to provide reliable data and to find solutions to water problems, and expanding the ratio of available water resources, the first question is what do water engineers and water scientists expect from water law. Further questions concern available data banks, which seem to be often lacking in consistency, and the chance to establish a harmonized and standardized network in order to attain easy access to the best available scientific data. Obviously, these questions require practical answers, about water waste, pollution, desalination, water transfers, interventions on the hydrologic cycle, reliable water-saving technologies, and best practice models.

With regards to the communications field, the basic questions are what can be done to disseminate water awareness all over the world and why other environmental issues (mainly, climate change, bio-diversity, and deforestation) are covered more so by the media as compared to water, since water is a basic necessity for life.

1.1.5. Starting points and hypothesis: water law reconstruction

Both at a domestic level and at an international level there is not a lack of regulations. On the contrary, due to an endless overlapping of rules, what is truly lacking are coherence and effectiveness. Therefore, coordination and simplification should be the first goals.

In these terms, building a new branch of law, with its own principles, and applying a codification of these principles to the water sector are two relevant issues, from a legal point of view.

On the other hand, a new approach to water is needed: apart from water policy, there should be a water culture, if not a distinct water ethic, based on rationality, solidarity, water saving,

water recycling, waste reduction and user information. The legal principles of the new legal framework would be closely connected, and they should stem from these cultural and ethical principles.

A greater degree of functional integration among legal experts themselves, and between legal experts and experts in other fields is another necessary starting point. Too often, in actual practice, professionals work in isolation from one another, as if in watertight compartments, which is inefficient.

My view is that it is necessary to proceed on the legislative level, but in a different way. The various interests regarding water have led to an extreme fragmentation of water law. Considering that water is a unique resource, but one subject to different sector by sector regulations, national legislators must consolidate water law.

So far water law has not been defined as a coherent branch of law, but has in fact assumed a descriptive role. Water law can be described as the gathering of different pieces of legislation and regulation affecting water resources. The aim which law should undertake is quite simple, theoretically. On the one hand, law has to provide consistent rules, and on the other hand, it must enforce the implementation of these rules.

Not surprisingly, water law arises and grows when, and where, water-related problems arise and grow. The point is that water law is often an «emergency law», called upon when a crisis occurs or is about to occur. This prevents it from being developed as a more comprehensive system, and becoming a real branch of law, making it instead a sum of required and urgent interventions by the legislator.

I am firmly convinced that this trend must be changed. Otherwise, the legal discipline of water resources will always be just «reactionary» legislation bound to stop leaks, but incapable of preventing damage about to be caused.

The time has come for law to forestall problems and to set a reliable framework and persuasive principles. In addition, a coherent legal framework could save resources and boost technologic studies, research and private-sector investments.

1.2. THE ROLE OF LAW

1.2.1. Timing: short term - long term actions

The water related situations are notably different from country to country, and sometimes they differ also among areas of the same country. Even if every nation is not necessarily experiencing emergencies, law, both at an international level and at a domestic level, must be utilized now, as there is simply no time left to waste.

As it has been correctly noted, the consequences of inaction in the water sector, in terms of individual suffering, social disruptions, and foregone economic opportunities, have been dramatically serious. Moreover, the cost of natural resources and environmental recovery usually outweighs the human and financial resources needed to follow sustainable solutions[4].

Water is a major economic resource and intertwined in several crises such as: quantity crisis, quality crisis, transboundary crisis, organizational crisis, and information crisis[5]. Whatever the nature of the crisis and wherever it occurs, it may mean underdevelopment and economic stagnation.

The usable percentage of water resources must be increased, allocation between users must be revised and waste and pollution must be curbed. Moreover, law must reconsider the different uses in terms of priorities, first the demand for water, and then the supply.

As it has been stated, there are three main priorities: the improvement of the knowledge of water resources and uses, the development of regulatory tools and institutional capacity building, the means for funding and an economic approach to the water sector[6]. Moreover, a participatory approach must be promoted.

The first thing law can do to pursue these aims is to create a branch specifically devoted to water issues. Water law, for the time being, does not really exist.

Even if a particular object, in this case being water, does not generally define areas of law, the relevance of water makes it rational to have a branch of law specifically devoted to water issues. Water meets a series of vital, social, economic needs, and competition is forthcoming among aspiring users. Law should protect the resource and settle disputes over it, clearly defining rules and respective rights.

In many countries there is not a specific area of the law designated as «water law». There are many sectional regulations regarding water, but they are included in different branches, and deal with water issues under a limited scope. In other systems, water law formally exists, yet it deals just with some, or many, but not all, aspects of water related legal problems.

Of course, a separate branch of law can not be created in a short time, especially if it is considered both a national issue, and a tool to facilitate the communication between different legal systems in the international arena. Setting up new regulations and infrastructures requires a long

[4] **1997, UNCSD, *Comprehensive Assessment,*** par.100.

[5] **1997, VLACHOS, *Sociocultural Dimensions*,** p.14.

Water is part of five interrelated and interacting crises: «a) a water supply and demand crisis that represents a predominantly engineering dimension; b) deteriorating water quality crisis that can be translated into an ecological dimension of water problems; c) transboundary dependencies crisis representing a geopolitical dimension not only in terms of international frontiers but also intra-national transfers of water across administrative boundaries; d) an organisational crisis exemplified in a management dimension, i.e., appropriate personnel, facilities and procedures as well as legal mandates, court decisions and administrative guidelines; e) a data and information crisis, not only in terms of availability, validity, reliability or comparability but also as part of combining data and judgement, modelling, and the building of useful decision support systems.»

[6] **1998, Paris Conference, *General Considerations*,** par.51.

time due to the delays necessary for administrative reforms, study of projects, funding, and users' awareness[7].

A reasonable approach does not require a sudden and total change. Reasonableness means that long-term general programs and plans must be accompanied by short-term specific actions, integrating environmental, social and economic expectations in a general regulatory and management framework[8]. Sustainability of the public choices becomes the more relevant criterion to balance short-term provisions with long-term perspectives.

Long-term actions share the need to tackle the problems in an integrated way: «codification» (consolidation) of legislation, creation of a reliable data and monitoring system, coordination of planning activities, and simplification of organization. Too often water issues are tackled during emergency times, while long-term preventive measures are given little attention.

We do not need many new regulations, but we do need to reduce the existing ones into systems. We do not need much new data, but we do need to create interchangeable information networks, suitable for use worldwide. We do not need many new plans, but we do need to make them compatible with each other and practical. We do not need many new public bodies, but we do need to give authorities the opportunity to administer.

Short-term actions share the urgency and therefore may not need to be based on long-term actions to be taken. Short-term actions may regard information, to be spread, allowing consumers to understand the crisis situation, and pricing policy, to be changed, distinguishing basic uses from other uses.

Nevertheless immediate actions concern issues of resource allocation. Action needs to be taken without waiting for the perfect piece of legislation or the perfect plan.

1.2.2. Separate branch, different integration

To build a new coherent branch of law, water law, requires the creation of new principles and rules, extraction of rules from different branches in which water regulations have been embedded so far, and then coordination of all these legal materials. Every conclusive statement of an international conference has had the goal of legislative changes in a holistic approach, yet these sectional changes are nothing but palliative.

The first step is to find and assess current rules and laws. First, water is considered under private law and real property law, related to ownership and rights to water. Second, it is considered under constitutional law, related not only to principles, but also to fundamental rights, like life and dignity. Third, it is considered under administrative law, related to regulations and public management. Fourth, it is considered under criminal law, related to offences and sanctions related to pollution. Fifth, it is considered under environmental law, related to protection and conservation. Sixth, it is considered under trade law, related to selling and buying of water and transfer of water rights. Seventh, it is considered under international law, related to relationship between riparian countries and management of transboundary resources. Eighth, it is considered under tort law, related to consequences of violations related to the use of water. Ninth, it is considered under public land law and land use law, related to the links with land management. Tenth, it is considered under natural resources law, related to exploitation.

Moreover, law should provide guidelines about the integration of different general policies (town planning, environmental recovery, social programs, industrial development, and others). Laws themselves are not required to deal with every profile related to water, but water law is

[7] **1998, Paris Conference, Experts' Workshop*: Regulatory Tools*,** par.II.2.2.2.

[8] **1992, UN Rio Conference*, Agenda 21 – Chapter 18*,** par.18.16.

«Water resources development and management should be planned in an integrated manner, taking into account long-term planning needs as well as those with narrower horizons, that is to say, they should incorporate environmental, economic and social considerations based on the principle of sustainability; include the requirements of all users as well as those relating to the prevention and mitigation of water-related hazards; and constitute an integral part of the socio-economic development planning process.»

expected to set the general framework and to demonstrate the advisable ways and the insuperable limits policy-makers should keep constantly in mind. Water law can play a relevant role with regard to water problems[9].

Water policies, concerning surface water and groundwater, but also coastal water and marine water[10], must be integrated into social and economic planning[11], including land-use planning, forest resource utilization and protection of coastal zones from land-based activities. Water issues must be considered and included in all levels of development plans, as water quantity and quality can not be neglected in health, economic and social policies.

As water management and uses are closely related to land management and uses, the sustainable development of adequate national and regional water policies, plans and regulations, must necessarily and continuously be connected to equally sustainable land policies, plans and regulations[12].

The point is that water policies, due to their complexity and their requirements, must have medium and long-term goals. Any water policy requires regulations, procedures and standards to be implemented, defining a clear legal framework and identifying objectives to be reached. In addition, necessary economic activities, like funding and partners mobilization, and financial means limitation do not allow the implementation of all the possible and desirable projects[13].

Integration of policies is one of the profiles of integration with politics. Water issues represent major concerns in the political arena, especially on an international level. The number of countries facing a water crisis, which affect social relations and economic growth, is increasing. That means that water is a relevant factor in adopting national fundamental choices, and that these choices must be integrated in a wider international approach.

Even if improvements have occurred, the general trend towards the increasing of water shortages, water quality deterioration and freshwater ecosystems stress has not been halted. Policies for poverty alleviation and sustainable development should include new approaches to freshwater management in order to enhance economic productivity and environmental conservation[14].

The integration of water law with economic profiles is needed in order to encourage the private sector to intervene with its financial instruments and management skills. The introduction of water markets and pricing mechanisms can attract the private sector, which has the means to play a relevant role in the utilization of the resources.

Laws and regulations are needed in order to guarantee fair competition and the regular development of water markets. That means, for instance, that while subsidies or income transfers, at least in a short-term perspective, can be necessary for social reasons, they must be well defined. Moreover, they should not fall on the public or private utilities providing the service[15], affirming, in a long-term period the principle of the recovery of all costs from the users[16].

The real challenge is to find the balance between market policies, which promote efficiency, and direct government action, which prevent socially unacceptable consequences and intervene, investing in water, when the market will not[17].

In these terms, economic instruments, like water pricing and water markets must be embedded in legislative actions. Sustainable development and the efficient use of the resource

[9] **1997, MCCAFFREY, *Water Scarcity***, pp.52 *et seq.* "Two of principal roles law can play with regard to problems of water scarcity are: a) to ensure the stability and facilitate the implementation of effective strategies for dealing with water scarcity; and b) to prevent and resolve disputes, both within and between countries, over increasingly scarce water resources."

[10] **1998, HELMER, ONGLEY, PETERS, *Key Points*.**

[11] **1997, UNCSD, *Comprehensive Assessment*,** par.19.

[12] **1997, UNCSD, *Comprehensive Assessment*,** par.161.

[13] **1998, INBO Workshop*, User's Participation*,** par.III.

[14] **1998, UNCSD Report, *Strategic Approaches – Addendum*,** par.10.

[15] **1997, UNCSD, *Comprehensive Assessment*,** par.121.

[16] **1998, Paris Conference, Experts' Workshop*: Sustainable Management*,** par.III.7.1.

[17] **1998, KLOHN, WOLTER, *Perspective.***

require the integration of regulatory and economic tools[18]. Water user rights, and their transfer on open markets, need a reliable economic and regulatory integrated framework[19].

Water is not an economic good like other goods, but it, and overall its related services, are more and more subject to economic evaluations[20]. Economic analysis and planning based on the economic value of water, and based on the related services, should prevent unnecessary and wasteful investments in water schemes and allow a rational and effective allocation of water resources among competing uses.

Nevertheless, the concepts of «unnecessary» and «rational» can apply only after basic needs and environmental minimum expectations are met[21]. The concept of water as economic and chargeable good needs to be implemented taking into account the social value water undoubtedly has[22].

The integration with the communication field is often underestimated. In the water sector, where every person, citizen, and consumer is naturally involved in, communication means both education and consent, while ignorance and isolation from communication leads to resource waste.

Communication must be promoted at different levels, enabling citizens and users to understand water issues and share different approaches. The participatory approach can not do without effective communication.

1.2.3. Peculiarities and difficulties

A new branch of law devoted to water resources would improve the knowledge of the legal issues and would allow a wider availability of legal information, enabling interested parties to find more easily the appropriate discipline. In addition, the collection of rules in a separate branch would foster the coherence of the discipline, the coordination among regulations, the harmonization among public and private parties involved, and the effectiveness of the law itself. A separate branch of law would therefore imply the rationalization and the simplification of the legal framework.

On the other hand, the task has certain difficulties. There is the risk of getting lost, as water issues are involved in an extensive range of regulations. There is the risk of slipping into utopian or demagogic positions, to the detriment of the feasibility of the project. There is the risk of adopting a mere descriptive approach, without taking advantage of the new branch in order to revise, rationalize and rethink the discipline.

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[18] **1998, UNCSD Report, *Strategic Approaches*,** par.31.

«The joint use of regulatory and economic instruments needs to be promoted to create the conditions for the productive and sustainable engagement of all economic agents. Identifying stable water user rights and permitting their transfer on open markets, subject to tests of beneficial use, may be one way to formalize currently unstructured water trading and create opportunities for productivity gains through a more efficient use of land and water resources. Formal negotiation and trading in water and pollution at the basin level among industry, municipalities and rural communities and users upstream and downstream is more complex, but can be started once a clear picture of environmental constraints and economic opportunities is drawn up. Since most economies can no longer afford to supply bulk and retail water in simple response to demand, demand management will become more important. Water efficiency gains in irrigated agriculture offer the best opportunity for reducing demand for bulk water and high-quality groundwater. Here, issues of land tenure and water user rights need to be addressed in designing policy reforms.»

[19] **1995, GOULD, *Recent Developments***, pp.93 *et seq.*

[20] **1998, Paris Conference, Experts' Workshop*: Sustainable Management*,** par.III.2.

«Water, or rather its related services, is however becoming more and more an economic asset, with production and conservation costs, utilization values, opportunity costs, demands and offers that vary together with their price.»

[21] **1992, UN Rio Conference*, Agenda 21 – Chapter 18*,** par.18.8.

«In developing and using water resources, priority has to be given to the satisfaction of basic needs and the safeguarding of ecosystems. Beyond these requirements, however, water users should be charged appropriately.»

[22] **1997, UNCSD, *Comprehensive Assessment*,** par.133.

So far, laws regarding water resources have been overlapped without any real connections: different fields of law, public and private, different purposes, protection, management, exploitation, different layouts, sectional regulations, consolidation attempts.

Under the international point of view the situation is even more complicated, as every country is experiencing different situations, and therefore has different objectives, uses different terminology, and has adopted different legal criteria.

The point is that setting up a new branch of law means that every country neither has to share the same laws and regulations, nor has to adopt a similar water code. A new branch of law should aim at a limited, but relevant, purpose that is to create a common legal language among countries.

Unfortunately, whereas water problems are easily detected, satisfactory solutions to these problems are still far from being found. From a legal point of view, however, there are many things that can be done.

At a general level, developing more harmonized and rational legislation is the first step, transforming its emergency and layer-style profile into a steady and permanent branch of law. Better integration between different actors, countries, local bodies, public institutions, private companies, users, and experts is the main goal. In addition, water law should provide a coherent legal framework to prevent delays due to bad legislation and in order to attain win-win solutions, matching community interests with private economic interests.

At a particular level, law should support every political, economic and technical initiative suitable to improve the current situation. There should be no hesitation in putting aside inefficient and outmoded rules and enacting more rational and effective laws instead.

All the legal responses share the need to rethink water law as a system.

1.2.4. Levels

Water actions must be taken at different levels: global, regional, national, local, as situations, regulations, and problems vary.

At an international level, United Nations declarations provide a series of general and sharable principles. At a regional level, treaties prevent or resolve disputes concerning water quality protection, water quantity conservation and water allocation. At a national level, respecting higher provisions, the discipline of water resources is enacted. At a local level, water services are organized and managed.

In these terms, water law has three main obligations.

First, to build up a setting of principles every country, and every person, can share.

Second, to define the responsibilities of every subject, public or private, involved in the water sector, defining complementary roles: the State, for regulation and control; the local communities, for decision-making; the public and private operators, for management and operation; and the users, for participation at all levels[23].

Third, to discipline the protection of water, the conservation of water, and the use of water.

The first obligation requires general rules at the global level suitable to be specified at a national level. The second and the third obligations, that is the substantial discipline complying with the principles, are likely to be properly met at a national level.

If it is true that many of the water related problems are better dealt at a regional, domestic and local level, it is also true that without a global common ground of principles, commitments and rules, no solution will be able to respond satisfactorily to a global issue[24].

[23] **1998, Paris Conference, Experts' Workshop: *Regulatory Tools*,** par.II.2.1.

[24] **1997, UNCSD, *Comprehensive Assessment*,** par.100.

«It would be illusory to believe that anything short of a global commitment would provide the means to sustainability. Because some of the water crises could be very severe, the whole world has a stake in averting them».

Moreover, the potential crises-provoking effects of regional water stress require a solid international basis for water law[25]. The need for a comprehensive legal instrument for international water bodies has been widely recognized[26].

Since water is a finite resource, the real challenge is to create a global system, pursuing the optimization of its use. The increasing need for food production, and consequently for water, calls for higher productivity on existing agricultural land, in order to respect sustainability[27].

The point is that food self-sufficiency, in which the country wholly relies on itself, substantially differs from food self-reliance, in which domestic production is integrated with international markets. While every country is naturally searching for the former, the optimization of the resource in an increasingly global economy needs the latter.

Under an economic point of view, water resources may be reasonably allocated more profitably in different sectors of the economy away from food production, if this generates the necessary income to import food. On the other hand, shifting from self-sufficiency to self-reliance may be a painful process, with dramatic effects on the poorer strata of the population, social inequities and geographic dislocations[28].

National and regional regulations are not likely to succeed in this transition if there is no higher level framework ensuring dependable sources of supplies at affordable and stable international prices[29]. Global food security should substitute for national food security, but reasons other than economic reasons will make this goal difficult to achieve.

At the global level, basic principles may be set, general programs may be proposed and coordination of institutions may be sought.

The international community's attention to water problems has lead to a number of conferences, agendas, declarations, and other instruments.

In 1972 the United Nations Conference on the Human Environment was held in Stockholm: it was probably the first time that freshwater quantity problems were globally considered. In 1977 the United Nations Water Conference was held in Mar del Plata. In 1990 the Global Consultation on Safe Water and Sanitation for the 1990s was held in New Delhi. In 1992 the Earth Summit was held in Rio, with its Agenda 21. In 1992 the International Conference on Water and Environment: Development Issues for the 21st Century was held in Dublin. In 1994 the International Conference on Population and Development was held in Cairo, with its Program of Action. In 1994 the Inter-ministerial Conference on Drinking Water Supply and Environmental Sanitation was held in Noordwijk. In 1997 the UN General Assembly Special Session, known as Earth Summit II or Plus 5 was held in New York.

In 1980, the United Nations General Assembly, in its resolution 35/18, proclaimed the period 1981-1990 as the International Drinking Water Supply and Sanitation Decade. During that decade Member States would assume a commitment to bring about a substantial improvement in the standards and levels of services in drinking water supply and sanitation by the year 1990. During that decade over 100 billion USD were spent on water supply projects.

The point is that global conferences have put every issue on the table.

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[25] **1998, UTTON, *International Waters***, pp.3 *et seq.*

[26] **1997, UNCSD, *Comprehensive Assessment*,** par.116.

[27] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.65.

«Sustainability of food production increasingly depends on sound and efficient water use and conservation practices consisting primarily of irrigation development and management, including water management with respect to rain-fed areas, livestock water-supply, inland fisheries and agro-forestry. Achieving food security is a high priority in many countries, and agriculture must not only provide food for rising populations, but also save water for other uses.»

[28] **1998, UNCSD Report, *Strategic Approaches*,** par.9.

«Rural communities in developing countries that depend on subsistence agriculture are closely linked with small first-order catchments and the water, biomass and soil resources that they contain. Such linkage dominates subsistence and economic productivity through cash crops cultivation and livestock rearing but does not tend to appear in national economic budgets until water resource availability declines and remedial intervention is required to avoid starvation and migration.»

[29] **1997, UNCSD, *Comprehensive Assessment*,** par.108.

The Agenda 21 – Chapter 18 adopted during the Rio Conference proposed seven program areas related to the freshwater sector. These program areas refer to different water related aspects: social aspects (drinking-water supply and sanitation; water and sustainable urban development; water for sustainable food production and rural development); environmental aspects (protection of water resources, water quality and aquatic ecosystems; impacts of climate change on water resources); management aspects (integrated water resources development and management; water resources assessment).

Other conferences will be useless unless a step forward is taken, shifting from abstract declarations to rules suitable to be implemented[30].

If it is true that Governments should incorporate the principles established in the international conferences in their social, economic and environmental planning, it is also true that it is often hard to check and intervene on the effectiveness of this incorporation. In fact, the lack of enforcement procedures and the nature of international declarations do not allow the consideration of the principles but as desirable goals.

In these terms an international code could assume a different role, providing more strict rules. It could not set a body of rules enforceable in every country, but it could provide general principles to be followed in national regulations and in international conflicts over water, if not otherwise provided by convention or agreements[31].

International organizations have also provided external support in the capacity-building national processes, even if with some fragmentation and incompleteness.

Water strategies can be developed in regional organizations, like the European Union. Apart from providing a basic platform against pollution, water waste and other negative phenomena, regional organizations can deal with issues like the creation of water trading channels.

While a global trading system, involving global international organizations, is hoped for, regional organizations have the skills and the instruments to define rules about such a complex task. If the role of Governments shifts from water provider to water market regulator, it is at institutional regional levels that more effective decisions can be taken.

At a regional level, the harmonization of national policies, strategies, programs, and regulations may find the appropriate instruments, as regional organizations deal with narrower groups of more homogenous nations that share more similar problems. In addition, regional organizations tend to have more reliable means of enforcement than global organizations. They can therefore assume an intermediary role between countries and global organizations, transforming general principles in stricter rules.

Regional organizations can not help dealing with water related problems, due to their environmental, economic and social impact. Decisions regarding water pollution, water uses, water resources allocation inevitably affect regional systems in different areas.

Environmental deterioration and water shortages bring about new reflections on water, which can no longer be regarded as an inexhaustible resource to be exploited indiscriminately. Protection must be integrated in a wide-ranging regional water policy. Traditional legal instruments need to be supplemented, and environmental problems must be addressed in the decision-making process.

Environmental protection can assume a dual role at a regional level. On the one hand, it can represent a general limit to other regional policies. On the other hand, it can be the object of a specific policy.

In the environmental area, environmental policies often represent a partially binding minimum guarantee. The countries are allowed to set stricter standards in particular cases.

[30] **1997, Earth Summit Watch: *Clearing the Water*.**

«The likely result of the current round of international deliberations on freshwater will be another normative statement, along with a call for more funds».

[31] **1966, International Law Association, *Helsinki Rules***.

Article I: "The general rules of international law as set forth in these chapters are applicable to the use of the waters of an international drainage basin except as may be provided otherwise by convention, agreement or binding custom among the basin States".

Environmental protection becomes the main issue, while the guarantee of competition becomes less important. In fact, enterprises operating in those countries more aware of environmental protection may be disadvantaged by the stricter policy of their country. Economic policies, like the protection of competition, become weaker when environmental policies intervene.

Sustainable development is the new legal principle of evaluation in verifying the compatibility between potentially conflicting national interests. On the one hand regional organizations are concerned about the correct functioning of the respective markets. On the other hand, there is the awareness that environmental resources are both the basis and the limit for further economic and social development.

Regional organizations water policies do not only aim to reduce river pollution, but also deal with the managerial aspect. The strengthening of the needs for planning and control stems from various factors: growth of the economy, urbanization, deterioration of the available natural resources.

In particular, water planning and water management must consider economic, social and environmental aspects as a whole in addition to dealing with specific matters such as watercourse regulation, minimum acceptable flow maintenance, and water recycling.

Riparian countries need to forge specific agreements over transboundary water resources[32]. Cooperation among riparian countries is required in order to use the resources in the most effective way, taking into account the interests of all riparian states interested[33].

Instead, generally countries consider their part of transboundary rivers as their water resources without any effort to establish real cooperation with other riparian countries. In some cases political distances or emergency situations make this task even harder and complex[34]. Moreover, the river basin often comprises more than two countries, and respective positions are intertwined.

More than 300 major river basins, and a number of groundwater aquifers, cross national boundaries. Maximizing the use of the resource requires a unitary approach and harmonized water resources strategies, within a range of joint programs that consider mutual needs and expectations[35].

At the national level, water resources planning and management integrated with the framework of the national planning process should take place, trying to pursue a holistic approach, and reducing the number of statutes, plans, and public bodies. Furthermore, the goals should include the integration of the decision-making process, the fostering of information, participation and citizens' awareness and the economic consideration.

At a local level, referred to as domestic river basins, water should be managed and plans should be adopted. It should constitute the lowest appropriate level to which water resources management is delegated. At the same level the integration among local authorities, communities and private enterprises should take place.

Municipalities should undertake the task to provide water services, through efficient cooperation models, and to monitor and check the implementation of the different rules.

[32] **1987, CAPONERA, *Patterns of Cooperation***, pp.1 *et seq.*
[33] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.4.
[34] **1998, KLIOT, SHMUELI, *Real and Ideal Institutional Frameworks,*** pp.216 *et seq.*
[35] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.10.

PART TWO – RESPONSE: WATER LAW

2.1. WATER PROBLEMS

2.1.1. Classification

While identifying water problems is not a difficult operation, classifying them is not easy, as they are mutually interlaced and closely connected. Nevertheless, trying to put them in order is anything but a waste of time, as the collection of the problems and their gathering in different families can help in understanding not only what has gone wrong so far, but also what can be done in the future. Certainly, every classification has its flaws and gaps, and the one I am going to introduce is meant to be an attempt to methodically deal with water issues.

There are two main classifications of water related problems: physical ones, related to water in its materiality, and political ones, related to the interaction of the resource with people and public powers. While the former are the real problems the world is facing, the latter are often the cause of them. Intervention on the first one is a matter of emergency. Intervention on the latter is a matter of prevention.

Each group can be divided into three subgroups. Physical problems concern the quantity of water, the quality of water and the connection between water and the environment. Political problems concern the lack of a culture of water, the relation among the interested parties, and the approaching pattern to water issues.

The proposed classification is as follows:

A) PHYSICAL PROBLEMS

1. Quantity problems
a) Water scarcity
b) Water waste

2. Quality problems
a) Freshwater deterioration
b) Groundwater deterioration

3. Environmental problems
a) Natural disasters
b) Subsidence and land depletion
c) Ecosystems upsetting
d) Water cycle alteration

B) POLITICAL PROBLEMS

1. Cultural problems
a) Inadequate water culture and water ethic
b) Inadequate attention and awareness
c) Inadequate policies integration

2. Relation problems
a) Inadequate resource allocation
b) Inadequate public-private relation

c) Upstream-downstream conflicts

3. Approach problems
a) Institutional responsibilities fragmentation
b) Inadequate decision-making levels
c) Inadequate experts' integration

2.1.2. Quantity problems

Use of water and waste of water represent the main reasons for water scarcity. Consumptive and non-consumptive uses require increasing quantities of water resources in the different sectors.

The demands for freshwater are affected by the changes in the society[36]. The bulk, and often unsustainable, water withdrawals are caused by social and economic phenomena, like population growing, urbanization, migration[37], industrial development and domestic consumption[38].

About half of the increase in consumption, multiplied worldwide by a factor close to 7 since the beginning of the century, and doubled during the last 20 years, is caused by population growth. Development and welfare cause the other half[39]. Poor allocation, waste and inadequate management makes the situation even worse.

The point is that while some phenomena, like industrial pollution, which affect water quality, can be alleviated by technical development, other phenomena, like population growth, are impervious to scientific techniques.

The seriousness of the problem is emphasized by a paradoxical trend highlighted by recent studies, according to which water problems contribute to population growth. In fact, communities struck by recurrent children deaths tend to «overprocreate» in order to preserve the desired family size. In this sense, birth-control policies based on education and contraception, which could slow the birth rate, are not likely to fully succeed unless children's survival rate is increased. The problem is breaking this viscous circle, which is to blame for this everyday tragedy.

As for urbanization, and its relationship with water, the Action Agenda of the Dublin Statement calls for a «sustainable urban development». Considering population density and water stress in the majority of the world's major cities, a different approach regarding urbanization and regarding its environmental impact is needed[40].

While water scarcity and pollution determine the exploitation of distant sources, marginal costs are skyrocketing. Water supplies should be based on appropriate water charges and discharge controls. Residual contamination of land and water can not be seen as a reasonable trade-off for industrial growth[41].

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[36] **1998, UNCSD Report, *Strategic Approaches – Addendum***, par.8.

«Sectoral demands include agriculture (irrigation and drainage), the provision of domestic water supply and sanitation, industry, energy generation, environmental requirements, amenity and tourism. The nature of these demands are further complicated by changes in patterns of consumption as a result of industrialization, rural/urban shifts, migration and unaccounted for water, and are set against clear limits and variability in the available resource. It is increasingly clear that unprecedented demands for water supplies are resulting in continued degradation of the resource base and intensified competition for high-quality water.»

[37] **1997, DE WAART, *Securing Access***, pp.109 *et seq.*

[38] **1997, UNCSD, *Comprehensive Assessment*,** par.42.

«This rapid growth in water demand is due to the increasing reliance on irrigation to achieve food security, the growth of industrial uses, and the increasing use per capita for domestic purposes».

[39] **1998, Paris Conference, *General Considerations*,** par.21.

[40] **1997, SAEIJS, VAN BERKEL, *The Global Water***, pp.13 *et seq.*

[41] **1992, The Dublin Statement, *Action Agenda*.**

«The sustainability of urban growth is threatened by curtailment of the copious supplies of cheap water, as a result of the depletion and degradation caused by past profligacy. After a generation or more of excessive water use and reckless discharge of municipal and industrial wastes, the situation in the majority of

Recommendation at an international level has been put forward in order to rationalize the relationship between water and urban areas.

The creation of a single coordinated management structure in each city may facilitate the participation of stakeholders within the city, and the discussions with parties operating in outside areas.

The improvement of knowledge regarding links between water, urban ecology, and urban planning in each urban center may be a precious tool for information exchange and communication.

The formulation of projections concerning water resources, demand and urban infrastructure equipment needs, may help plan investments.

The adoption of rational water pricing, considering both the real payment capacities of users and the covering of service charges may ensure continuity of service.

The establishment of a permanent dialogue between urban planners and water professionals may develop the integrated management of urban waters[42].

In addition, physiological, welfare, and social processes, pathologic and inexcusable processes make the situation worse. Waste of resources is the common denominator of water related activities, while inadequate water pricing policies facilitate a wasteful attitude.

Precious and vital resources are lost due to different careless behavior, from the bad maintenance of water facilities to the final users' unawareness of water value[43]. Suggested activities include the initiation of public-awareness campaigns to the encouragement of rational water utilization by the users.

a) Water scarcity

The most serious problem is the lack of water in extensive regions of the world. Permanent drought conditions make sustainable development difficult to attain. In addition, they affect access to safe drinking and sanitation water an objective hard to achieve[44].

The World Health Organization estimates that a total of more than 5 million people die each year just from diseases caused by unsafe drinking water, lack of sanitation and lack of water for hygiene. Depending on the disease, supply of safe drinking water and sanitation could reduce the amount of illness and death by as much as three-quarters.

Unfortunately the trend is towards a worsening of the water availability[45], and that affects not only people's survival, but also their capacity to carry on productive lives and consequently their social and economic development.

In some developed countries, water scarcity is going to become a real problem, even because the waste ratio of the resource is often extremely high. Underdeveloped countries and their inhabitants, however, are the main victims of water scarcity[46].

Recently the UN Committee on Natural Resources noted that some 80 countries, representing about 40% of the world's population, were already suffering from serious water shortages, and that water scarcity has become the real limiting factor to economic and social development[47].

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the world's major cities is appalling and getting worse. As water scarcity and pollution force development of ever more distant sources, marginal costs of meeting fresh demands are growing rapidly. Future guaranteed supplies must be based on appropriate water charges and discharge controls. Residual contamination of land and water can no longer be seen as a reasonable trade-off for the jobs and prosperity brought by industrial growth.»

[42] **1997, Symposium on Water, *Paris Statement*.**

[43] **1998, NCSD Briefing Kit, *Agenda 21 – Chapter 18*,** par.E.

[44] **1997, UNCSD, *Comprehensive Assessment*,** par.63.

[45] **1997, UNCSD, *Comprehensive Assessment*,** par.34.

«When the world's total river flow is divided by the world population (of 1995), the quotient amounts to an average of 7,300 cubic meters of water per person per year. Owing to the growing world population, this represents a drop of 37 per cent per person since 1970».

[46] **1997, UNCSD, *Comprehensive Assessment*,** par.28.

[47] **1997, FALKENMARK, *Water Scarcity***, pp.26 *et seq.*

Water scarcity occurs when the amount of water withdrawn exceeds the amount of water that can be withdrawn from available sources, like rivers, lakes and shallow underground aquifers.

Freshwater constitutes only 2.5% of all water on Earth, 70% of this freshwater is frozen in ice caps, most of the remainder is present as soil moisture or is not accessible, lying in deep underground aquifers. That means that 0.007% of all water on Earth is available for direct human uses. The accessible water, which is also the real renewable water, is therefore the water held in rivers, lakes, reservoirs and shallow underground sources[48].

So, while the availability of natural water resources, which correspond to all the water on the planet, exceeds demand, the amount of water resources which can be used are not enough to meet the needs of many populations. Technical, geographical, geological and hydrographic restrictions reduce the availability of natural water resources, turning them into potential water resources. Further, social, environmental and economic restrictions reduce the availability of the potential water resources, turning them into unusable water resources.

When water scarcities occur, a keen competition among potential uses arises. The ecosystem is likely to be placed in jeopardy, and, in the most serious situations, life is not guaranteed.

Moreover, availability of water is affected by natural phenomena like seasonal weather change and evapotranspiration, not to mention that water run-off often occurs far from where water is needed and water transportation is, so far, an expensive process.

Furthermore, freshwater can not be exploited over given limits, as navigational and recreational uses, hydropower generation and environmental needs require minimum flows and adequate amounts of water on site.

Experts have estimated that the amount of freshwater that is readily accessible for human use is about 12,500 cubic kilometers per year (including water that is captured and stored by dams and reservoirs), and that, currently, humans are using about half of this amount. Given the expected population increase and the expected increases in demand as a result of economic growth and social changes, a very concerning situation arises, as present patterns are showing their lack of sustainability[49].

The dramatic increase in uncontrolled water withdrawals, especially due to agricultural purposes, and the large waste of the resources has affected not only freshwater, but also groundwater supplies. As underground water is withdrawn at a faster rate than it is replenished, groundwater has become a nonrenewable resource, and the use of it can not be defined as sustainable[50].

Groundwater is the source of supply for about one third of the world's population, representing the main or sometimes the only source of water for rural dwellers in many dry regions. Groundwater is being overused, often heavily, in a number of areas for agricultural purposes. This excessive use of groundwater is likely to increase over the next 30 years[51].

The overuse of underground sources dropped water levels notably, with two main consequences. On the one hand, water has been increasingly scarce on site and expensive to pump out. On the other hand, people are forced to use lower-quality sources, which may contain natural contaminants. The impoverishment of the underground water table is both a side effect of water stress and a cause of further water problems.

b) Water waste

Waste of water resources is extremely common, due to evaporation in lake-reservoirs and irrigation canals, low water efficiency in irrigated agriculture, losses in drinking water distribution

[48] **1997, UNCSD, *Comprehensive Assessment*,** par.33.

[49] **1997, UNCSD, *Comprehensive Assessment*,** par.37.

Given an expected population increase of about 50 per cent in the next 50 years, coupled with expected increases in demand as a result of economic growth and lifestyle changes, this does not leave much room for increased consumption.

[50] **1997, SAEIJS, VAN BERKEL, *The Global Water***, pp.5 *et seq.*

[51] **1997, UNCSD, *Comprehensive Assessment*,** par.47.

systems, irresponsible behavior of some consumers and insufficient recycling of industrial water[52]. The poor implementation of the user-pays principle and the low, and often unfair and unbalanced, pricing of services have enabled this trend.

2.1.3. Quality problems

Water pollution is a complex phenomenon, including civil pollution by untreated sewage, industrial pollution, agricultural pollution, natural pollution, chemical discharges, petroleum leaks and spills. To a certain extent, water has a self-purifying capacity, but once it crosses that critical threshold, water must be helped in order to regain its purity.

Water pollution problems vary around the World, according to population growth, development patterns, and available treatment systems[53].

Problems developing countries are facing often mirror similar problems developed countries faced years ago. The point is that developing countries often do not have the opportunity to follow the same path, as their water availability is often far less in comparison to the developed countries' availability, both for climatic and for demographic reasons. So, if it is true that tested solutions can be transferred, it is also true that consequences have been, are and will be far more serious.

Careless exploitation for thousands of years and inadequate drainage systems resulted in serious problems like soil salinization. The main effects in cultivated areas are lower crop yields and in some cases total crop failure.

About 20% of the world's 250 million hectares of irrigated land, especially in arid and semi-arid regions, are affected by salt, which means that their capability to produce food is significantly reduced. A further 1 1/2 million hectares mainly located in arid and semi-arid regions are affected each year[54].

The overuse of aquifers near seacoasts leads to freshwater contamination through salt. The main causes are overexploitation of water resources, as a result of increased agriculture, population and industrial demand.

On small islands freshwater is an even more fragile resource. When it is overdrawn, this action inevitably leads to salt water intrusion. People on some small islands have been forced to turn to expensive alternatives, including desalination and importing of water by tanker[55].

a) Freshwater deterioration

Safe drinking supply, sanitation needs and sustainable development are endangered by quality problems as well. Water deterioration, which is not necessarily a more important or urgent problem than water scarcity, has generally been treated with more seriousness, as it has affected developed countries sooner than developing countries.

Major water deterioration problems include human illness determined by untreated contaminated water; eutrophication determined by discharge of phosphorus and nitrogen; soil salinization; groundwater depletion determined by nitrates from fertilizers; harmful effects in living beings determined by commercial chemicals; elevated levels of heavy metals[56].

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[52] **1998, Paris Conference, Experts' Workshop: *Sustainable Management*,** par.III.4.

[53] **1998, HELMER, ONGLEY, PETERS, *Key Points.***

«Primary causes of water quality degradation by human activities can be grouped into six different categories according to the major factors controlling these issues: population density; changes in water balance; land-use indicators; long-range transboundary atmospheric transport of pollutants; concentrated pollutant sources; global climate change».

[54] **1997, UNCSD, *Comprehensive Assessment*,** par.67

[55] **1997, UNCSD, *Comprehensive Assessment*,** par.50

[56] **1997, UNCSD, *Comprehensive Assessment*,** par.53

Water quality deterioration, associated with water shortages, leads to reduced availability of freshwater, and consequently, to health, environmental, social and economic problems. Deteriorated freshwater can be used just for several limited purposes or for no use at all.

b) Groundwater deterioration

Groundwater deterioration is more dangerous and more difficult to clean up than freshwater deterioration, due to flow slowness. Theoretically, pollutants can be removed from water, but technical and economic requirements make decontamination of water a last-chance option. In many countries, lower-quality groundwater, some of which contain natural contaminants, has become a source for use.

The intrusion of salty water from the ocean, replacing water withdrawn from an aquifer, can lead to severe contamination of groundwater.

2.1.4. Environmental problems

The causes of environmental problems are mainly determined by human needs, and exacerbated by human carelessness. For example, they often share also the incapacity to operate globally and methodically, which is inexcusable when emergency matters do not arise.

Land exploitation, dams and canals, deforestation, drainage of wetlands, overuse of underground sources, overuse of aquifers near seacoasts may be caused by food production needs, sanitation needs, and development needs.

It is beyond doubt that quantity and quality water problems are environmental problems as well. Yet they are not the only crucial water problems. On the other hand they do not wear out environmental problems. Even if it is difficult to divide environmental water problems into different sections, there are specific phenomena affecting the water cycle and the natural flow of water that can be categorized.

a) Natural disasters

Land overuse and abuse, and lack of prevention measures, have led to floods with catastrophic consequences. Landslides have occurred due to land exploitation, which have, in turn, been conducted without taking into account the integration of water flows.

The Action Agenda of the Dublin Statement stresses the relevance of the «protection against natural disasters». Considering the yearly toll paid in human lives, misery and economic loss to droughts and floods, often due to lack of preparedness and data, investments are urgently needed to stop this trend. Expected climate change and rising sea levels will make the situation worse for many people, and will threaten the provision of water resources[57].

b) Subsidence and land depletion

Fossil aquifers and groundwater reservoirs filled during periods of thousands of years, can not be naturally replenished by rain and melting snow. Groundwater depletion by intensive drainage determines the subsidence phenomena[58], that is the sinking of the land surface overlying

[57] **1992, The Dublin Statement,** ***Action Agenda***.

«Lack of preparedness, often aggravated by lack of data, means that droughts and floods take a huge toll in deaths, misery and economic loss. Economic losses from natural disasters, including floods and droughts, increased three-fold between the 1960s and the 1980s. Development is being set back for years in some developing countries, because investments have not been made in basic data collection and disaster preparedness. Projected climate change and rising sea levels will intensify the risk for some, while also threatening the apparent security of existing water resources. Damages and loss of life from floods and droughts can be drastically reduced by the disaster preparedness actions recommended in the Dublin Conference Report.»

[58] **1997, UNCSD,** ***Comprehensive Assessment*****,** par.49.

an aquifer due to the removal of hydrostatic pressure from certain formations, no longer able to support the weight of overlying strata.

Erosion is another side effect of the poor management of water resources and inadequate watershed protection. Land abandonment and forest fires intensify soil erosion. Eroded soil particles increase water pollution and constitute a danger for reservoirs, reducing their capacity by accumulating at the bottom[59].

c) Ecosystems upsetting

Water ecosystems have been violated, and the continuos neglect of the freshwater requirements is determining environmental, social and economic consequences. Biodiversity, widely acknowledged as one of the most important environmental value, is put in jeopardy on a regular and daily basis.

The overuse of underground sources has a series of negative consequences on the environment. It affects aquatic ecosystems, limiting the minimum acceptable river flow or forcing lakes to shrink.

The Action Agenda of the Dublin Statement deems «protecting aquatic ecosystems» as a main target. Considering the role water plays in different ecosystems' survival and the damages created by no longer sustainable development, integrated management of river basins is seen as the solution[60].

Water uses and pollution and waste discharges have contaminated not only groundwater and surface water, but also run-off water[61].

d) Water cycle alteration

Human activities and behaviors have disrupted the water cycle, altering its renewing function. People have altered the earth's life-giving hydrologic cycle, upsetting the freshwater ecosystems and limiting biological variety and vitality. Building of dams, reservoirs and canals, deforestation, and drainage of wetlands have heavily intervened in the natural water cycle[62], causing destructive environmental, social and economic effects[63].

2.1.5. Cultural problems

The water sector also suffers from poor communication and poor participation of users. It seems as if water scarcity and pollution are not such attractive subject matters as air pollution or as global warming. That leads to minor consideration, less efforts, less resources.

In these terms, participation of users should be promoted, as a diffused global water culture and ethic can be reached only by involving the final consumers. Participation is one of the most powerful means to settle possible conflicts on water use, and implement water projects, which

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«In some cases, groundwater depletion results in the sinking of the land above aquifers. Land subsidence caused by high water withdrawals has been recorded in many countries, including Mexico, the United States of America, Japan, China and Thailand, with the land sinking from 1 to 10 meters».

[59] **1997, UNCSD, *Comprehensive Assessment*,** par.68

[60] **1992, The Dublin Statement, *Action Agenda***.

«Water is a vital part of the environment and a home for many forms of life on which the well-being of humans ultimately depends. Disruption of flows has reduced the productivity of many such ecosystems, devastated fisheries, agriculture and grazing, and marginalized the rural communities which rely on these. Various kinds of pollution, including transboundary pollution, exacerbate these problems, degrade water supplies, require more expensive water treatment, destroy aquatic fauna, and deny recreation opportunities. Integrated management of river basins provides the opportunity to safeguard aquatic ecosystems, and make their benefits available to society on a sustainable basis.»

[61] **1997, UNCSD, *Comprehensive Assessment*,** par.39.

[62] **1997, UNCSD, *Comprehensive Assessment*,** par.38.

[63] **1997, SAEIJS, VAN BERKEL, *The Global Water***, pp.9 *et seq.*

require the approval of the objectives by the users, the sharing of long-term targets, the definition of priorities, and the mobilization of financial means[64].

a) Inadequate water culture and water ethic

Apart from physical problems, what we lack are a water culture and a water ethic. There is not adequate awareness of the complexity of the issues involved, even if water has historically always been a major concern for vast populations and nations.

Over one billion people, that is one out of five earth inhabitants, lack access to safe drinking water. Two and a half billion people, one out of two, lack access to adequate sanitation. Over five million people, mostly children, die every year from water related diseases; 50% of the world population suffers from debilitating water-related disease, while 80% of all sickness in the world is related to water[65].

In comparison with these data, 50% of the water in developed countries is lost. From an ethical point of view, this lack of respect for water and life is probably the most outrageous present situation on earth.

b) Inadequate attention and awareness

The attention devoted to water resources has been relevant over the last decades, and over the last years in particular. International conferences, summits, agendas, declarations, plans have followed one another. Nevertheless, more attention, or a different kind of attention is needed. If we compare how much attention has been focused on water issues with the attention given to other important issues, like global warming, it will be easy to find that the former is often subordinated to the latter.

Similarly, there is a global shared awareness of the seriousness of the water problems. Nevertheless again, using the same comparison, water problems appear to be underrated.

The easier explanation rests in the fact that while the concerns for the earth's temperature and atmosphere are global the concerns for water problems are mostly regional. Another explanation is that the concerns for water problems, at least the vital concerns, are mainly located in underdeveloped countries. The fact is that millions of people are dying every year and billions of people are heavily challenged by water problems.

c) Inadequate policies integration

Lack of unitary consideration and of integration of policies is another relevant problem. Until recently, water has been considered a domestic issue, like, until some years ago, air pollution, the greenhouse effect, and deforestation. At a certain point, we realized that no solution would have been effective unless found internationally.

The current water transportation limits may make people believe that water problems are to be treated just at a domestic, or at the most, at a regional level. I do not believe it is the correct approach, as some common ground is needed.

2.1.6. Relation problems

Apart from the natural causes, shared by general quantity problems, the limits to water transportation, at present an expensive process, do not allow for the overcoming of the unfair distribution of the resource.

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[64] **1998, INBO Workshop*, User's Participation*,** par.VI.

[65] **1999, WHO *Supercourse***

«Access to sustainable safe drinking water and sanitation services for populations currently at risk would result in: 200 million fewer diarrhoeal episodes: 2.1 million fewer deaths caused by diarrhoea; 76 000 fewer dracunculiasis cases; 150 million fewer schistosomiasis cases; 75 million fewer trachoma cases».

a) Inadequate resources allocation

Water resources are not only scarce, but also unevenly allocated, and therefore are dramatically unavailable. In 1997 the United Nations stated that by 2025 as many as 5.5 billion people, that is as much as two-thirds of the world population at that time, may live in regions under heavy water stress[66].

Accessible resources are poorly distributed: the arid and semi-arid zones of the world, constituting 40% of the landmass, have only 2% of the global run-off[67].

Poor allocation of water resources is a problem several countries are facing at present, and many more will face in a short time. The less the resource is available, the higher the chance conflicts will arise, both at a domestic and at a regional level.

The allocation problems can concern either one country as a whole or some part of the population. A number of countries suffer from inadequate nationwide supply of water resources. In other countries, for economic, political and technical reasons, part of the population, the poorer strata, lack access to piped water, and therefore must buy it from vendors. Consequently, the poor pay more to have a basic commodity than do the rich, and water becomes another issue in the web of social injustice.

b) Inadequate public-private relation

Furthermore, water problems concern the relation between the public and private sphere, both for water rights concerns and for management of resources concerns. Sometimes, the public-private relation becomes an ideological conflict based on unproven propositions. However, it is important that the public and private spheres integrate and the partnership promoted.

The Action Agenda of the Dublin Statement requires, in order to create an «enabling environment» that allows planning and implementation, substantial investments both in projects and in capacity building[68].

As tariffs do not usually allow the balance of investment amortization costs, and therefore public budgets are not sufficient to meet the expenses to be made, public and private sectors have necessarily to cooperate in the water management[69] in order to promote financially viable projects.

In the water sector, where investments are highly capitalistic[70], the intervention of specialized private companies is needed in order to encourage financing, expertise and know-how.

c) Upstream-downstream conflicts

The scarcity of a vital resource leads to different types of upstream-downstream conflicts: conflicts among countries about regionally shared watercourses, conflicts among municipalities about locally shared watercourses and even conflicts among individuals about a given watercourse[71]. Conflicts may be related to water quantity competition, to water quality, and to water projects[72].

Besides, as the relation between static land tenure rights and mobile rights to use water has not been clarified, different kind of conflicts may arise. Public administrations do not have

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[66] **1997, UNCSD, *Comprehensive Assessment*,** par.84.

[67] **1997, UNCSD, *Comprehensive Assessment*,** par.35.

[68] **1992, The Dublin Statement, *Action Agenda*.**

«Implementation of action programs for water and sustainable development will require a substantial investment, not only in the capital projects concerned, but, crucially, in building the capacity of people and institutions to plan and implement those projects.»

[69] **1998, Paris Conference, Experts' Workshop: *Regulatory Tools*,** par.II.1.6.

[70] **1998, Paris Conference, Experts' Workshop: *Sustainable Management*,** par.III.3.

«The building of large developments on the scale of river basins, or of inter-basin transfers, large water intake systems, water and wastewater treatment plants as well as water distribution networks, drainage or wastewater collection systems require significant funding, whose realistic amortization can only be envisaged on a very long period of several decades».

[71] **1995, SLY, *Conflict of Interest*, pp.3 ss.**

[72] **1997, FALKENMARK, *Water Scarcity***, pp.34 *et seq.*

adequate means to ensure «water law enforcement», such as control of withdrawals and discharges and the follow-up of disputes[73].

The Action Agenda of the Dublin Statement deems «resolving water conflicts» a main target. Considering the increasing relevance of international watersheds and the risk of conflicts among riparian countries, the creation of international basin organizations, whose purpose is to harmonize and reconcile the competing interests, is the first step to take[74].

While some years ago water management was considered mainly a neutral, apolitical and technical activity, conflict resolution represents a fundamental part of current water management[75].

Apart from regionally shared watercourses, water problems should be considered also under an international perspective because the interdependent nature of water pollution. Water problems caused by problems like acid fallout and airborne transport of chemicals and metals from different sources (industries, vehicles, power plants, incinerators, smelters, pesticides), may also affect other countries even if those countries do not share a watercourse, and determine a transfer of the water pollution[76].

In addition, as lakes and rivers eventually drain to the seas, freshwater pollution is one of the main causes of coastal water pollution: 80% of marine pollution comes from human activities on land[77].

2.1.7. Approach problems

Finally, all the above problems share not only current urgency, but also past destructive pathways. The political, social and legal approach is unsatisfying, not effective and no longer sustainable[78]. The main cause to a wrong approach to water issues is often poor legislation.

Human development is based on the water people are degrading and wasting. The neglect of water resources, required for the ecosystem, affects not only the environment but human health as well.

a) Institutional responsibilities fragmentation

The concept, the need and the importance of a holistic management of freshwater as a finite and vulnerable resource has been highlighted at a international level[79], requiring the

[73] **1998, Paris Conference, Experts' Workshop*: Regulatory Tools*,** par.II.1.4.

[74] **1992, The Dublin Statement, *Action Agenda***.

«The most appropriate geographical entity for the planning and management of water resources is the river basin, including surface and groundwater. Ideally, the effective integrated planning and development of transboundary river or lake basins has similar institutional requirements to a basin entirely within one country. The essential function of existing international basin organizations is one of reconciling and harmonizing the interests of riparian countries, monitoring water quantity and quality, development of concerted action programs, exchange of information, and enforcing agreements. In the coming decades, management of international watersheds will greatly increase in importance. A high priority should therefore be given to the preparation and implementation of integrated management plans, endorsed by all affected governments and backed by international agreements.»

[75] **1998, MOSTERT, *A Framework*,** pp.206 *et seq.*

[76] **1997, UNCSD, *Comprehensive Assessment*,** par.57.

[77] **1997, UNCSD, *Comprehensive Assessment*,** par.58.

[78] **1998, UNCSD Report, *Strategic Approaches*,** par.8.

«The balance between environment and development needs to be founded on a clear understanding of the environmental systems and the resources that they can furnish without compromising their overall long-term integrity. The economic implications of environmental degradation and ignorance of climatic variability can account for significant percentages of gross domestic product in lost productivity.»

[79] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.35.

«Long-term development of global freshwater requires holistic management of resources and a recognition of the interconnectedness of the elements related to freshwater and freshwater quality.»

integration of sectional water plans and programs within the framework of national economic[80] and social policy[81].

Water vulnerability depends on social, economic, ecological and institutional factors. Public health protection, ecosystem integrity and human resources developments are the three objectives to be pursued in order to integrate water protection and water management[82].

There are too many plans, too many parties involved, too many bodies. Too often there is a useless and negative fragmentation of institutional responsibilities regarding water related issues. There is no integration of policies, and there is a lack of global and regional planning both in terms of urban and rural development[83].

Water issues should be confronted, under a separation of regulatory and management functions, by specialized bodies both at a governmental level and a river basin level. Regulations are necessary to unite economic expectations and community interests[84].

Water institutions should be provided with reliable budget allocations, management instruments and policy tools in order to complete their functions, and they should promote public awareness and consensus, involving consumers and citizens[85].

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[80] **1998, UNCSD Report, *Strategic Approaches – Addendum*,** par.24.

«Water planning and management needs to be integrated into the national economy, recognizing the vital role of water for the satisfaction of basic human needs, food security, poverty alleviation and ecosystem functioning, and taking into account the special conditions of non-monetary sectors of the economy.»

[81] **1997, UNCSD, *Comprehensive Assessment*,** par.131.

[82] **1998, NCSD Briefing Kit, *Agenda 21 – Chapter 18*,** par.C.

Suggested activities include technical and institutional capacities to identify and protect potential sources of water-supply within all sectors of society; preparation of national plans for water resources protection and conservation; application of the "polluter pays" principle, where appropriate, to all kinds of sources, including on-site and off-site sanitation.

[83] **1998, UNCSD Report, *Strategic Approaches*,** par.25.

«The drive towards integrated management might suggest the need for a government authority responsible for all aspects of the hydrological cycle. However, experience with water resource management demonstrates the need for a clear separation of policy, regulation and operational functions, the commercial autonomy of water service utilities, and for adapting existing arrangements to promote integrated water resources management at a technical level. For that to happen, a policy dialogue to adapt mandates and responsibilities has to be initiated. Despite the common perception that the water utility business is currently being deregulated as state monopolies are commercialized or privatized, there is a need to reregulate to allow private actors and financially autonomous water utilities to engage in a fair and transparent commercial environment and protect public and environmental interests.»

[84] **1998, UNCSD Report, *Strategic Approaches – Addendum***, par.9.

«Institutions for integrated water management have been strengthened in several developing countries, along with the adoption of new or improved water policies, information systems and action plans resulting in improvements in water-use efficiencies, water quality and related ecosystems. Industrialized countries are replacing outmoded policy and regulatory frameworks as circumstances and socio-economic circumstances change. Several initiatives to establish comprehensive and participatory river basin management, including international river basins, are replacing purely administrative and technical solutions. International networks in support of integrated water resources management have been created.»

[85] **1998, UNCSD Report, *Strategic Approaches*,** par.15.

«Water institutions in many developed and developing countries remain relatively weak, unable to command regular budget allocations and deprived of the policy instruments and management tools to implement sound water management. The failure of institutions to implement progressive policies is often linked as much to a lack of public awareness and consensus as to lack of financial resources. In reaching out to diverse and diffuse national populations, even well crafted technocratic solutions have failed to make the expected impacts when not accompanied by serious attempts to involve consumers in urban and rural areas. Many spatial disparities are evident at subnational levels, with remote regions and districts lagging behind the central zones of economic activity in terms of water service provision. The weakness is reinforced by the tendency to mix policy-making, regulation and operational functions in single institutions.»

b) Inadequate decision-making levels

Without a clear and global overview of the water sector, it is also likely that decisions are not taken at the most suitable level. The difficulties encountered when attempting to achieve the objectives of global and sustainable water management derive from inadequate institutional organization.

Moreover, as water issues involve different sectors, specialized technical administrations take into accounts their own concerns, without any coordination or dialogue[86].

c) Inadequate experts' integration

Moreover, there is an unsatisfactory integration not only between different legal systems, but also between different field of expertise. The risk is that the solutions developed by legal experts are inapplicable due to economic or technical reasons, and vice versa. Nonetheless, multidisciplinary teams, made up of experts from different backgrounds, should be set up.

Integration is often impaired by narrow specialization. The impairment is prolonged by a lack of communication as each field of expertise has its own rules and language that can not be shared with other fields.

[86] **1998, Paris Conference, Experts' Workshop: *Regulatory Tools*,** par.II.1.2.

2.2. WATER PRIORITIES

2.2.1. Classification

Similarly to the classification of water related problems, it is not easy to classify water related priorities. On the one hand, to intervene directly on some of them means to intervene indirectly on others. On the other hand, the classifying criteria are questionable, as no reference point exists.

Nevertheless, choices are to be made, and a set of priorities is to be adopted in order to direct these choices towards the desired solutions. Certainly, the priority scale can not be considered as merely hierarchic, as, to a certain extent, every interest has to be fulfilled. The point is that the task of public powers, and of legislators at first instance, is to reconcile competing, and sometimes opposing, interests.

Priorities are nothing but guidelines for every subject involved, from the highest international level to the final user. Anyhow, choices and priorities must consider their feasibility, and match short-term and long-term actions.

There are two main groups of water related priorities: utilization ones, related to the use of water in its relation with people and the environment, and action ones, related to the interventions that can be taken and the relation between public powers and private parties.

The proposed classification is as follows:

A) UTILIZATION PRIORITIES

1. Life priorities
a) Desertification and drought prevention
b) Protection from natural disasters
c) Drinking and sanitation water supply

2. Environmental priorities
a) Quantity protection
b) Quality protection
c) Environmental recovery
d) Ecosystems protection

3. Exploitation priorities
a) Sustainable development
b) Efficient management
c) Uses coordination

B) ACTION PRIORITIES

1. Political priorities
a) Rationality
b) Communication
c) Integration
d) Planning
e) Public-private relation

2. Ethical priorities
a) Water culture and water ethic promotion
b) Conservation for future generations

3. Technological priorities
a) Water saving techniques promotion
b) Transportation techniques improvement
c) Data collection

2.2.2. Life priorities

a) Desertification and drought prevention

It is beyond doubt that the most important priorities are the ones closely connected to life. The fight against desertification and drought, through a rational integration of land management and water management, is the first goal of any water policy.

What should be understood and assessed is the threat of the impact of climate change, and its exacerbating effects, on water resources[87].

Suggested activities include: monitoring of the hydrologic regime, including soil moisture, groundwater balance, penetration and transpiration of water-quality, and related climate factors, especially regions and countries most likely to suffer from the adverse effects of climate change.

Other activities include: collection of case-studies to establish whether there are linkages between climate changes and current occurrences of droughts and floods in certain regions, development and initiation of response strategies to counter the adverse effects that are identified, including changing groundwater levels and mitigation of saline intrusion into aquifers.

b) Protection from natural disasters

Similarly, adequate measures must be adopted in order to limit the lethal effects of flooding, mudslides and other natural disasters related to water, establishing mechanisms for regional consultations, early warning systems, mitigation plans and financial support[88].

c) Drinking and sanitation water supply

Drinking and sanitation are inalienable rights to be ensured to everyone, preventing people from dying from a lack of safe water[89]. Suggested activities include: establishment of protected areas for sources of drinking-water (building and expansion), where appropriate, establishment of sewage treatment facilities and drainage systems; encouragement of water development and management based on a participatory approach, involving users, planners and policy makers at all levels.

Since the Mar del Plata Action Plan, adopted by the United Nations Water Conference in 1977, the commonly agreed premise was that "all peoples, whatever their stage of development and their social and economic conditions, have the right to have access to drinking water in quantities and of a quality equal to their basic needs"[90].

The New Delhi Statement, adopted in 1990 at the Global Consultation on Safe Water and Sanitation for the 1990s, formalized the need to provide, on a sustainable basis, access to safe

[87] **1998, NCSD Briefing Kit, *Agenda 21 – Chapter 18*,** par.D.
[88] **1998, UNCSD Report, *Strategic Approaches – Addendum*,** par.38.
«At the international level, there is a need to maintain support of such activities following the close of the International Decade for Natural Disaster Reduction in 1999.»
[89] **1998, NCSD Briefing Kit, *Agenda 21 – Chapter 18*,** par.D.
[90] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.47.

water in sufficient quantities and proper sanitation for all, emphasizing the "some for all rather than more for some" approach[91].

The first guiding principle of the Dublin Statement declares that fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment. From this principle, and particularly from the vital value of water, is inferred the connection between effective management of water resources and a holistic approach, an integration of social, economic and environmental aspects[92].

The international community as a whole, including both public authorities and civil society is called to give priority to providing access for all to safe drinking water and sanitation[93].

2.2.3. Environmental priorities

a) Quantity protection

Water law has changed with reference to the environmental uses of water. Protection from pollution, environmental recovery, waste reduction and water recycling become the main targets. The relations between the different uses and the different demands must be considered from both points of view, quantitative and qualitative.

In addition to the availability of water resources, the achievement of appropriate physical, chemical and microbiological quality standards is a problem of primary importance in order to meet the foreseeable demand for specific uses.

Traditionally, environmental problems have been more closely connected to quality aspects. Recently, the quantity aspects have acquired more and more relevance. An integrated management of water quantity and quality together has become one of the main targets[94].

b) Quality protection

Quality protection aims both at safeguarding drinking water supplies and food security, and at securing health ecosystem maintenance. Water quality management should be the link between general policies affecting waters and specific provisions on waters.

The quantity approach must be integrated with the quality approach, as they can not be considered separate issues. The qualitative approach should determine relevant changes in the management of water resources and in the behavior of users, in order to develop more efficient practices and promote, for instance, the recycling and the reuse of treated wastewater[95]. The elimination of unsustainable uses of toxic materials, especially persistent organic pollutants is one of the main targets.

c) Environmental recovery

Technology represents one of the law's best friends, and the preservation of watercourses has sometimes attained significant results, as the cleaning of the Hudson River in the United States, for example, demonstrates. Environmental recovery is a tool for saving capital as well, if compared with the cost of filtration plants ant their operating cost[96].

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[91] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.48.

[92] **1992, The Dublin Statement, *Guiding principles*,** n.1.

[93] **1998, Paris Declaration**.

[94] **1997, UNCSD, *Comprehensive Assessment*,** par.157.

It is recommended to «manage water quantity and quality together in an integrated and comprehensive manner, taking into account the upstream and downstream consequences of management actions, regional and sectoral relations and social equity».

[95] **1998, Paris Conference, Experts' Workshop: *Regulatory Tools*,** par.II.1.3.

[96] **1998, CHICHILNISKY, HEAL, *Economic Returns*,** p.630.

d) Ecosystems protection

Ecosystems must be maintained through the allocation of appropriate amounts of water. The basic concept is sustainability, as human needs and rational management of water resources can not separate themselves from an ecosystem sensitive approach. The protection of water resources must take into account the functioning of aquatic ecosystems in order to satisfy the needs of human activities[97]. Sustainability calls for matching environmental awareness and economic development[98].

The ecosystem approach[99] to freshwater management includes the prior assessment of water availability and water quality, the identification of different possible relationships within the ecosystem, the prediction of the environmental, economic and social impact of any action, and the assessment of the choices before any decision is taken.

The most relevant challenge to the ecosystem approach is the balance between the forced maximization of the use of the resource and the necessary sustainability of the same use. The ecosystem approach considers river basins or groundwater systems as the appropriate levels of management.

The principles on which the implementation of the ecosystem approach is based focuses on adaptation of policies, establishment of partnerships, empowering of capacities, and assessment of consequences[100].

The conflict between water uses and water conservation is now considered under a different point of view. Protecting ecosystems, in fact, has not only an ethical value, but also a practical value, providing the so-called ecosystems services, which include production of food, reduction of flood risk, and filtering of pollutants.

This means that protecting adequate flows in rivers and adequate levels in lakes is not just a matter of aesthetics or of mere environmental concern, but it tightly deals with human activities and benefits[101].

2.2.4. Exploitation priorities

[97] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.8.

«Integrated water resources management is based on the perception of water as an integral part of the ecosystem, a natural resource and a social and economic good, whose quantity and quality determine the nature of its utilization. To this end, water resources have to be protected, taking into account the functioning of aquatic ecosystems and the perenniality of the resource, in order to satisfy and reconcile needs for water in human activities».

[98] **1998, UNCSD Report, *Strategic Approaches – Addendum*,** par.15.

«The principle of sustainability must underpin an integrated approach to managing freshwater resources in order to maintain and extend the benefits derived from natural freshwater systems.»

[99] **1998, UNCSD Report, *Strategic Approaches – Addendum*,** par.21.

«The conservation of freshwater and related ecosystems is vital to sustainable development. Such ecosystems are themselves users, water regulators and providers of freshwater-based resources, including fisheries. It is therefore necessary to promote an ecosystem approach in integrated water resources planning, development and management, within the framework of river basin and aquifer systems.»

[100] **1998, UNCSD, *Strategic Approaches – Abstract***

«The implementation of the ecosystem approach is based on four principles: a) adapting policy and practices including the equitable sharing of costs and benefits and the implementation of sustainable practices; b) establishing new partnerships to improve effectiveness and efficiency in freshwater ecosystem management; c) strengthening the capacities at different levels to sustainably manage water resources; d) improving the assessment of water resources and ecosystem functions and identifying threats to the resource base.»

[101] **1997, UNCSD, *Comprehensive Assessment*,** par.41.

«Great strides have been made in understanding the freshwater needs of aquatic ecosystems. Such needs are being accepted as legitimate calls on water, leading an increasing number of decision makers to give these "environmental" flows priority along with water use for economic activities.»

a) Sustainable development

The definition of sustainable development refers to that development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It is a concept suitable to direct fundamental choices and represent a limit for public policies. The concept of sustainable development is strictly linked to the principle of equity where economic, environmental and social goals must be coherently achieved.

The objectives of sustainable development, for which water is one of the main vectors, are the control of natural flood, drought and erosion hazards, the meeting of sound and rightful requirements of the various categories of users, and the conservation of resources and natural aquatic ecosystems[102].

The major issues concern drinking water provision, the agro-food self sufficiency between stock farming[103] and fish farming[104], the harmonious development of industry, energy production, leisure and tourism, the increase of fish farming, the prevention and control of pollution, the prevention of natural disasters[105].

The integrated water resources management, which considers interactions between all components related to waters, like economic framework, institutional and legal capacity-building, human resources development and participatory approaches[106], should aim at satisfying the freshwater needs of all countries for their sustainable development[107].

The integrated management includes both the land-related aspects and the water-related aspects and it has to be carried out at the level of the river basin or sub-basin[108], that is the geographical area from which rainfall and other waters drain into rivers. It must cover all kinds of freshwater bodies, both groundwater and surface water, and it must consider both quantity and quality aspects.

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[102] **1998, INBO Workshop, User's Participation,** Introduction.

[103] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.66.

«The non-availability of water-supplies of suitable quality is a significant limiting factor to livestock production in many countries, and improper disposal of animal wastes can in certain circumstances result in pollution of water-supplies for both humans and animals. The drinking-water requirements of livestock vary according to species and the environment in which they are kept. It is estimated that the current global livestock drinking-water requirement is about 60 billion liters per day and based on livestock population growth estimates, this daily requirement is predicted to increase by 0.4 billion liters per annum in the foreseeable future.»

[104] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.67.

«Freshwater fisheries in lakes and streams are an important source of food and protein. Fisheries of inland waters should be so managed as to maximize the yield of aquatic food organisms in an environmentally sound manner. This requires the conservation of water-quality and quantity, as well as of the functional morphology of the aquatic environment. On the other hand, fishing and aquaculture may themselves damage the aquatic ecosystem; hence their development should conform to guidelines for impact limitation. Present levels of production from inland fisheries, from both fresh and brackish water, are about 7 million tons per year and could increase to 16 million tons per year by the year 2000; however, any increase in environmental stress could jeopardize this rise.»

[105] **1998, Paris Conference, *General Considerations*,** par.3.

[106] **1998, UNCSD Report, *Strategic Approaches – Addendum*,** par.11.

«Integrated water resources management within a national economic framework is essential for achieving efficient and equitable allocation of water resources and thus for promoting sustainable economic development and poverty alleviation. The adoption of an integrated approach to the environmentally sustainable management of water resources is also fundamental for protecting freshwater ecosystems, water quality and human health. At the same time, the financial sustainability of the water sector together with policies for financial burden-sharing and for ensuring access by the poor are a prerequisite for the successful implementation of integrated water resources management. In order to be effectively implemented, integrated water resources management should also include institutional and legal capacity building, human resources development and participatory approaches. The basis for a strategic approach to integrated freshwater management can be founded on a set of key elements that bring together all the relevant parties and their particular socio-economic and environmental concerns that are bound by freshwater.»

[107] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.7.

[108] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.9.

Conjunctive management of groundwater and surface water as a single source of supply (often obstructed by the legal distinction between the two), and comprehensive management of water quantity and quality (often considered as different issues) are necessary steps to rationalize water management[109].

Moreover, it must include concurrent water conservation and wastage minimization measures[110]. On the one hand, it requires an interactive and multi-sectional approach to water resources management; on the other hand it requires a local consideration of the communities' priorities within the national economic development policy.

As for the suggested activities, they include the inventory of water resources, flood and drought management, including risk analysis and environmental and social impact assessment, schemes for rational water use through public awareness-raising and educational programs, international scientific research cooperation on freshwater resources, and water conservation through improved water-use efficiency.

At the national level, they include integrated water resources planning and management in the framework of the national planning process and, where appropriate, establishment of independent regulation and monitoring of freshwater, based on national legislation and economic measures[111].

b) Efficient management

The more technical and the more specific the function, the more specialized administrative bodies are endowed with responsibilities. Water is a multi-purpose natural resource. However, its connection with involved interests must not imply sector by sector regulations, but a coordination of functions, even if that does not mean providing only one management and governing level. Consequently, the functions must be reorganized in terms of non-traditional management levels. Only then will it be possible to define the legal instruments that can be used for the management and protection of water resources. These instruments must define water resources, their use, private individuals' interests and rights, and public activities.

Water management involves general economic evaluations, but water cannot be exclusively regulated by economic principles. Public bodies can apply neither cost-benefit analysis, nor market laws alone, as social and civic interests are involved[112].

Management requires capacity building as well[113]. A group of trained professionals from different backgrounds who work in different sectors should constitute the human resources basis of every project.

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[109] **1984, GOLDFARB, *Water Law***, pp.28 *et seq.*

[110] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.3.

«The multisectoral nature of water resources development in the context of socio-economic development must be recognized, as well as the multi-interest utilization of water resources for water supply and sanitation, agriculture, industry, urban development, hydropower generation, inland fisheries, transportation, recreation, low and flat lands management and other activities».

[111] **1998, NCSD Briefing Kit, *Agenda 21 – Chapter 18*,** par.A.

The targets are the following: by year 2000 «design and initiate targeted national action programs and put in place appropriate institutional structures and legal instruments, establish efficient water-use programs to attain sustainable resource utilization patterns; by year 2025 achieve sub-sectoral targets of all freshwater program areas».

[112] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.15.

«Pursuant to the recognition of water as a social and economic good, the various available options for charging water users (including domestic, urban, industrial and agricultural water-user groups) have to be further evaluated and field-tested. Further development is required for economic instruments that take into account opportunity costs and environmental externalities.»

[113] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.21.

«Institutional capacity for implementing integrated water management should be reviewed and developed when there is a clear demand. Existing administrative structures will often be quite capable of achieving local water resources management, but the need may arise for new institutions based upon the

Lack of integration, as well as lack of expertise, has been so far the main obstacle to effective projects. Water users and decision-makers should, therefore, increase their capacity to deal with water issues. In addition, a network of experts in hydrology, law, economics, conflict resolution, politics should be created.

The Action Agenda of the Dublin Statement highlights the importance of «capacity building». Considering the relevance of well-trained and qualified personnel to face water issues, countries must ensure the creation of water experts in the different fields involved[114].

Effective management requires a reduction of bureaucracy, and a high level of independence, with an autonomous balanced budget, a responsible board of directors and a multi-year «program contract»[115].

Effective management should use appropriately all the tools at its disposal: laws and regulations; water quality standards; economic instruments such as taxes and pricing policies; monitoring systems; water quality monitoring tools; environmental impact assessments; cross-sectional coordination[116].

The main character of an efficient management is its integration[117]. Integrated water resources management is deemed essential for equitable allocation of resources and, therefore, for sustainable economic development.

Integrated management should include institutional and legal capacity building, human resources development and a participatory approach[118]. It should consider the following elements: sustainability; water policy and integrated management; management of resources; capacity building; information management; indicators of progress; ecosystem integration; human interactions with the environment; water quality and environmental sanitation.

An efficient management of water resources is required, especially in the case of water services. Public bodies, directly or indirectly, supply water to the community. An excessive reliance on government for water services has been seen as one of the reasons for policy failure[119]. Transparency and accountability, which do not exclude subsidies, are preconditions for sustainable and efficient financial management[120].

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perspective, for example, of river catchment areas, district development councils and local community committees.»

[114] **1992, The Dublin Statement, *Action Agenda*.**

«All actions identified in the Dublin Conference Report require well-trained and qualified personnel. Countries should identify, as part of national development plans, training needs for water-resources assessment and management, and take steps internally and, if necessary with technical co-operation agencies, to provide the required training, and working conditions which help to retain the trained personnel. Governments must also assess their capacity to equip their water and other specialists to implement the full range of activities for integrated water-resources management. This requires provision of an enabling environment in terms of institutional and legal arrangements, including those for effective water-demand management. Awareness raising is a vital part of a participatory approach to water resources management. Information, education and communication support programs must be an integral part of the development process.»

[115] **1998, Paris Conference, Experts' Workshop: *Regulatory Tools*,** par.II.2.4.1.

The program contract must set «objectives to be reached and constraints to be respected, tariffs and their evolution, and possible public subsidies for specific services provided to administrations or the conditions that they would require, besides the possibilities of direct funding of the services provided to the users».

[116] **1998, HELMER, ONGLEY, PETERS, *Key Points.***

[117] **1998, UNCSD Report, *Strategic Approaches*,** par.21.

«Integration of all water-related activities through a mix of institutional and economic instruments is a key requirement for addressing the goals of social welfare, environmental integrity and economic productivity. In striving to reconcile socio-economic demands with available resources, three fundamental areas of action may be recognized: (a) the pivotal role of participation and the principle of subsidiarity, (b) the role of economics and financing in driving productivity gains, and (c) the need to protect hydro-environmental integrity and recognize environmental limits.»

[118] **1998, UNCSD *Freshwater Management Key Issues*.**

[119] **1998, HELMER, ONGLEY, PETERS, *Key Points*.**

[120] **1998, UNCSD Report, *Strategic Approaches – Addendum*,** par.27.

Water services management faces a range of repetitive problems: deterioration of facilities due to bad maintenance, overproduction of water volumes compared to used volumes and billed volumes, high unpaid bills rate, and an untrained staff[121].

Regular water supply and the search for consumer satisfaction should go hand in hand with quality control, water quantity protection, recycling, waste prevention, and fair distribution.

There should be a high differentiation in the tariffs, according to the quantity used: low tariffs for the quantity which corresponds to an average social use, much higher tariffs for the quantity in excess. In any case, mechanisms that enable the recovery of costs from the users are required to improve water services.

c) Uses coordination

As soon as water becomes insufficient for every use, the main issue becomes setting a hierarchy between competing uses, favoring the life supporting uses first and then the high-valued economic uses. At the same time, regulations and other policy means must guarantee the economic efficiency of each use, considering long-run marginal costs, opportunity costs and pollution charges[122].

Water uses include social uses (drinking, sanitation, leisure activities), food production (agriculture, fisheries, stock farming), industrial uses (hydropower generation), transport uses (navigation).

Three sectional uses stand out, and each of them requires a different kind of water. Drinking and sanitation require water to be treated to potable retail standards; irrigated agricultural production requires untreated water; industrial production requires bulk supplies to be treated according to various standards[123].

Water is most importantly used for drinking and hygiene. Only after everyone gets a reasonable quantity of water for their basic needs, economic decisions can be taken.

Irrigated agriculture absorbs around 80% of water withdrawals[124]. In the dry tropics the amount reaches 90%. Even if the world can produce enough food for everyone, the uneven allocation of resources prevents a little less than a billion people from having access to sufficient food. The dramatic increase in food demand and the subsequent increase in food production have determined a 60% rise in water withdrawals for irrigation since 1960[125]. Suggested activities include providing water supply and sanitation for the unserved rural poor; adopting appropriate technologies for water treatment; developing small-scale irrigation and water supply for humans

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«All costs must be covered if the provision of water is to be viable. Subsidies for specific groups, usually the poorest, may be judged desirable within some countries. Wherever possible, the level of such subsidies and who benefits from them should be transparent. Information on performance indicators, procurement procedures, pricing, cost estimates, revenues and subsidies needs to be provided in order to ensure transparency and accountability, maintain confidence and improve investment capacities in the water sector.»

[121] **1998, Paris Conference, Experts' Workshop: *Regulatory tools*,** par.II.1.7.

[122] **1998, UNCSD Report, *Strategic Approaches*,** par.14.

«Although many countries have policies that prioritize categories of water use, particularly in times of shortage, very few have implemented regulations or incentives designed systematically to use water in an economically efficient manner. Water tariffs rarely reflect long-run marginal costs, let alone full economic pricing, including opportunity costs and pollution charges. Consequently, all types of water remain undervalued in economic terms and the associated water services severely underpriced. That miscalculation continues to result in profligate use within some sectors notably agriculture and chronic shortages to meet basic human needs. More importantly, there is no clear economic signal sent to competing sectoral users or to the state organizations responsible for regulating freshwater resource use and allocating resources among economic sectors.»

[123] **1998, UNCSD Report, *Strategic Approaches*,** par.5.

[124] **1998, UNCSD Report, *Strategic Approaches*,** par.8.

«The water demands of irrigation schemes to satisfy grain production take up the bulk (about 85 per cent) of the world's mobilized water resources.»

[125] **1997, UNCSD, *Comprehensive Assessment*,** par.44.

and livestock and for water and soil conservation; recognizing water as a social, economic and strategic good in irrigation planning and management[126].

Considering that a large amount of the water withdrawn is lost before getting to the plant, more efficient irrigation practices, combined with a different pricing policy are one of the main instruments to save water resources[127].

The Action Agenda of the Dublin Statement is concerned with «agricultural production and rural water supply». Considering the food security priority, water-saving technologies and management methods should allow rural communities to adopt new approaches for both rainfed and irrigated agriculture[128].

Even if industrial consumption is more effective than agricultural consumption, some measures can be adopted to save water resources, well regulating the industrial sector and enabling access to financial means and technology[129].

Recycling, water pricing, application of the «polluter pays» principle[130], in which those responsible for pollution pay control, mitigation and cleanup costs, can encourage pollution reduction, conservation and reuse.

2.2.5. Political priorities

a) Rationality

The first priority, from a political point of view, is to make up for the rationality of water related regulations. The first step in this direction requires a new setting of principles that consider the new situation, the new challenges and the final goals.

An array of sharable and general rules will represent both a legal framework and the basis for a common language about waters. Regulations should contain realistic and progressive ambitions and the means for implementation, control and enforcement[131], ensuring an orientation of efforts that users are requested to make, and equity among all parties facing the same situation[132].

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[126] **1998, NCSD Briefing Kit, Agenda 21 – Chapter 18,** par.F.

[127] **1998, UNCSD Report, *Strategic Approaches*,** par.8.

«Many schemes are operating well below their design levels because of poor operation and maintenance, as well as inequitable distribution, with tail-enders always receiving smaller allocations than designed. Lack of drainage often leads to waterlogging and salinity, taking land out of production and further degrading surface and groundwater.»

[128] **1992, The Dublin Statement, *Action Agenda*.**

«Achieving food security is a high priority in many countries, and agriculture must not only provide food for rising populations, but also save water for other uses. The challenge is to develop and apply water-saving technology and management methods, and, through capacity building, enable communities to introduce institutions and incentives for the rural population to adopt new approaches, for both rainfed and irrigated agriculture. The rural population must also have better access to a potable water supply and to sanitation services. It is an immense task, but not an impossible one, provided appropriate policies and programs are adopted at all levels, local, national and international»

[129] **1998, UNCSD Report, *Strategic Approaches*,** par.10.

«The potential for water conservation and the use of clean technologies to manage demand and minimize the environmental impact of effluent disposal is high when industrial sectors are well regulated, with access to capital and technology. Unfortunately for many developing countries and economies in transition, the push to allow industrial sectors to grow has left environmental regulation behind.»

[130] **1993, NOLLKAEMPER, *The Legal Regime***, pp.79 *et seq.*

[131] **1998, UNCSD Report, *Strategic Approaches* – Addendum**, par.30.

«A legislative and regulatory framework should be established in order to facilitate integrated water resources management strategies, and to ensure that the capacity exists to apply legislation and enforce regulations.»

[132] **1998, Paris Conference, Experts' Workshop: Regulatory Tools,** par.II.2.2.1.

b) Communication

Another neglected issue is communication. User and citizen's information is particularly important in the water sector. Since everyone uses water and everyone wastes it, everyone should understand what the real issues are in order to change their habits and contribute to relieve the water stress. Individual's lack of consideration for water problems is often just a matter of ignorance.

In addition, widespread information may improve the relation between public powers and citizens, allowing the latter to understand charges and restrictions people are normally not used to. Water issues involve users, both as individuals and as representatives of specific categories, private industry, local elected officials, members of parliaments. A common language is needed in order to recover from the disjunction among these parties.

c) Integration

Integration is a multilevel process that should be implemented among countries, municipalities, and individuals.

Models of cooperation aiming at maximizing the benefits from the development of transboundary river basins or aquifers should be developed through joint management initiatives[133]. An institutional and regulatory framework to ensure functional water markets, to favor the reallocation of resources[134] and to protect water rights should be set[135].

Water marketing is one of the most important and controversial tools of water management[136]. It may favor the improvement in water use efficiency. In addition, water transfers are also a relevant component in water policies as long as the resource is not sufficient for every use.

In any case, a water market can not be considered a conventional type of market, for traditional and objective reasons. Water is not a simple economic good, and policies about water are far more complex than policies about different goods[137].

d) Planning

There are several reasons for planning. First, there is the inadequacy of specific provisions regulating complex intervention sectors. Second, there is the need to weigh up all the different interests in one place before implementation. Third, there is the need to allow the public authorities to intervene at the crucial stage, when the basic choices are made. Planning will also give more guarantees to private individuals, water licensees, water services providers and consumers.

Planning limits the power of discretion of the public authorities, promotes the uniformity of the choices adopted and increases public understanding of the basic trends of water policy. In a way, planning, which is the prelude to informed decision-making, is the intermediate stage between legislation and administration and therefore represents an inevitable choice.

The presence of a plan between legislation and provisions offers several advantages. With regard to law, planning prevents the legislator from directly tackling technical problems, for which he is not sufficiently trained to deal with. Moreover, it prevents the basic choices from being crystallized at a certain time, with little chance of updating.

With regard to specific provisions, planning represents a joint point of reference closer than statutory provisions, and coordinates the exercise of power of discretion by different public bodies.

Many activities can be regulated in the planning arena: building hydraulic works, granting licenses and permits, resource protection, primary water services regulation, and others. The plan must be kept under review and constantly revised.

Moreover, implementation of the contents of the plan must be feasible, preferring less ambitious targets to ones that cannot be achieved. Flexibility must be a further characteristic of the

[133] **1998, FEITELSON, HADDAD, *A Stepwise*,** pp.227 *et seq.*
[134] **1995, TARLOCK, *Reallocation*,** pp.104 *et seq.*
[135] **1977, SCHACTER, *Sharing***, p.71 *et seq.*
[136] **1997, TARLOCK, *Current Trends***, pp.190 *et seq.*
[137] **1992, NATIONAL RESEARCH COUNCIL, *Water Transfers***, pp.2 *et seq.*

plan, so that it can be carried out in stages. Otherwise the plan would show itself more as a delay than a planning of provisions.

e) Public-private relation

A correct water policy should start from the public interest: permits and authorizations should be part of a planning scheme in which all the interests affecting water resources are weighed. Protection of water resources should be considered in such unitary schemes.

The relations between the public administration and private individuals, traditionally governed by licenses and permits, must therefore be integrated with plans and general rules. When domestic and production needs increase considerably, the pattern of administration operating with specific measures may be unsuitable for managing the water sector as a whole.

Competition between claims can ensure the most effective choice for a particular water resource, but it cannot ensure that all the choices are coordinated. The most rational use of a determined resource is not necessarily such if all the uses in a determined river basin are considered at the same time.

The license and the permit systems regulate the relations between private individuals and the public administration starting from the interests of individuals who take the initiative, and from the case at hand. A correct water policy should instead start from the public interest, and from the general situation, and then consider water rights.

Water rights are different kinds of property rights. The right is not over water itself, but over the use of water. Water in natural watercourses should be considered as a common property, which gives a government a great amount of power[138]. Private rights over water, interfering with the public interest, are always subject to the public's common needs and to public control.

Further, public bodies must review licenses, permits, and their conditions from time to time, to ensure they comply with plans and regulations. Licenses and permits must be replaced or revoked if unsuitable to public purposes.

2.2.6. Ethic priorities

a) Water culture and water ethic promotion

All the priorities above share the need for a unitary and new approach, that is a water culture, not to mention a water ethic. Rationality, solidarity, participation and subsidiarity are the cornerstones of this new water culture, which should be based on communication, users' and citizens' information and complete integration between countries[139].

b) Conservation for future generations

Water should be saved not only for present generations, but also for future generations. The Action Agenda of the Dublin Statement states that «water conservation and reuse» should be the main targets of future policies. Considering the unsustainable amount of water wasted in the agricultural, industrial, and domestic sectors, new patterns of water use should be found, promoting combined savings and the multiple use of water. More efficient irrigation practices and recycling will lead to water savings and reduced pollution[140].

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[138] **1984, GOLDFARB, *Water Law***, Introduction.

[139] **1977, SCHACTER, *Sharing***, p.73 *et seq.*

[140] **1992, The Dublin Statement, *Action Agenda*.**

«Current patterns of water use involve excessive waste. There is great scope for water savings in agriculture, in industry and in domestic water supplies. Irrigated agriculture accounts for about 80% of water withdrawals in the world. In many irrigation schemes, up to 60% of this water is lost on its way from the source to the plant. More efficient irrigation practices will lead to substantial freshwater savings. Recycling could reduce the consumption of many industrial consumers by 50% or more, with the additional benefit of reduced pollution. Application of the "polluter pays" principle and realistic water pricing will encourage conservation and reuse. On average, 36% of the water produced by urban water utilities in developing countries is

Water conservation measures represent both necessary, saving techniques and recognition of the value of water, other than just its economic value. Domestic water conservation measures include the adoption of water-saving plumbing fixtures, the limiting of the outdoor uses of water, the repair of leaking distribution and sewer systems, the metering of all water connections, the rationing and curbing of water uses and recycling of water.

2.2.7. Technological priorities

a) Water saving techniques promotion

According to United Nations data, half the water in drinking water supply systems in the developing world is lost due to leakage, vandalism and illegal hookups[141].

In many countries water-saving technologies and appropriate practices have lead to a significant improvement in the efficiency of the use of water, often in consequence to public pressures for action. Irrigation, industrial processing and municipal supplies have benefited from new technologies[142].

Appropriate technologies that can provide sustainable solutions must take into account the need to reduce pollution, to use renewable sources of energy and to recycle resources. Suggested activities include introduction of sanitary waste disposal facilities based on environmentally sound low-cost and upgradable technologies, promotion of recycling and reuse of wastewater and solid wastes[143].

Water saving techniques applied to agriculture already exist: close monitoring of irrigation system performance, high-efficiency irrigation, water harvesting, inland valley swamp development, low-lift pump schemes, peri-urban irrigation with treated urban waste water, conjunctive use of surface water and groundwater[144].

So far desalination is a limited option available mainly to low-volume, high-value users, but at present still economically prohibitive for large-scale production.

b) Transportation techniques improvement

Due to great inequalities in water distribution, water transportation techniques have a relevant role in dealing with water issues. Global and regional water markets are highly limited by conveyance costs. While the sale price of water does not exceed the thirtieth of the sale price of oil anywhere in the world, the transportation costs of oil and water are quite the same.

c) Data collection

Any water policy needs suitable legal instruments. This requires knowledge of the situation, an estimate of future demand, planning, coordination of the various public bodies involved, and the location of the optimal operating area[145].

"unaccounted for". Better management could reduce these costly losses. Combined savings in agriculture, industry and domestic water supplies could significantly defer investment in costly new water-resource development and have enormous impact on the sustainability of future supplies. More savings will come from multiple use of water. Compliance with effective discharge standards, based on new water protection objectives, will enable successive downstream consumers to reuse water which presently is too contaminated after the first use.»

[141] **1997, UNCSD, *Comprehensive Assessment*,** par.61.

The World Bank estimates that about $600 billion needs to be invested worldwide to repair and improve water delivery systems.

[142] **1998, UNCSD Report, *Strategic Approaches – Addendum*,** par.9.

[143] **1998, NCSD Briefing Kit, *Agenda 21 – Chapter 18*,** par.E.

[144] **1997, UNCSD, *Comprehensive Assessment*,** par.103.

[145] **1998, UNCSD Report, *Strategic Approaches – Addendum*,** par.19.

«There is a need to finance, establish and maintain effective data collection and dissemination, information management systems and research in order to provide a sound basis for policy formulation, planning and investment decisions, and the operational management of freshwater resources. The collection

A serious water policy requires therefore in-depth surveys, estimates, reports and assessments. Suggested activities include enhancing the institutional skills of countries to ensure the adequate assessment of water resources and flood and drought forecasting services; developing and maintaining proper data systems to support the provision of data on water quantity and quality for surface and groundwater; enhancing supporting research and development programs[146].

The public administration must know the actual availability of the resources, the qualitative level, as well as existing and future uses. These data must be processed to obtain a solid basis for any public intervention[147]. Otherwise the solutions are likely to miss the mark. Only then can general rules be provided.

The point is that there are serious doubts about data, statistics and estimates about water, which sometimes highly differ from agency to agency, making the information tools for assistance to decision-making insufficiently developed[148]. Besides, data are often not easily accessible or usable[149].

There are two opposite problems. In some countries measurement networks and staffing levels have been reduced, making means necessary for gathering information insufficient[150]. In other countries, there is a competition between public and private bodies and there is an excess of data. In both cases, there is a lack of a network of harmonized information systems and of a common procedure in analyzing and using data[151].

The point is that information is dispersed, as data are usually distributed among several managing organizations, and heterogeneous, as each data collection and evaluation is made under different systems, separately efficient, but unable to allow exchange and dialogue with each other[152].

The Action Agenda of the Dublin Statement insists on the «knowledge base». Considering a reliable data network as an irreplaceable basis for water management, interdisciplinary research, data collection and analyses about the hydrologic cycle are necessary[153].

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of all freshwater resource and related socio-economic and environmental data and information needed for policy decisions, planning and management action and monitoring should have a high and continued priority.»

[146] **1998, NCSD Briefing Kit, *Agenda 21 – Chapter 18*,** par.B.

[147] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.23.

«Water resources assessment, including the identification of potential sources of freshwater supply, comprises the continuing determination of sources, extent, dependability and quality of water resources and of the human activities that affect those resources. Such assessment constitutes the practical basis for their sustainable management and a prerequisite for evaluation of the possibilities for their development.»

[148] **1998, Paris Conference, Expert's Workshop: *Improving the Knowledge*,** par.I.2.

It underlines how the concepts used remain unclear and of little operational value, the elaboration of modern products for data development is only beginning, and data management is not yet sufficiently developed.

[149] **1998, Paris Conference, Expert's Workshop: *Improving the Knowledge*,** par.I.3.

[150] **1998, Paris Conference, Expert's Workshop: *Improving the Knowledge*,** par.I.4.

[151] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.14.

«The development of interactive databases, forecasting methods and economic planning models appropriate to the task of managing water resources in an efficient and sustainable manner will require the application of new techniques such as geographical information systems and expert systems to gather, assimilate, analyze and display multisectoral information and to optimize decision-making. In addition, the development of new and alternative sources of water supply and low-cost water technologies will require innovative applied research. This will involve the transfer, adaptation and diffusion of new techniques and technology among developing countries, as well as the development of endogenous capacity, for the purpose of being able to deal with the added dimension of integrating engineering, economic, environmental and social aspects of water resources management and predicting the effects in terms of human impact».

[152] **1998, Paris Conference, Expert's Workshop: *Improving the Knowledge*,** par.I.1.

It underlines that information is not relevant enough with regards to continuity and duration of observations, reliability, representativeness of measurement and sampling sites, nature of monitored parameters.

[153] **1992, The Dublin Statement, *Action Agenda.***

The exchange of information of national experiences and the sharing of successful initiatives on a regional and global level are to be pursued. Even if international initiatives dealing with the collection of water-related information on a global basis have been taken[154], what is lacking is probably an effective circulation of national data.

«Measurement of components of the water cycle, in quantity and quality, and of other characteristics of the environment affecting water are an essential basis for undertaking effective water management. Research and analysis techniques, applied on an interdisciplinary basis, permit the understanding of these data and their application to many uses. With the threat of global warming due to increasing greenhouse gas concentrations in the atmosphere, the need for measurements and data exchange on the hydrological cycle on a global scale is evident. The data are required to understand both the world's climate system and the potential impacts on water resources of climate change and sea level rise. All countries must participate and, where necessary, be assisted to take part in the global monitoring, the study of the effects and the development of appropriate response strategies.»

[154] The World Hydrological Cycle Observing system (WHYCOS) program, developed by the World Meteorological Organization (WMO) with support from the World Bank and other donors, aims to significantly improve the precision and continuity of field measurements by possibly resorting to advanced technologies and whose final objective is the setting-up of regional data bases. The United Nations Environment Program (UNEP) / World Health Organization (WHO) / Global Environment Monitoring System (GEMS) water program provides support for the monitoring of water quality. The WHO / United Nations Children's Fund (UNICEF) Global Drinking Water Supply Monitoring Program collects and analyses information about water supply and sanitation coverage in developing countries. The Rural Water Statistical System (AQUASTAT) program of the Food and Agriculture Organization of the United Nations (FAO) assembles information on rural water use in participating countries. The International Hydrological Program of the United Nations Educational, Scientific and Cultural Organization (UNESCO) includes the FRIENDS (Flow Regime from International Experimental and Network Data) Program that deals with the main topics related to hydrological regimes of rivers using a regional methodology: data bases, inputs, low water flow, floods, heavy rainfall, but also physical processes: run-off, trends, hydrology of integrated water management. The Hydrological Information Referral Service (INFOHYDRO) is a service for the dissemination of information on national and international organizations, institutions and agencies dealing with hydrology and on national and international hydrological data banks.

2.3. PRINCIPLES

2.3.1. Classification

General principles are the basis for every branch of law. As for water law, there are three main groups of principles. The first group concerns water and its cultural and moral value. The second group concerns water and its legal essence. The third group concerns water and its relationship with decision-making processes.

The proposed classification is as follows:

1. Ethical principles
a) Water as a global resource
b) Reasonableness

2. Conceptual principles
a) Legal status of water
b) Community ownership
c) Public regulation and free market

3. Power allocation principles
a) Subsidiarity
b) River basin principle
c) Participation of users

2.3.2. Ethical principles

a) Water as a global resource

Some principles concern water itself. Water is a basic need and right[155]. Water is the basis for sustainable development and water is a resource. The Action agenda of the Dublin Statement deems «alleviation of poverty and disease» as the main target. Considering the dramatic data about large strata of the world's population suffering from water scarcity, the priority should be given to water resources development and management to the accelerated provision of food, water and sanitation to these people[156].

The main thing to realize is that water is a limited commodity and as such it requires particular attention by the law. Water thus takes on the status of a resource, which has been specified, in a legal setting. National regulations, often supported by the respective supreme courts, connect water resources to public interests and to fundamental principles of the respective systems.

[155] **1992, Second International Water Tribunal, *Declaration of Amsterdam*.**
Article 1: "All members of present and future generations have the fundamental right to a sustainable livelihood including the availability of water of sufficient quantity and quality".

[156] **1992, The Dublin Statement, *Action Agenda***.
«At the start of the 1990s, more than a quarter of the world's population still lack the basic human needs of enough food to eat, a clean water supply and hygienic means of sanitation. The Conference recommends that priority be given in water resources development and management to the accelerated provision of food, water and sanitation to these unserved millions.»

The status of a resource constitutes the basis of water law. Such regulation is linked to the constitutional sphere, with all that follows in relation to individual legal positions and rights. The community's needs, likewise in the long-term, prevail over those of the individual. It follows that it is not so much important who water belongs to, as how it is managed. Still, it is a limited resource. Therefore, it follows that water should be exploited and not wasted. Still, water is a vital resource. It follows then that economic assessments can not go so far as to exclude social assessments.

b) Reasonableness

As far as the legislative, regulatory and administrative actions are concerned, reasonableness is the guiding principle. That means that law must be not only coherent, but also easily available to water matters. That means that useless regulations must be repealed. That means that power allocation criteria should consider the object of the rule of law itself. But overall the reasonableness of water law means that choices can not be made without considering water in its deepest value.

Water is defined as a resource, which is conceptually meaningful. Since freshwater is finite, this means that the public and private interests regarding its appropriation will be stronger and stronger. Appropriation, ownership, and water rights, are the defining tools under the users' point of view. Under the public powers' point of view the defining tool is allocation.

The fact that water is essential to life, development and the environment means that it is not a mere commodity, and, subsequently, that the traditional legal entries and rules can not be applied in isolation.

Reasonableness can be applied even in a stricter manner, that is in defining what use is reasonable between competing interests. In these terms, many factors are to be considered, like the suitability of the use to that specific watercourse, the social impact of the use, the economic value of the use, the purpose of the use, and the harmful consequences it may cause.

2.3.3. Conceptual principles

a) Legal status of water

Water is a natural element, and as such it involves ethical issues. It is a limited public commodity, and as such it must be properly managed. It is a means of transport, and as such its regular flow must be guaranteed. It is a means of production, and as such it must be conveniently exploited. It is an economic asset, and as such it can be traded. It is an environmental good, and as such it must be protected. It is a social resource, and as such it must be made available for basic needs. It is part of our environmental heritage, and as such it must be conserved for future generations.

Water is a complex resource. That complexity reflects the variety of relations between water and the legal system and between water and public and private interests. I do not think it possible to use just one of the traditional legal entries, as something will be inevitably lost. We must accept its complexity, starting from the very complexity of creating, and understanding, water law. The fact that water has economic value does not mean it can not be a social good as well, being that it is part of the basic requirements for life and health.

b) Community ownership

Some principles concern the ownership of water. If we consider it as a vital and finite resource, the real issue should be the management of this resource and not the property, meaning that water should not be private. We can call it a community's and functional ownership, or a form of sovereignty, and not a traditional public ownership, as it is a social and economic resource, a social asset.

Legal problems relating to the ownership of water have an indirect value, although the interest of legal science, case law, and national legislation might lead us to believe the opposite. Ownership must not be reduced to a conflict between public and private. Instead, laws of

ownership must be functional to serve interests that are public in the deepest sense of the term. Not only is it a question of interests concerning people's welfare, but also their very survival.

The public ownership of water is not sufficient in itself to ensure rational management. Without suitable planning, public ownership may have a neutral value. On the contrary, the public ownership of water is more strictly related to those administrative measures, allowing particular uses. Not only is it a matter of public property versus private property, but it is also a kind of property drastically different from other kinds of property.

It looks like the real challenge is between public and private. The point is that water, becoming scarcer and scarcer, tends to be considered a commodity, but in the meantime private ownership is decreasing. Nonetheless, public property is more a community's ownership, in which the functional value is underlined, that of a traditional public ownership. While is it perceived that water meets community's interests, the public role, through the adoption of administrative systems, is naturally required.

One of the most controversial issues is the difference between water as a social right and water as a commodity[157]. Water could be both, and could be neither. Water is not a social right in the sense that everyone is entitled to get as much water as they wish to. But water is a social right as long as it is the basis for life.

Similarly, water is not a commodity in the sense that everyone is entitled to own it like one owns other commodities. But water is something precious and finite, therefore tradable[158] and under economic evaluation, and it should be attentively managed and saved. In these terms, it is important that there is full cost accounting[159], and full cost recovery for the provision of water, and that users pay for the water used for economic purposes[160].

This hides the difference between public regulation and free market regulation. While they can be in conflict with each other, neither the former nor the latter can solve water problems in a satisfactory way. In addition, both must deal with each other.

The development of water regulations over the years, with an increasing role for the State, shows that the question of ownership is only a secondary matter in relation to the other interests involved. It is not as important to know who a particular water resource belongs to, as to ensure that the water is being protected and used for public purposes.

Once the public ownership is accepted, in the defined terms, the problem is to settle and regulate private rights, making them compatible with the overriding public interest.

The public ownership of all the water resources has a dual value, beyond the property aspect, in a strict sense. On the one hand, it constitutes a matter of principle, ruling out the legal possibility of private ownership of natural resources indispensable for human life. On the other hand, it prevents the law of basic interests from being distracted by side issues.

That does not mean that the individuals cannot exercise "legal possibilities" over water. The nature of water does not allow physically rigid phenomena of exclusion of individuals. The problem is to set limits on the non regulated intervention of individuals to avoid damage to primary public interests.

In short, the public ownership of water is one of the instruments available to the public authorities. Changes in the basic definition of this kind of property that cannot be compared to other forms of ownership are derived from a different water policy.

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[157] ***1997,*** **DE HAAN*****, Balancing Free Trade***, pp.246 *et seq.*

[158] **1997, DE WAART, *Securing Access***, pp.106 *et seq.*

[159] **1992, UN Rio Conference, *Agenda 21 – Chapter 18***, par.18.16.

«A prerequisite for the sustainable management of water as a scarce vulnerable resource is the obligation to acknowledge in all planning and development its full costs. Planning considerations should reflect benefits investment, environmental protection and operation costs, as well as the opportunity costs reflecting the most valuable alternative use of water.»

[160] **1997, UNCSD, *Comprehensive Assessment*,** par.118.

«The cost of using or misusing water does not disappear, but is paid either by the user or by the community at large or through a depletion of the existing natural capital.»

c) Public regulation and free market

It is interesting to note that while privatization is spreading throughout many economic sectors, the trend in the water sector is partially, but significantly, different. While privatization applies to the activities, like water supply services, the good itself is declared public.

In a way, if we set public law against private law, this is not surprising. Private law is utilized to settle conflicts about assertive and selfish petitions, while the purpose of public law is to guarantee a community's cohabitation and happiness. As the scarcity of the resources calls for unitary needs and social choices, instead of individual choices, the new role of public law, both domestic and international, is inevitable.

The fourth principle of the Dublin Statement declares that water has an economic value in all its competing uses and should be recognized as an economic good. From this principle, and particularly from the relationship with the social value of water, is inferred the relevance and the functionality of economic profiles in order to ensure both a sustainable exploitation and a conservation of the resource[161].

On the one hand the economic value balances the social value, contributing to defining the concept of resource. Freshwater is not a mere commodity, but it can not be defined as a mere social right. On the other hand, the economic value aims at promoting water saving and recycling policies. The necessary hierarchy among competing uses must be built considering both life and environmental issues, but also economic-effective assessments.

Market and non-market instruments are bound to be complementary in the water sector[162].

2.3.4. Power allocation principles

a) Subsidiarity

Some principles concern power allocation. The first principle is subsidiarity, according to which decision-making must be located at the lowest appropriate level[163]. In fact, power allocation is nothing but a fundamental principle about organization. Since water is a finite renewable resource, essential for life and development, and indifferent to political boundaries, power allocation is probably the most questionable issue, both at an international level and at a domestic level.

The subsidiarity principle is the fundamental guideline, but the concept of lowest appropriate level must be filled up so that it will not be just an empty box. In these terms, the power

[161] **1992, The Dublin Statement, *Guiding Principle*,** n.4.

[162] **1998, UNCSD Report, *Strategic Approaches*,** par.23.

«An integrated approach to the efficient and equitable development and allocation of water resources requires the use of economic and regulatory instruments designed to maximize social net benefits. The use of market and non-market instruments to allocate water resources has received much attention in recent years. Although administrative solutions and the rigorous application of laws and regulations are more commonly used to allocate water, market mechanisms are increasingly being introduced. The pricing of bulk and retail water at somewhere near the long-term marginal cost is becoming inevitable as subsidies become unrealistic or are no longer found to be acceptable. Nevertheless, in setting up tariffs, there is a need to accommodate those sectors of the population that cannot afford minimum levels of services. Pollution charges send economic signals to users, encouraging wastewater treatment and reuse. Informal markets in both bulk water and water services are used by many rural economies in which transactions between neighbouring farmers and transient demands and supplies (agro-pastoral communities, for example) are arranged. Such markets occur in an unstructured way and can involve a degree of self-regulation, particularly in semi-arid zones with long dry seasons. In some circumstances, informal groundwater markets are proving unsustainable as farmers seek to maximize agricultural output in the short run. Formal market mechanisms have been used under special circumstances in which infrastructure and regulation allow the marketing of user rights and where the sectoral competition is severe»

[163] **1997, UNCSD, *Comprehensive Assessment*,** par.21.

«In making decisions about water resources management it is important to have overall planning and coordination, but it is also helpful to delegate as much responsibility as possible to the lowest appropriate levels.»

distribution requires a previous ascertainment of the legal powers that can be exerted in the water sector.

At an international level, power must be distributed among worldwide organizations, regional organizations, and countries. Then countries must decide how to distribute powers within the domestic borders among states, regions, provinces, and local bodies.

Subsidiarity, with its delegation holding as much responsibility as possible, contributes to a wider participation of users and consumers in water policies. Administrations and public bodies in charge of water management are expected to decentralize their actions and promote partnerships[164] that enable a real participation of local authorities and users' representatives in the decision-making process[165].

As far as power allocation is concerned, subsidiarity should therefore be considered the cornerstone, however with a few adjustments. If it is true that subsidiarity means to locate the power at the lowest possible level, it is also true that the level must be appropriated.

Dealing with increasingly scarce worldwide water resources means that the lowest appropriate level can be often quite high. That is why international organizations intervene more and more often in the water sector. That is why fundamental choices are to be taken at a high level. So, if it is desirable that bureaucracy takes a step backward, it is not as much desirable that decision-making processes take place exclusively at the lowest level.

In addition, subsidiarity has another meaning, related to the public-private dialectic: public powers must intervene, but their intervention must be as minor and unintrusive as possible. The role of the legislator and of the public administration is crucial both in an active sense and in an inactive sense.

The uncertainty of power allocation affects decision-making processes, leading not only to conflicts but also to inactivity. There are many levels of the government that should be involved. At an international level, there are worldwide organizations and regional organizations. At a country level, States, Regions, and municipalities are naturally involved.

b) River basin principle

The second principle is the river basin principle, according to which the decision-making territorial partitions should not be the traditional political ones, but the hydrological ones. Both internationally and domestically, the subsidiarity principle must be matched with the river basin principle[166]. The effectiveness of rules and regulations can not do without a consideration of the problems related to the natural, and not the political, boundaries[167].

The river basin[168] is the most suitable area for securing efficient water management, water protection, and water supply[169]. The main decisions must be taken at that level, to administer the water cycle as a whole, and to share the resource[170]. Not only is the river basin a basic hydrologic concept, but it also becomes a basic administrative partition.

The trend is to entrust most powers to specialized independent bodies, whose territories coincide with the river basin. Nevertheless, public bodies with general interests must intervene to

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[164] **1998, UNCSD Report, *Strategic Approaches – Addendum*,** par.32.

«The establishment of an enabling environment should be promoted, with specific mechanisms that facilitate partnerships between public, private and community organizations, local authorities, non-governmental organizations and all public and private actors.»

[165] **1998, Paris Conference, Experts' Workshop: *Regulatory Tools*,** par.II.2.3.

[166] **1998, Paris Conference, *General Considerations*,** par.7**.**

«The large watersheds or aquifers are the natural and relevant geographic units to organize such a sustainable water management».

[167] **1997, BOURNE, *International Water***, pp.3 *et seq.*

[168] **1967, TECLAFF, *The River Basin***, pp. 7 *et seq.*

[169] **1998, UNCSD Report, *Strategic Approaches – Addendum*,** par.16.

«Fundamental to this process is the concept of an integrated approach to the planning, allocation, development and management of freshwater resources at the level of river basins and aquifers. The basic management unit should be designated in such policies as river basins and aquifer units.»

[170] **1985, TECLAFF, *Water* Law**, pp.424 *et seq.*

coordinate the basic choices with other policies such as economic policy, town planning, energy policy and others.

The main task of the legislator becomes the organization of the relation between river basin agencies and traditional public bodies and to guarantee as much independence as possible to such agencies' compatibly with primary public interests protected by the public authorities.

In addition, as effective management needs that land uses and water uses are coordinated, catchment area or groundwater aquifer are the natural bases of comprehensive policies.

Moreover, the river basin should be the geographical unit for water monitoring, data gathering and analysis. The problem is that not only are strict hydrologic data required, but also complex socio-economic data are required.

c) Participation of users

Active participation of different parties is also relevant[171]. Government should not be the provider of water services, but the provider of an institutional framework[172] in which communities, consumers, users, private organizations, local authorities and non-governmental public organizations can act according to their different roles[173]. In particular, the integration of population in the decision-making process and in the local water management is a target to be pursued[174].

Participation is based on information[175] that is both data networks for experts and decision-makers and information networks for consumers and users. Knowing the problems, the priorities, the options and the difficulties means making people aware of the situation and facilitating cooperation among them.

Apart from information, that is a one-way process, public administration must look for dialogue with users, that is a two-way process, in which users' comments are taken into account[176].

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[171] **1992, Second International Water Tribunal, *Declaration of Amsterdam***.

Article 2, par.2:"Each individual human being, collectivity and entity which has an interest in a water resource has the right to effective participation in decision making processes concerning activities that may in any way effect that water resource".

[172] **1998, UNCSD Report, *Strategic Approaches – Addendum*,** par.31.

«The role of government needs to be clearly defined, with a distinction between the functions of standard and regulation setting and control, on the one hand, and the direct management and provision of services on the other, as well as between the role of government at all levels and that of the private sector and other stakeholders.»

[173] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.19.

«Particular emphasis has to be placed on the introduction of public participatory techniques, including enhancement of the role of women, youth, indigenous people and local communities. Skills related to various water management functions have to be developed by municipal government and water authorities, as well as in the private sector, local/national non-governmental organizations, cooperatives, corporations and other water-user groups. Education of the public regarding the importance of water and its proper management is also needed».

[174] **1999, Academie de l'Eau, *Water Charter*.**

The Water Academy (Academie de l'Eau), with the support of the World Bank, is setting up a Social Charter of Water, which aims at promoting the active and direct participation of the local populations in water decision-making process. The starting recommendations of The Social Charter of Water are the following: 1. to identify the different local interlocutors to be integrated from the beginning of the project; 2. to assess the evaluation of local population requests; 3. to set up procedures of dialogue and negotiation with the local population and its representatives; 4. to define and set up, with the local population and their representatives, the content and the mode of their participation; 5. to utilize any realization of an adapted education and information policy; 6. to assess the appropriateness between requests and supplies of local population and their representatives; 7. to increase investments to allow for all these actions.

[175] **1992, Second International Water Tribunal, *Declaration of Amsterdam***.

Article 4 :"Each individual human being, collectivity and entity has the right to be informed adequately of an activity that may affect its fundamentals rights protected by this Declaration".

[176] **1998, INBO Workshop*, User's Participation*,** par.VI

The second principle of the Dublin Statement declares that water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels. From this principle, and particularly from the need of widespread awareness of the importance of water, is inferred the necessity that decisions are taken at the lowest appropriate level, with full public consultation and involvement of users in the planning and in the implementation of water projects[177].

The participatory approach has another relevant value. Especially in developed countries shifting from an unstressed to a stressed situation, water policies are often unpopular, as they intervene in limiting and raising the prices of water uses. Therefore relevant choices are often delayed, as policy-makers are unwilling to face unpopularity.

Participation, that involves information, means allowing users to see from the inside the real issues, to understand the policy grounds and to contribute to the decision-making process, assuming partial responsibility.

Within the participatory approach a relevant role is reserved for women.

The third principle of the Dublin Statement affirms that women play a central part in the provision, management and safeguarding of water. From this principle, and particularly from the past institutional underrating of women's role, is inferred the opportunity that new policies and decision making processes taking women's needs and capacity into consideration[178].

The women's role is the core of the diffused participation approach[179], as women are often those who manage the basic cells of human society, and who convey values between generations. Moreover, being that women are the main providers for household uses in developing countries, they are distracted from other productive activities.

[177] **1992, The Dublin Statement, *Guiding Principle*,** n.2.
[178] **1992, The Dublin Statement, *Guiding principle,*** n.3.
[179] **1992, UN Rio Conference, *Agenda 21 – Chapter 18*,** par.18.19.

PART THREE – OVERVIEW: THE ITALIAN CASE

3.1. THE ITALIAN CASE: THE FRAMEWORK

3.1.1. International principles

The first thing a water code should provide is principles. The first set of principles should stem from ethical principles. Ethical legal principles might have neither direct nor immediate impact on practical matters. Nevertheless, they would form the aggregating element of the new branch on different levels.

One level is about rules: a branch of law can be considered coherent if it has not only a fixed and determined object, but also common basic regulations, which represent a constant term of comparison for interpretation of the specific regulations. In addition, definitions are needed, in order to provide a common language.

Another level is about countries: the parties of the international community should share a common ground of rules. It does not make a difference how extensive the rules are at the beginning. Political, social, legal, meteorological, hydrological differences among countries are a fact. Different problems among countries and needs of countries are a fact. But if the mutual interest is to prevent people's death, wasting of resources and underdevelopment, countries need to establish a set of guiding, if not binding, principles.

International water conferences, summits and meetings have already provided a satisfactory framework of principles, directing water initiatives towards the goals of equity and sustainability[180].

So far, international law has affected water issues mainly through treaties and international customs. International law lacks compulsory jurisdiction and centralized enforcement and, apart from offering general principles[181], relies mainly on self-help[182].

Treaty-based rules are easier to ascertain than norms of customary international law. Apart from interpretation of issues, treatises provide a fragmentary framework: there are plenty of water related agreements, some of them date from centuries ago, and they are generally linked to specific watercourses, involving often just two parties[183].

Nevertheless, at least one general principle has been pointed out, that is the principle of equitable utilization[184] on a drainage basin basis[185], according to which the objective of the

[180] **1998, UNCSD Report, *Strategic Approaches*,** par.20.

[181] **1994, KLIOT, *Water Resources***, pp. 4 *et seq.*

[182] **1997, JONES, *Global Hydrology*,** pp.326 *et seq.*

«International law merely offers four principles that fall rather short of being mutually supportive, and there is no effective mechanism for resolving the conflicts that can arise: 1. The principle of Absolute Territorial Sovereignty or the Harmon Doctrine proclaims that states have unlimited rights to use the resources within their territory, and therefore provides an argument that favors upstream users. In contrast, 2. The Principle of Absolute Territorial Integrity holds that no state may use its resources to the detriment of a downstream state. This is supported and extended by 3. The principle of Condominium or common jurisdiction holds that the rights of a State are strictly limited and that prior consent from other interested states is needed before water resource developments can take place. This is fundamental to Integrated Drainage Basin Development. The most commonly invoked principle falls slightly short of requiring mutual agreement. This is: 4. The principle of Equitable Utilization or Limited Territorial Sovereignty, which holds those developments are permissible if they do not harm the resources of a neighbor. The principle was established by the International Law Commission in 1966 and forms the core of the Helsinki rules on the use of water in international rivers. It supports a reasonable and equitable sharing of resources».

[183] **1993, MCCAFFREY, *Water, Politics,*** pp.97 *et seq.*

[184] **1967, LIPPER, *Equitable Utilization*,** pp.15 *et seq.*

[185] **1977, SCHACTER, *Sharing***, p.65.

agreements appears to be «the apportionment of the uses and benefits of the watercourse in question in an equitable manner»[186].

In these terms, international principles over water have commonly been perceived as general, non-binding declarations. What is really needed is the implementation of these principles in the regional agreements and in the national legal systems[187]. That requires, on one hand, a coordination of the different statements that come up during international meetings, and, on the other hand, a transformation of these general principles into more strict directives, followed by national legislators.

The principle of equitable utilization, which is the core of the law relating to the uses of international watercourses[188], naturally entails other principles, which can be infused into basic national regulations.

The first principle is solidarity, which implies that water, as a natural resource as it is, must be shared at all levels, and it must not be used as a means of political, social or economic abuse.

The second principle is rationality, as water resources cannot afford to be wasted. Water saving and water recycling are nothing but consequences of the implementation of this general principle. In the same way, the integration among experts of different fields and different countries is another corollary of this general principle.

The third principle is subsidiarity, as equitable and rational utilization of water resources requires a defined institutional framework, in which every level is involved in a coordinated way.

The fourth principle is participation, which implies information, as every category of parties involved, citizens, users, industry, providers, farmers, public bodies should have the possibility to understand the water issues, to represent their point of view and to be involved in the decision-making process.

Besides, the principle of equitable utilization[189] requires some criteria[190] to be applied when the water supply is inadequate: consideration of the past utilization of waters of the basin; economic and social needs of each community; dependence of the population upon the waters of the basin; comparative costs of alternative means of satisfying the different needs; availability of other resources, avoidance of unnecessary waste; compensation as a means of adjusting conflicts among uses, environmental consequences[191].

3.1.2. International code and national code

If a water code could represent the solution to water problems under a legal point of view, the first thing to do is to define what the legal framework should be. Having a water code does not entail that a single water code must apply to every country. The differences in demand and supply, needs, problems, legal systems, political systems, weather, and social conditions make any one code unsuitable to all the countries[192].

Not every country is experiencing water problems. Nor is every person affected the same way from water problems. Some statistics and theories demonstrate that water issues will not become a real problem for many countries. Other statistics show that even if pollution were eliminated, many countries would face serious water problems, especially if they insist on being

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"It is neither fair nor sensible to apply international standards of equitable use only to a part of the interconnected waters of an international drainage basin".

[186] **1993, MCCAFFREY, *Water, Politics,*** pp.98 *et seq.*

[187] **1999, CORREJA, DA SILVA, *International Framework***, pp.90 *et seq.*

[188] **1997, KROES, The Protection of International**, pp.83 *et seq.*

[189] **1966, International Law Association, *Helsinki Rules***.

Article IV: "Each basin State is entitled to a reasonable and equitable share in the beneficial uses of an international drainage basin".

[190] **1977, SCHACTER, *Sharing***, p.67 *et seq.*

[191] **1966, International Law Association, *Helsinki Rules***.

Article V, par.2.

[192] **1980, CAPONERA, The Law of International**, pp.13 *et seq.*

self-sufficient in food production. Water is a vital concern in dry zones, overpopulated regions, and overexploited areas. On the other hand, developed countries, or at least part of them, are already experiencing water stress, which affects, or will affect, their welfare.

Water stress can be defined and measured by the relationship between water withdrawal and water availability. It has been observed that water stress begins once the use of freshwater rises above 10% of renewable freshwater resources.

According to this criterion, countries have been distinguished by four categories: low water stress countries (which do not experience major water stresses); moderate water stress countries (for which water scarcity is likely to become a limiting factor); medium-high water stress countries (in which sustainable development is placed in jeopardy); and high water stress countries (which face serious scarcity and use water in a non renewable pattern).

Each group of countries has its own different goals. Low water stress countries must just be concerned with the quality of their freshwater. Moderate water stress countries aim at increasing supply and reducing demand. Medium-high water stress countries require a rational management of water, resolving competing human uses and ensuring adequate water flows for aquatic ecosystems. High water stress countries need emergency action in order to guarantee economic growth if not life itself[193].

Obviously, the capacity to respond to water stress varies, depending on several factors. One of the main factors is income level. The richer a country is the better it can deal with water stress.

In any case, apart from considerations based on countries and their different concerns, chances are that in the not so distant future most population of the world will have to deal with water problems.

There are a large number of international treaties and conventions[194] on water, even if, so far, there have been many controversies[195], but just few conflicts over it. International agreements reflect international custom, as evidence of a general practice accepted by law. During situations of crises, the acceptance of general principles is less likely, and the binding less strong. If prompt action is not taken, it means that the situation will rapidly get worse and worse[196].

The water code should be considered under a different perspective. Given different levels of decision-making power (international, regional, national, and local), the main target is to locate, under both the subsidiarity and the reasonableness principles, what can be, or should be, decided at each level. On the one hand every situation could be studied, and regulated, at the most effective level, without imposed solutions from higher levels. On the other hand, every country will share general principles and common settings.

In a domestic and traditional sense, «water code» is that piece of legislation which collects, checks, revises and coordinates the legislation affecting water[197]. Therefore, the domestic «water code» will provide a single legal reference to public and private parties, with clear advantages, like availability of legal information, certainty of the applicable law, and coordination[198].

In an international and original sense, a «water code» could be the symbol of a new legal approach to water. It should provide general principles and power allocations, that is the natural framework for substantial discipline[199]. Logically enough, the point is that the «international» water code should precede the «domestic» water code. Following this pattern, chances are that water

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[193] **1997, UNCSD, *Comprehensive Assessment*,** par.71.

[194] **1998, UTTON, *International Waters***, pp.7 *et seq.*, which reports a number of examples.

[195] **1993, MCCAFFREY, *Water, Politics,*** pp.92 *et seq.*

It provides a list of the most relevant dispute areas, including the Middle East (Jordan, Tigris-Euphrates, Nile), the Asian subcontinent (Indus, Ganges), North America (Great Lakes, Columbia River, Rio Grande, Colorado), South America (Parana River).

[196] **1997, DONKERS, *Fresh Water***, pp.136 *et seq.*

[197] **1997 UN ECAFE, *Guidelines***, pp.1 *et seq.*

[198] **1997 UN ECAFE, *Water Legislation***, pp.161 *et seq.*

[199] **1977, SCHACTER, *Sharing***, p.74.

"The idea of a code underlines the value of general normative principles expressed as law, or even as proposed law, in providing a coherent and balanced framework for practical cooperation"

law will achieve it's objective, anticipate change, hopefully for the better, and not solely respond to emergency situations.

So far, an international water code does not exist, but international water related principles have been asserted in the Dublin Statement.

The first principle is that fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment. It requires a holistic approach, which links social and economic development on the one hand, and land use and water use on the other hand. The Italian system has acknowledged the principle that water is a finite resource, and has tried to connect land use and water use, but is still far from being a holistic approach.

The second principle calls for a participatory approach, involving users, planners and policy-makers at all levels. On the public side, it requires that decisions must be taken at the lowest appropriate level. On the private side, it involves full awareness of the importance of water and full involvement of users in the planning and in the implementation of water projects. While efforts are being made in order to allocate the different actions at the lowest appropriate level through the subsidiarity principle, the participation of users is still an occasional phenomenon in the Italian system.

The third principle states the importance of the women's role in the provision, management and safeguarding of water. It requires a deeper participation of women in the water-related actions and policies. The Italian system does not account for that.

The fourth principle declares that water has an economic value and should be recognized as an economic good. On the one hand it takes for granted the right of people to have access to water for basic needs at an affordable price. On the other hand, the economic evaluations are needed in order to ensure efficiency, avoid waste, and encourage protection of water resources. The economic value of water has been recognized recently in the Italian system, through the adoption of tariffs in water services and fees for water permits.

3.1.3. The Italian case: public interests

Water law should deal with every issue and every interest involving water as the main actor: defense of the population from natural disasters attributed to water, supply of water for drinking and sanitation, protection of watercourses from pollution, and exploitation of water resources. Water law should therefore come into contact with a number of other branches of law, carving out a wide niche for itself.

Public interests affecting water resources can be divided into three main groups. The first is the defence of territory and civilian protection from flooding; the second is the use of water in the different ways; the third is the protection of the quality and quantity of water resources.

The importance of these interests emerged in the legal world over a period of time, and the interests themselves became the substantial objects of the legal discipline.

Civilian protection from flooding came first. With the industrial development process and the needs of agriculture, water emerged as a means of production and was followed by public interest in the exploitation of water resources. At this stage water acquired the status of a commodity in a legal and economic sense and the need arose to define rules about the ownership of water and the rights that can ensue. When water pollution and shortage of water resources become severe, protection becomes a matter of urgency.

The subject matter and instruments of water law differ according to the kind of public interest. The rules enacted to provide protection from floodwater are aimed at carrying out hydraulic works or, in any case, prevention. The rules governing the exploitation of water resources regulate the relations between private individuals and public administration, as well as the water supply. The rules protecting water resources include a set of prohibitions, limits and controls. The rules regulating ownership consider water as a commodity. Other rules relate to organisation and planning, which are functional to the legislative discipline.

Besides the complex array of legislation, water also has a complex legal status. Water is a natural element, part of our environmental heritage, a public commodity, a means of production, and a social and vital resource. That complexity reflects the variety of relations between water and the legal system and between water and public and private interests.

3.1.4. The Italian case: physical problems and political problems

Italy is affected both by physical and political problems. To a great extent the latter have been the cause of the former.

As a developed, traditionally agricultural and populated country, Italy has been suffering from heavy water withdrawals, and it is one of the European countries with the highest withdrawals.

Water scarcity is not a vital problem, but in certain regions the situation is rather concerning. People's dignity and sanitation needs are, especially during the summer months, put in jeopardy by the lack of running water in specific times of the day.

At the same time, water is wasted, due to leaking in supply facilities, agricultural misuse and lack of awareness of the water value by the population. Over time the management and utilization pattern in Italy has become unsustainable.

Water quality problems, dating from an earlier time, add to quantity problems. Both freshwater and groundwater have been subjected to pollution stress, by point and non-point sources.

Moreover Italy is affected by other environmental problems, the most concerning being landslides and mudslides. In addition, aggressive town planning, lacks of protection of natural barriers, and controversial land management practices have lead to a chronic dangerous situation in some areas of the country. In other areas, intensive drainage has caused subsidence, a phenomenon hard to reverse.

Furthermore, ecosystems have not been conserved and biodiversity has been distorted in many natural streams due to excessive exploitation.

In some fashion, all these problems have been exacerbated, by cultural faults. There is a lack of a water culture, there is a lack of attention to water related problems, and there is a lack of awareness to the value of the resource and to the seriousness of the situation.

Water is not perceived as a relevant issue under a political point of view. Citizens consider water as a social good and as an infinite resource, which must be made available at a very low price. Wasteful behavior is common and accepted, and the water tariff policy has not been able to support investments in the water sector.

The relation between central administration and local bodies on one side and the citizens on the other side suffers from the government's blackmail of the voters. Low water tariffs demonstrate how the use, and the waste, of water have been embedded in a distorted notion of a welfare state.

Under a strictly political point of view, Italy suffers from legislative and institutional fragmentation, which reflects itself on a muddled and inefficient power allocation. In addition, there is no attempt to integrate different fields of expertise and different areas of interventions.

3.1.5. The Italian case: traditional approach

Even if water related issues are increasingly seen as relevant and pressing in Italy, the current approach to water law suffers dearly from the traditional approach to water regulations.

The uncoordinated overlapping among rules and among public bodies, the uncertainty of the legal status of water, the poor integration among experts, and the unsatisfactory users' participation and access to information are the main effects of an unsustainable policy regarding water resources.

There is no water law, no water ethic and no water culture in Italy, but a sum of regulations enacted to face emergency situations (diffused pollution, regional scarcity, natural disasters) exists. Water is still taken for granted, mistaking the right to a reasonable quantity of water for the right to waste water.

Moreover, there is a shortsighted mechanism for dealing with water legal issues, in a fragmented way, neglecting the irrepressible links between quantity, quality and exploitation issues.

Water law does not exist, as there are just a number of laws devoted to specific aspects. That means that principles are scattered in different pieces of legislation, and that the structure of water related regulations is not definable but as a sum of sectional rules.

There is no effort to reconstruct (or construct) water law. Recent rationalizing attempts are still devoted to single aspects: watershed protection, water services, and pollution. In every piece of legislation different aspects are embedded, as it is not possible to exclude them, but there is no will to try and put it all together.

The Italian legal system does not have a water code. Nor does it contain a piece of legislation devoted to gather and coordinate water law regulations. There are, however, many pieces of legislation that deal with water issues. Among them, there are four that share a sort of general character and that, if integrated, could form a water code.

The first law is the R. D. 11 December 1933, n.1775, which deals with the exploitation of surface and underground waters and with jurisdictional matters. It is a dated law, repeatedly amended, which contains no rules about environmental concerns and management needs. Water permits were not embedded in a more general framework, which caused drawbacks when exploitation needs increased and changed due to technological development.

The second law is the L. 18 May 1989, n.183, which deals with the protection of the watershed and the water resources, the safeguarding of the water heritage, and the uses and the management of water. It tries to set a coordinated system involving watershed protection and water resources management and it introduces the river basin principles, but it is still a sectional law with a partially undefined object.

The third law is the L. 5 January 1994, n.36, which deals with water services, water uses and water management, but which contains general principles as well. It attempts to promote efficiency through the Integrated Water Service, which includes supply, sewerage and purification services.

The fourth law is the D. Lgs. 11 May 1999, n.152, which deals with the protection of water resources from pollution, implementing European Union directives. During preliminary proceedings it has been called, incorrectly, a code about water. In effect, it merges different regulations about the environmental aspects related to water, but it is just one of the four pillars of water law in Italy.

These four laws, and the other more particular ones that must be added, cover the legal water issues, but without real coordination. Each of them has a respective declared objective, but, not surprisingly, each of them tends to widen its own area. All of them intervene on the same object, and because issues are so intertwined it would have been impossible to divide the discipline into watertight compartments. Protection of water resources is no separate matter from utilization of the same water resources. In fact, management of water includes water services, and so on.

In these terms, overlapping of rules and contradictions occur. A water code might have the opportunity to solve these legal problems and contain a coherent set of regulations. The four laws cited might be merged into a single code, which would represent the legal framework for addressing water law matters.

As far as the Italian legal system is concerned, there is no holistic approach and no integrated decision-making process, with too many public bodies involved, too many statutes overlapping and too many plans adopted sector by sector without coordination.

Each Italian general statute regarding water sets up a new committee, in which every public authority wants to be represented. Specialized and technical bodies are overly linked with political authorities, whereas there is no direct participation of citizens and consumers. Each statute provides for new plans, which lack of feasibility means to delay the actions to be taken, just easing public authorities' consciences.

In Italy water is too cheap, which allows the waste of resources. If it is true that water is a social good as well, the low price should be only related to the social use. If no elected politician or policy-maker raises its price, as a whole, there could be a high differentiation in the tariffs, according to the quantity used: low tariffs for the quantity corresponding to an average social use, much higher tariffs for the quantity in excess.

The point is that water use is thought to be a social right in Italy, which means it must be cheap. Because it is a social right easy and non-expensive access to water for basic needs must be guaranteed. Besides, it is hard to convince people they have to pay much more for water, in a country that has one of the highest taxes in Europe. Italian citizens and consumers should understand that the social right, associated with water use, must have strict limits (drinking, hygiene), but it can not be extended to every use.

Better information regarding water related problems and issues should be provided. In addition, disseminating a "water culture" and "water ethics", on the one hand, and, on the other hand, allowing, participation and solidarity should also take place.

The water management situation must be improved as well. Water and wastewater services are highly unsatisfactory and economically inefficient, mainly due to a high fragmentation of the providers. Shortages in drinking water supply in certain areas are common and the whole network suffers from leakage. Increasing the efficiency in the water related services is one of the main goals.

3.1.6. The Italian case: water law between national and EU regulations

The European Community legislator addresses water law from a more limited point of view as compared to national legislation. The main object of its interest is the protection of water resources. The EC has enacted several directives, even before the Single European Act and the Maastricht Treaty legitimised a specific environmental policy.

The need for environmental protection has assumed a dual role. On the one hand, it represents a general limitation to other European Community policies. On the other hand, it is the object of a specific policy. Both are equally important.

Apart from the environmental directives, the EC has also adopted environmental action programs that have followed one another since 1973. Whereas the first program did not deal specifically with water resources, the latter have contained specific provisions.

The European Community water policy does not only aim to reduce river pollution, but deals with the managerial aspect. The strengthening of the needs for planning and control by the EC stems from various factors: growth of the economy, urbanisation, and deterioration of the available natural resources. In particular, water planning and water management must consider economic, social and environmental aspects as a whole besides dealing with specific matters such as watercourse regulation, minimum acceptable flow maintenance, and water recycling.

Therefore, many targets exist: rational use of the available resources, larger availability of the potential resources, protection of all the waters, especially the good quality ones, constant comparison between the available water resources and the predictable water requirements, creation of an effective information system. On the one hand the EC is concerned with the sound functioning of the common market. On the other hand, there is the awareness that environmental resources are both the basis and the limit for further economic and social development.

Most recent action programs extend the sphere of applicability by widening the responsibilities of the civil service, public and private companies, users and the general population. Sustainable development is the new legal principle of evaluation in order to verify the compatibility between potentially conflicting basic European Community interests.

Whereas the environmental action programs are general, the EC directives refer to different sectors. They have been enacted with reference to the function of water resources or with

reference to the kind of pollution. They intervene on drinking water[200], bathing water[201], dangerous substances discharges[202], groundwater protection[203], human consumption[204], urban wastewater treatment[205], pollution from agricultural sources[206], fish waters[207], shellfish waters[208]. Moreover there are directives providing technical support[209].

EC directives often contain similar, not to mention repetitive, provisions, and they are very technical. They need to be constantly updated with reference to new problems and to new scientific knowledge.

Furthermore, each of them contains specific rules preventing Member States with stronger environmental safeguards from being undermined. On the one hand, directives proclaim that their enforcement must not bring about a worsening of the environmental situation. On the other hand, Member States, individually or jointly, are allowed to adopt stricter measures as compared to those provided by European Community law.

In the environmental arena, European Community law represents a partially binding minimum guarantee. The Member States are allowed to set stricter standards in particular cases. Environmental protection becomes the main issue, while the guarantee of competition becomes less important. In fact, enterprises operating in those states more aware of environmental protection may be disadvantaged by the stricter policy of their country. The economic basis of the European Community environmental policy, that is the protection of competition, becomes weaker when the EC is expressly endowed with its own environmental policy. The economic profile is subordinate to the environmental profile.

The point is that the European Community and national legislators must provide the public administration with legal criteria. Any water policy needs suitable legal instruments. That requires

[200] Council Directive 75/440/EEC of 16 June 1975 concerning the quality required of surface water intended for the abstraction of drinking water in the Member States; Council Directive 79/869/EEC of 9 October 1979 concerning the methods of measurement and frequencies of sampling and analysis of surface water intended for the abstraction of drinking water in the Member States.

[201] Council Directive 76/160/EEC of 8 December 1975 concerning the quality of bathing water.

[202] Council Directive 76/464/EEC of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community; Council Directive 82/176/EEC of 22 March 1982 on limit values and quality objectives for mercury discharges by the chlor-alkali electrolysis industry; Council Directive 83/513/EEC of 26 September 1983 on limit values and quality objectives for cadmium discharges; Council Directive 84/156/EEC of 8 March 1984 on limit values and quality objectives for mercury discharges by sectors other than the chlor-alkali electrolysis industry; Council Directive 84/491/EEC of 9 October 1984 on limit values and quality objectives for discharges of hexachlorocyclohexane; Council Directive 86/280/EEC of 12 June 1986 on limit values and quality objectives for discharges of certain dangerous substances included in List I of the Annex to Directive 76/464/EEC; Council Directive 88/347/EEC of 16 June 1988 amending Annex II to Directive 86/280/EEC on limit values and quality objectives for discharges of certain dangerous substances included in List I of the Annex to Directive 76/464/EEC; Council Directive 90/415/EEC of 27 July 1990 amending Annex II to Directive 86/280/EEC on limit values and quality objectives for discharges of certain dangerous substances included in list I of the Annex to Directive 76/464/EEC.

[203] Council Directive 80/68/EEC of 17 December 1979 on the protection of groundwater against pollution caused by certain dangerous substances.

[204] Council Directive 80/778/EEC of 15 July 1980 relating to the quality of water intended for human consumption; Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption.

[205] Council Directive 91/271/EEC of 21 May 1991 concerning urban wastewater treatment; Commission Directive 98/15/EC of 27 February 1998 amending Council Directive 91/271/EEC with respect to certain requirements established in Annex I thereof.

[206] Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources

[207] Council Directive 78/659/EEC of 18 July 1978 on the quality of fresh waters needing protection or improvement in order to support fish life.

[208] Council Directive 79/923/EEC of 30 October 1979 on the quality required of shellfish waters

[209] Council Directive 91/692/EEC of 23 December 1991 standardizing and rationalizing reports on the implementation of certain Directives relating to the environment.

knowledge of the situation, an estimate of future demand, planning, coordination of the various public bodies involved, and the location of the optimal operating area.

This rational arrangement must hold the different stages of water policy in due consideration. With reference to the single stage the relations between public bodies change. The more technical and the more specific the function, the more specialised administrative bodies are endowed with responsibilities.

3.1.7. The Italian case: priorities

Recovery efficiency is Italy's first priority in the water sector. Certainly, there are relevant short-term actions to be taken, such as protection from natural disasters and water supply scarcity in certain areas. However, what Italy is really missing is the rationalization of the legislative and institutional framework and the improvement of the management of the resource.

Fewer but coordinated pieces of legislation, fewer, but more powerful, bodies, fewer but more integrated plans are some of the actions to be taken.

Moreover, better communication and a more cognizant relation between administration and users should be promoted, in order to allow for the regulations, and the water prices, to be understood and accepted. Cultural priorities have been so far neglected for their long-term effects, but information, participation and solidarity can have short-term effects as well.

In these terms, other important priorities, like protection of water resources and the ecosystems, the safeguarding of water quantity, and environmental recovery, can not be really pursued until substantial changes are made under the institutional and cultural point of view. In the same way, technological priorities are more likely to be set in a solid and coherent institutional and legal framework.

Understanding the value and the limitation of the resource is the basis for sustainable development. Promoting an efficient management of water resources is the necessary means to reduce waste, allocate resources rationally and limit negative effects on development.

Recently, Italian law recognized that water is a resource that must be safeguarded for future generations. Such a principle is inconsistent with the principle that water resources are a private property, and therefore it was clearly stated that all waters are public. Even before this statement, water ownership was not the main aspect of water discipline. Regulatory powers, community's accessibility to the water resources, use and protection of freshwater were the relevant issues in the legislative arena.

Stating the public ownership of waters does not mean that they are not a commodity, but simply that they are a peculiar type of commodity, with a strong functional role reserved to public powers. The coordination between public regulation and free market starts from the acknowledgement that what is traded is not water itself, but water services.

The principle of subsidiarity, stated at a general level, has not yet been completely coordinated with the river basin principle, which is stated, but not always rationally pursued.

Finally, the participation principle has been just stated incidentally, without really understanding its relevance.

3.2. THE ITALIAN CASE: BASIC CHARACTERS

3.2.1. Object and principles

a) Objects

The objects of water law in Italy coincide with the different objects of the four laws cited: water resources uses and exploitation (R. D. n.1775/1933), watershed protection (L. n.183/1989), water services management (L. n.36/1994), water resources protection (D. Lgs. n.152/1999). The general objects of the legislation concerning water include therefore civil protection issues, environmental issues, quality issues and exploitation issues.

The land and the population must be protected from the destructive action of the water[210], and the purpose of the law is to guarantee the safeguard of human life, of the watershed and of the soil[211].

Water related environmental aspects must receive adequate safeguarding[212]. The purpose of the law is to prevent and reduce water pollution[213], to recover polluted watercourses[214], to improve the state of waters[215], to maintain the self-purifying capacity of watercourses[216], and to maintain the capacity of waterbodies to sustain biodiversity[217]. The purpose of the law is carried out through the identification of environmental quality objectives[218] and through the identification of measures for pollution prevention and reduction in sensitive and vulnerable areas[219].

Surface water, groundwater and coastal water must be protected in relation to their destination and utilization[220]. The purpose of the law is to protect waters assigned to specific uses[221], and it is carried out through the identification of use-related water quality objectives[222], and through the definition of limited values for pollution discharges related to the different uses[223].

Water resources must be used, saved and managed for a rational economic and social development[224]. The purpose of the law is to pursue sustainable and lasting uses, preferably drinking uses[225], to guarantee homogenous conditions of resources utilization and services management[226]. Those who manage or use water resources adopt the measures required to curb waste, to limit consumption and to improve recycle and reuse[227]. The purpose of the law is carried out through the integrated protection of quality and quantity aspects within the river basin[228],

[210] Art.1, par.1, L. n.183/1989
[211] Art.3, par.2, L.183/1989
[212] Art.1, par.1, L. n.183/1989
[213] Art.1, par.1, D.Lgs. n.152/1999
[214] Art.1, par.1, D.Lgs. n.152/1999
[215] Art.1, par.1, D.Lgs. n.152/1999
[216] Art.1, par.1, D.Lgs. n.152/1999
[217] Art.1, par.1, D.Lgs. n.152/1999
[218] Art.1, par.2, D.Lgs. n.152/1999
[219] Art.1, par.2, D.Lgs. n.152/1999
[220] Art.1, par.1, D.Lgs. n.152/1999
[221] Art.1, par.1, D.Lgs. n.152/1999
[222] Art.1, par.2, D.Lgs. n.152/1999
[223] Art.1, par.2, D.Lgs. n.152/1999
[224] Art.1, par.1, L. n.183/1989
[225] Art.1, par.1, D.Lgs. n.152/1999
[226] Art.3, par.2, L.183/1989
[227] Art.1, par.2, D.Lgs. n.152/1999
[228] Art.1, par.2, D.Lgs. n.152/1999

through the adjustment of the sewerage, treatment and purification services[229], through the identification of measures for preservation, saving, reuse and recycle of water resources[230], and through adequate systems of controls and criminal, civil and administrative penalties[231].

b) General principles

As for general principles, each of the four laws cited have their own principles. The principles concern the essence of water, the relationship among uses, the priorities and the organization of the water sector. The more recent they are the more aware they are of the peculiar value of water itself.

Public ownership has been eventually acknowledged as it is clearly stated that all the waters, surface water and groundwater, even if not abstracted from the ground, are public[232]. Public ownership of water resources is in fact a form of community ownership if not a form of sovereignty, different from other types of ownership.

Law strictly determines public powers on water and the relationship between the good and the owner. Ownership is outlined taking into account the protection and the use of the resource: the public owner acts as a functional regulator.

In these terms public ownership is strictly connected with another general principle, that is solidarity. All the waters represent a resource, which must be protected and used in accordance with a principle of solidarity[233].

The definition of water as a resource shows the peculiarity of water itself that can not be treated by the law as an economic good like others. Water is a community resource, which can not be exploited by individuals unless public evaluations and assessment on public interests are made, in order to obtain the highest and widest advantage for the population.

The social and unselfish relevance of water is confirmed by the consideration of the rights of parties who are not, technically, persons having rights or being liable to duties. Any water use must take place safeguarding the legitimate expectations of the succeeding generations to an unspoiled environmental heritage[234]. Law acknowledges rights to people who are not living yet. The unusual pattern followed by the law is another example of the legal peculiarity of water resources.

In the same sense, law recognizes social, environmental and hydrological values, highlighting at the same time the functional role of water. Water uses are directed towards the saving and the renewal of the water resources, in order to safeguard water heritage, environment, agriculture, flora and wildlife, and the hydrological balance[235].

As for hierarchy of uses, human consumption use has priority over other uses of the same watercourse, while other uses are allowed when the resource is sufficient, and providing that they do not damage the quality of the water used for human consumption[236]. During drought times and in any case of water scarcity, when diversions are regulated, agricultural use has priority over other uses, apart from the human consumption use[237].

As for territorial organization, the entire national territory is divided into river basins, which are classified into National River Basins (“Bacini idrografici di rilievo nazionale”), Interregional River Basins (“Bacini idrografici di rilievo interregionale”), and Regional River Basins (“Bacini idrografici di

[229] Art.1, par.2, D.Lgs. n.152/1999
[230] Art.1, par.2, D.Lgs. n.152/1999
[231] Art.1, par.2, D.Lgs. n.152/1999
[232] Art.1, par.1, L. 36/1994
[233] Art.1, par.1, L. 36/1994
[234] Art.1, par.2, L. 36/1994
[235] Art.1, par.3, L. 36/1994
[236] Art.2, par.1, L. 36/1994
[237] Art.28, par.1, L. n.36/1994

rilievo regionale")[238]. The law lists National River Basins[239] and Interregional River Basins[240], while Regional River Basins are the water basins not listed as National or Interregional River Basins[241].

The River Basin Authorities ("Autorità di bacino di rilievo nazionale"), specialized bodies, process and adopt the respective River Basin Plans ("Piani di bacino"), coordinate them with other water related plans and verify and foster their implementation[242].

As for participation of users and information for users, there is no principle that is firmly stated as general. Specific provisions can infer it, but it should have better acknowledgement. The Regions foster the active participation of the interested parties, especially during the elaboration, review and updating of the protection plans[243]. On the other hand, the parties that manage water services provide users with information, foster initiatives for the water culture dissemination and guarantee the access to the water services related data[244].

c) Organizational principles

The public administration takes any relevant cognitive, planning and implementing action in order to pursue the goals of the law[245].

Power allocation follows the organizational principles of recent general reforms of public administration[246], particularly the principle of subsidiarity, applied both at a national and at a European Union level. The principle of subsidiarity has not been effectively linked to the principle of participation, while they are strictly intertwined.

The provisions of the L. n.183/1989, of the L. n.36/1994 and of the D. Lgs. n.152/1999 represent fundamental principles of the State legislation and are to be respected by the Regions in their own legislation[247]. In addition, the provisions of the L. n.183/1989 represent fundamental regulations of economic and social reform[248], which give them additional power on regional legislation.

Alternate powers are reserved to the administration in case of inactivity on behalf of Regions or local bodies, affecting obligations deriving from the European Union, or when serious risks for the health and the environment occur, or when the competent body is not complying with its information duties[249].

Technical provisions are to be adopted and adjourned by government regulations, in order to adapt them to new needs, to scientific and technologic improvements and to European Union legislation[250].

The administration determines the general guidelines on water resources survey, water economy regulations and water protection from pollution; the general methodology for the planning of water resources rational use and for multiple uses of water resources. In addition the adminsitration determines the guidelines regarding: the general criteria for the water transfers for human consumption; the general criteria for the review and updating of the Aqueduct General Regulatory Plan; the technical indicators for the location of water crises risk areas. Lastly, the administration determines the general guidelines to prevent water emergencies; the criteria for the management of the integrated water service; the setting of the lowest water service levels guaranteed; the balancing tariff workings; the schemes for water transfers[251].

[238] Art.13, par.1, L. n.183/1989
[239] Art.14, par.1, L. n.183/1989
[240] Art.15, par.1, L. n.183/1989
[241] Art.16, par.1, L. n.183/1989
[242] Art.12, L. n.183/1989
[243] Art.3, par.9, D.Lgs. n.152/1999
[244] Art.23, par.2, L. n.36/1994
[245] Art.1, par.2, L. n.183/1989
[246] Art.3, par.1, D.Lgs. n.152/1999
[247] Art.1, par.5, L. n.183/1999; art.33, par.1, L. n.36/1994; Art.1, par.3, D.Lgs. n.152/1999.
[248] Art.1, par.3, D.Lgs. n.152/1999
[249] Art.3, par.3, D.Lgs. n.152/1999
[250] Art.3, par.4, 5, D.Lgs. n.152/1999
[251] Art.4, par.1, L. 36/1994

The Cabinet, which has a role of coordination, assents to the deliberations on general methods and criteria referring to cognitive activity and planning; on National River Basin Plans ("Piani di bacino di rilievo nazionale"); on National River Basins and Interregional River Basins definitions; and on National Intervention Plans ("Programmi nazionale di intervento")[252].

While all the Departments must cooperate in the activities in the watershed protection sector[253], State activities concerning soil protection are completed under the responsibility of the Department of Public Works and the Department of the Environment[254].

Other than the traditional public bodies that are set up, specific bodies are set up.

The Watershed Protection General Direction ("Direzione generale della difesa del suolo") provides technical support in the watershed protection sector[255].

The National Technical Services ("Servizi tecnici nazionali") perform the cognitive activity; carry out the Monitoring and Surveillance Unified Informational System and the Integrated National Network ("Sistema informativo unico e rete nazionale integrati di rilevamento e sorveglianza"). They provide, under payment of a fixed tariff, data, counseling and advice to the interested parties[256].

The Water Resources Use Inspection Committee ("Comitato per la vigilanza sull'uso delle risorse idriche") controls the efficiency and the effectiveness of the water services, determining and updating the tariffs instituted and the users' interests[257].

The Water Services Observatory ("Osservatorio dei servizi idrici") collects, process and discloses water services related data[258].

The Regions delimit the Regional River Basins; cooperate in the National River Basin Plans processing; provide proposals on studies and projects; adopt the Regional and Interregional River Basin plans. In addition, the Regions carry out projects and works in the Regional and Interregional River Basins; organize the activities in the Regional and Interregional River Basins; and draw up reports on land use and hydrogeological situation[259].

Local bodies participate in the regional activities in the watershed protection sector[260], have control and monitoring functions and are responsible for the water services supply.

3.2.2. Instruments

a) Data

Cognitive activity, referred to the whole national territory and forming a national network data system, includes collection, processing, filing and disclosure of the data; testing, research and study; theme map formation; and assessment of the action's consequences[261]. The collection criteria o national and regional data regarding surface water and groundwater and their uses, withdrawals and discharges are standardized[262].

Public administrations collecting data about the watershed protection sector must transmit them to the Region concerned and to the National Technical Services[263].

The Regions ensure the widest diffusion and circulation of the information on the quality situation of watercourses, and transmit their data to the Environmental Protection National Agency

[252] Art.4, par.1, L.183/1989
[253] Art.8, L.183/1989
[254] Art.5, par.1, L.183/1989
[255] Art.7, L. n.183/1989
[256] Art.9, L. n.183/1989
[257] Art.21, par.1, L. n.36/1994
[258] Art.22, par.1, L. n.36/1994
[259] Art.10, L. n.183/1989
[260] Art.11, L. n.183/1989
[261] Art.2, par.1, 2, L.183/1989
[262] Art.5-bis, par.1, R.D. n.1775/1933
[263] Art.2, par.3, L.183/1989

("Agenzia nazionale per la protezione dell'ambiente")[264]. The Environmental Protection National Agency processes the data and transmits them to the interested Departments[265].

Plans, research and surveys carried out by public bodies within the watershed protection area are transmitted to the River Basin Authorities[266].

Access to public data networks and data exchange among public administrations is guaranteed, in order to improve the control of water uses and the citizens' information[267]. In particular, competent public administrations ensure the exchange of data about water permits[268].

b) Hydrological instruments

The appropriate River Basin Authority defines and periodically updates the Water Balance ("Bilancio idrico") between the availability of locatable resources in the area and the needs for the different uses, observing the general criteria and objectives[269].

In the river basins characterized by substantial withdrawals or transfers, diversions are regulated so that they assure the flow level needed to sustain life and ecosystems[270]. All the diversions are regulated so that the Minimum Vital Flow ("Minimo deflusso vitale") is guaranteed in the waterbodies, without any compensation, but just with the reduction of the diversion fee[271].

While the abstract notion of Minimum Vital Flow has been stated, there is still no actual identification of the values of it, making the regulations often useless.

c) Water permits

Water permits had been for a long duration the only instrument used by the public in order to manage the utilization of water resources, mainly based on economical and productive interests.

Water diversions are prohibited without authorization or permit[272], and the permit is granted according to water availability[273]. The River Basin Authorities check permits requests in order to assess the compatibility of the water use with the protection plan and the water balance[274]. The agreement that accompanies the permit set quantity, fashion, terms, conditions, and times of water withdrawal, abstraction, return and use[275]. Water permits are forfeited for non-use, poor use, reneging on the agreement and violation of the law[276].

Since there are many requests for permits, only the request that demonstrates the most rational utilization of the water resource is chosen. The choice is made according to the following criteria: waste reduction, priority for drinking water production, best use of the source, quality and quantity characteristics of the water body, quality and quantity of the water returned compared with the water withdrawn[277]. The competent authority can request that the applicants modify the project in order to attain a more rational utilization of the resource[278].

The resources intended for human consumption can be used for different purposes only in case of great availability of the resource or in case of the lack of alternative supply sources, which must be verified[279].

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[264] Art.3, par.7, D.Lgs. n.152/1999
[265] Art.3, par.7, D.Lgs. n.152/1999
[266] Art.31, par.1, L. n.36/1994
[267] Art.5-bis, par.1, R.D. n.1775/1933
[268] Art.5-bis, par.2, R.D. n.1775/1933
[269] Art.3, par.1, L. 36/1994
[270] Art.3, par.1, L. n.183/1989; Art.3, par.3, L. 36/1994; Art.12-*bis*, par.3, R.D. n.1775/1933
[271] Art.22, par.5, D.Lgs. n.152/1999
[272] Art.17, par.1, R.D. n.1775/1933
[273] Art.19, par.1, R.D. n.1775/1933
[274] Art.7, par.2, R.D. n.1775/1933
[275] Art.40, par.1, R.D. n.1775/1933
[276] Art.55, par.1, R.D. n.1775/1933
[277] Art.9, par.1, R.D. n.1775/1933
[278] Art.12, par.1, R.D. n.1775/1933
[279] Art.12-*bis*, par.1, R.D. n.1775/1933

The permit is issued providing that quality targets for the watercourse are respected, that Minimum Vital Flow is guaranteed and that reuse of purified wastewater is not possible or economically unsustainable[280].

d) Financial aspects

The tariff is considered according to the water services provided[281]. The tariff must guarantee the investment costs covered and operation costs, taking into account the quality of the water resource, the quality of the service provided, the required works, the facilities management costs, the remuneration of the capital invested[282].

The Cabinet sets a method to establish the Reference Tariff ("Tariffa di riferimento"), organized into users and territorial bands[283]. The Reference Tariff is established, taking into account hydrologic situations, in order to limit consumption[284].

The Reference Tariff is the basis for establishing the tariff on the service[285]. Local bodies, taking into account the financial plans for interventions establish the tariff on the service[286]. The tariff is imposed[287] and collected[288] by the parties that manage the integrated water service.

A lower tariff is instituted on basic domestic consumption and low income bracket population consumption[289]. In order to reallocate costs, a higher tariff is set for second homes and for seasonal tourist lodging[290].

Water diversions are subjected to an annual fee, according to the use[291]. The annual fees for the water diversions are considered for the use of the water withdrawn and they are organized into irrigation uses, human consumption uses, industrial uses, fish farming uses, leisure uses, power production uses, hygiene uses[292].

3.2.3. Planning

a) River Basin Plan

Watershed protection planning activities include preservation and reclamation of the land in the river basins; protection and regulation of the waterbodies and wetlands; flood control; mining activities discipline; landslides and hydrogeological instability control; subsidence control; coast protection; surface water and groundwater recovery; rational utilization of water resources. They also include assuring the minimum acceptable flow; facilities management and maintenance; environmental protection of the interested areas; integrated management of the public services; reorganization of the hydrogeological restriction; prevention activity[293].

The River Basin Plan is a sectional territorial plan[294], adopted after a complex procedure[295]. The River Basin Plan is a cognitive, normative, technical and operational plan[296] as well, which

[280] Art.12-*bis*, par.3, R.D. n.1775/1933
[281] Art.13, par.1, L. n.36/1994
[282] Art.13, par.2, L. n.36/1994
[283] Art.13, par.3, L. n.36/1994
[284] Art.13, par.3, L. n.36/1994
[285] Art.13, par.4, L. n.36/1994
[286] Art.13, par.5, L. n.36/1994
[287] Art.13, par.6, L. n.36/1994
[288] Art.15, par.1, L. n.36/1994
[289] Art.13, par.7, L. n.36/1994
[290] Art.13, par.7, L. n.36/1994
[291] Art.35, par.1, t.u. n.1775/1933
[292] Art.18, par.1, L. n.36/1994
[293] Art.3, par.1, L.183/1989
[294] Art.17, par.1, L. n.183/1989
[295] Artt.18-20, L.n.183/1989
[296] Art.17, par.1, L. n.183/1989

coordinates the actions to be taken in order to preserve, protect, exploit the land and use the water resources, taking into account physical and environmental characteristics[297].

The contents of the River Basin Plan include: the complete cognitive framework regarding situations, resources, needs, demands; the guidelines for land protection and water resources use; the indication of the required facilities; the planning of the use of the resources; provisions and restrictions. In addition, they include: the cost-benefits assessment; the environmental impact assessment; the mining and abstraction regulations; the indication of areas to be subjected to special discipline; provisions against discharges; measures against subsidence; the planning of future uses; priorities of the interventions[298].

River Basin Plans are coordinated with economic development plans, with land use plans[299], and with town planning[300]. Town planning instruments, for example, must include dual channels so they use less valuable waters, and use water saving techniques[301].

River Basin Plans provisions are immediately mandatory, if so stated, for public administrations and for individuals[302]. River basin plans are implemented through Three-year Intervention Plans ("Programmi triennali di intervento")[303].

b) Water Protection Plan

The Water Protection Plan ("Piano di tutela delle acque") is a sectional plan within the River Basin Plan[304]. The River Basin Authorities must define the targets for the protection plans and the intervention priorities[305]. The Water Protection Plan coordinates Environmental Quality Targets ("Obiettivi di qualità ambientale") with Specific Destination Quality Targets ("Obiettivo di qualità per specifica destinazione")[306].

The Water Protection Plan includes the interventions required to obtain and maintain the quality objectives and the required measures for the quality and quantity protection of the water system[307]. In particular, the Water Protection Plan includes the cognitive activity results, the environmental quality targets, the specific destination quality targets, and the list of waterbodies with specific destination. In addition, it includes the list of sensitive areas, the integrated quality and quantity protection measures, the interventions agenda, the verification programs, the waterbodies reclamation works[308].

Within the Water Protection Plans, measures for the water balance are adopted, taking into account: needs, availability, Minimum Vital Flow, replenishing capacity, and consistent uses[309].

In order to acquire the data required to draft the Water Protection Plan, the Regions adopt data recording programs that can describe the river basin characteristics and assess the anthropical impact[310]. The Regions adopt programs in order to comprehend and verify the quality and quantity condition of the surface water and groundwater within the river basin[311].

[297] Art.17, par.1, L. n.183/1989
[298] Art.17, par.3, L. n.183/1989
[299] Art.17, par.4, L. n.183/1989
[300] Art.17, par.6, L. n.183/1989
[301] Art.5, par.1-*bis*, L. 36/1994
[302] Art.17, par.5, L. n.183/1989
[303] Art.21, par.1, L. n.183/1989
[304] Art.44, par.1, D.Lgs. n.152/1999
[305] Art.44, par.2, D.Lgs. n.152/1999
[306] Art.4, par.6, D.Lgs. n.152/1999
[307] Art.44, par.3, D.Lgs. n.152/1999
[308] Art.28, par.4, D.Lgs. n.152/1999
[309] Art.22, par.2, D.Lgs. n.152/1999
[310] Art.42, par.1, D.Lgs. n.152/1999
[311] Art.43, par.1, D.Lgs. n.152/1999

c) Other plans

Water Uses Planning ("Pianificazione delle utilizzazioni delle acque") aims at avoiding negative effects on the quality of water resources and at reaching sustainable water consumption[312].

The Cabinet sets the guidelines for the River Basin Water Balance ("Bilancio idrico di bacino"), including uses survey criteria and Minimum Vital Flow definition[313]. Water diversions can be reviewed in order to guarantee the water balance, without any compensation, but with only the reduction of the diversion fee[314].

The appropriate River Basin Authority, in order to ensure the balance between resources and needs, adopts the measures for the Water Economy Planning ("Pianificazione dell'economia idrica"), taking into account the different uses[315].

The Aqueduct General Regulatory Plan ("Piano regolatore generale degli acquedotti") must consider urban conglomeration water needs, ascertain water resources availability, determine the facilities to be built or completed, coordinate drinking water supply with other water uses[316].

3.2.4. Sectors

a) Quantity protection and savings

The Regions adopt regulations and provisions to curb waste and reduce consumption (through the improvement of the water distribution networks; the realization of dual networks to use less valuable water for consistent uses; the diffusion of information and water saving techniques; the installation of water meters in every home units; the realization of differentiated disposal systems for wastewater and rainfall)[317].

Technical regulations are adopted in order to foster the reuse of wastewater[318]. The Regions adopt plans in order to implement water savings, through incentives for business that use treated wastewater or are provided with reuse facilities[319].

Agreements on water transfers among different river basins are drawn up in order to plan the use of water resources[320].

b) Quality protection and recovery

In order to protect and recover surface water and groundwater, minimum Environmental Quality Targets, to be respected throughout the entire national territory, are set[321], taking into account the self-purifying capacity of the watercourses and the biodiversity support capacity[322]. The Regions can set stricter minimum Environmental Quality Targets[323].

The Regions identify for each waterbody, or part of it, the corresponding quality classification among the ones listed in the law ("high", "good", "sufficient", "poor", "terrible")[324]. In relation to the classification, the Regions set and adopt the measures required to reach or keep the Environmental Quality Targets, avoiding further deterioration[325].

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[312] Art.22, par.1, D.Lgs. n.152/1999
[313] Art.22, par.3, D.Lgs. n.152/1999
[314] Art.22, par.6, D.Lgs. n.152/1999
[315] Art.3, par.2, L. n.36/1994
[316] Art.2, L. n.129/1963
[317] Art.5, par.1, L. n.36/1994
[318] Art.6, par.1, L. n.36/1994
[319] Art.6, par.2, L. n.36/1994
[320] Art.17, par.1, L. n.36/1994
[321] Art.4, par.1, D.Lgs. n.152/1999
[322] Art.4, par.2, D.Lgs. n.152/1999
[323] Art.4, par.7, D.Lgs. n.152/1999
[324] Art.5, par.1, D.Lgs. n.152/1999; Annex n.1, D.Lgs. n.152/1999
[325] Art.5, par.2, D.Lgs. n.152/1999

As a rule, the quality classification «sufficient» must be reached by the year 2008 and the quality classification «good» must be reached by the year 2016[326]. Different time limits can be set by the Regions for waterbodies, setting such conditions as not to allow the reaching of the quality classification "good" by the year 2016[327].

The Regions can set less strict environmental quality classifications if the human activity has affected the waterbody so heavily that it is impossible or economically unsustainable to improve its quality. Other reasons for setting less strict environmental classifications are the nature of the basin, or special and unexpected circumstances that inflict the basin, such as flood or drought[328]. In any case further deterioration must be avoided[329].

In order to protect and recover surface water and groundwater, Specific Destination Quality Targets, to be respected throughout the entire national territory, are set[330]. Specific Destination Quality Targets set the watercourses status, taking into account their specific utilization[331]. The Regions can set further destinations of watercourses and relevant quality targets[332].

Water with a specific functional destination are: surface freshwater intended for drinking water, bathing water, water supporting fish life, water supporting shellfish life[333]. Specific Destination Quality Targets sets are pursued[334].

Surface freshwaters intended for drinking water are classified in three categories (A1, A2, A3) according to their physical, chemical, and microbiological characteristics[335]. Depending on their category, the freshwaters are subjected to different treatments[336]. Exemptions are allowed in cases of special circumstances provided that no real danger for public health occurs[337].

Freshwaters that need protection or improvement to support fish life are preferably chosen by the Regions among waterbodies located in national and regional parks, wetlands protected by the Ramsar Convention (2 February 1971), and other freshwaters of a scientific, natural, environmental and productive value[338]. Freshwaters supporting fish life must meet the requirements of the law[339]. Exemptions are allowed in case of special circumstances due to natural phenomena[340]

Waters that need protection or improvement to support shellfish life are chosen by the Regions among coastal and brackish waters in order to guarantee satisfying levels of the products, which must be directly edible[341]. Waters supporting shellfish life must meet the requirements of the law[342]. Exemptions are allowed in case of special circumstances due to meteorological or geographical conditions[343].

c) Environmental protection

Sensitive Areas ("Aree sensibili") are water systems that can be classified in one of the groups listed by the law[344]: natural lakes, other freshwaters, estuaries and coastal waters subjected

[326] Art.5, par.3, D.Lgs. n.152/1999
[327] Art.5, par.4, D.Lgs. n.152/1999
[328] Art.5, par.5, D.Lgs. n.152/1999
[329] Art.5, par.6, D.Lgs. n.152/1999
[330] Art.4, par.1, D.Lgs. n.152/1999
[331] Art.4, par.3, D.Lgs. n.152/1999
[332] Art.4, par.7, D.Lgs. n.152/1999
[333] Art.6, par.1, D.Lgs. n.152/1999
[334] Art.6, par.2, D.Lgs. n.152/1999; Annex n.2, D.Lgs. n.152/1999
[335] Art.7, par.1, D.Lgs. n.152/1999
[336] Art.7, par.2, D.Lgs. n.152/1999
[337] Art.8, par.1, D.Lgs. n.152/1999
[338] Art.10, par.1, D.Lgs. n.152/1999
[339] Art.12, par.1, D.Lgs. n.152/1999; Annex n.2, D.Lgs. n.152/1999
[340] Art.13, par.1, D.Lgs. n.152/1999
[341] Art.14, par.1, D.Lgs. n.152/1999
[342] Art.15, par.1, D.Lgs. n.152/1999; Annex n.2, D.Lgs. n.152/1999
[343] Art.16, par.1, D.Lgs. n.152/1999
[344] Annex n.6, D.Lgs. n.152/1999

or likely to be subjected to eutrophication by phosphorus or nitrogen; surface freshwaters intended for drinking water that might contain high quantities of nitrate; areas that need additional treatments due to discharges[345]. The Regions can indicate additional sensitive areas[346].

Agricultural Nitrates Vulnerable Areas ("Zone vulnerabili da nitrati di origine agricola") are land zones which, according to the law[347], discharge directly or indirectly nitrogenous compounds of agricultural provenance in polluted waters or in waters that might be polluted due to the discharges[348]. The Regions can indicate additional vulnerable areas[349]. The Agricultural Good Practice Code ("Codice di buona pratica agricola") must be implemented in vulnerable areas[350].

Other vulnerable areas are indicated according to the use of chemical products in agriculture, or to the threat of droughts, soil depletion and desertification[351].

In order to maintain and improve the quality of surface freshwaters and groundwater intended for human consumption and to protect the resource, the Regions designate Water Resources Safeguard Areas ("Aree di salvaguardia delle risorse idriche"), distinguished in Absolute Conservation Zones ("Zone di tutela assoluta"), Observance Zones ("Zone di rispetto"), and Protection Zones ("Zone di protezione")[352].

Absolute Conservation Zones include the area surrounding the diversions and they must be protected and assigned to diversion facilities[353]. Observance Zones include the areas surrounding the absolute protection zones and they can be subjected to use restrictions in order to protect the quality and the quantity of the resource[354]. Protection Zones are indicated by the Regions in order to protect the water heritage, and general and specific provisions can be adopted[355]

Within national and regional natural parks, the subject managing the park defines the waterbodies that can not be diverted in order to guarantee the preservation of the ecosystem[356]

Urban areas must include sewerage networks for urban wastewater[357]. The Regions identify adequate individual systems or other public and private systems for isolated residential complex or in case the realization of the sewerage network does not have environmental advantage or requires excessive costs[358]. The Regions periodically publish reports related to urban wastewater treatment[359].

All the discharges must be authorized[360]. The authorization is issued to the holder of the activity from where the discharge origins[361]. Domestic wastewater discharges in sewerage networks are always allowed in conformity with regulations adopted by the integrated water service carrier[362].

Authorization requests for industrial wastewater discharge must contain information about quality and quantity discharge information, water quantity to be withdrawn, receiving waterbody, and control withdrawal point[363]. All the discharges must be regulated in order to respect the

[345] Art.18, par.1, D.Lgs. n.152/1999
[346] Art.18, par.4, D.Lgs. n.152/1999
[347] Annex n.7, D.Lgs. n.152/1999
[348] Art.19, par.1, D.Lgs. n.152/1999
[349] Art.19, par.3, D.Lgs. n.152/1999
[350] Art.19, par.5, D.Lgs. n.152/1999
[351] Art.20, D.Lgs. n.152/1999
[352] Art.4, par.1, D.P.R. n.236/1988
[353] Art.5, par.1, D.P.R. n.236/1988
[354] Art.6, par.1, D.P.R. n.236/1988
[355] Art.7, par.1, D.P.R. n.236/1988
[356] Art.25, par.1, L. n.36/1994
[357] Art.27, par.1, D.Lgs. n.152/1999
[358] Art.27, par.4, D.Lgs. n.152/1999
[359] Art.28, par.9, D.Lgs. n.152/1999
[360] Art.45, par.1, D.Lgs. n.152/1999
[361] Art.45, par.2, D.Lgs. n.152/1999
[362] Art.45, par.4, D.Lgs. n.152/1999
[363] Art.46, par.1, D.Lgs. n.152/1999

waterbodies quality objectives and they must respect the emission limits provided by the law[364]. Discharges can not be watered down in order to respect the emission limits[365].

Discharges must be made available for sampling by the competent bodies[366]. The competent control body can make every inspection it deems necessary to ascertain discharges conditions[367]. In order to promote water savings and wastewater reuse the competent authority can foster and sign agreements with interested economic parties[368].

Discharge into the soil is prohibited[369], as well as discharges into the subsoil and into groundwater[370].

The discharges of industrial wastewater into surface water must respect the emission limits set to pursue quality objectives[371]. The discharges of industrial wastewater into sewerage networks must respect technical regulations and emission limits adopted by the subject managing the urban wastewater purification plant[372].

The discharges of urban wastewater within sensitive areas must undergo stricter treatment[373]. The competent authority can set stricter emission limits for hazardous substances, considering the toxicity of the substance and the impact on the environment[374].

The Regions adopt specific regulations for water used for hydropower generation, irrigation and drinking water production[375].

The competent authority controls the discharges in accordance with a program ensuring a periodical, widespread, effective and impartial system of preventive and subsequent controls[376]. The subject in charge for the control can make inspections, controls and samplings required to ascertain the respect of emission limits, regulations and other provisions[377]. If authorization provisions are unfulfilled, the competent authority, according to the seriousness of the offense, can issue a warning, the suspension of the authorization, or the revocation of the authorization[378].

d) Water services

Water services are reorganized on the basis of Optimal Territorial Areas ("Ambiti territoriali ottimali")[379] into Integrated Water Services ("Servizi idrici integrati").

Criteria for the Integrated Water Services are the respect of the unity of the hydrologic basin, the elimination of the management fragmentation and the achieving of appropriate management dimensions[380].

The Regions delimit the Optimal Territorial Areas[381] and regulate the forms of cooperation among local bodies in the same Optimal Territorial Area[382]. The Regions adopt a model of agreement to regulate the relation between local bodies and the parties managing the water services[383].

[364] Art.28, par.1, D.Lgs. n.152/1999; Annex n.5, D.Lgs. n.152/1999
[365] Art.28, par.5, D.Lgs. n.152/1999
[366] Art.28, par.3, D.Lgs. n.152/1999
[367] Art.28, par.4, D.Lgs. n.152/1999
[368] Art.28, par.10, D.Lgs. n.152/1999
[369] Art.29, par.1, D.Lgs. n.152/1999
[370] Art.30, par.1, D.Lgs. n.152/1999
[371] Art.31, par.1, D.Lgs. n.152/1999
[372] Art.33, par.1, D.Lgs. n.152/1999
[373] Art.32, par.1, D.Lgs. n.152/1999
[374] Art.34, par.1, D.Lgs. n.152/1999
[375] Art.40, par.1, D.Lgs. n.152/1999
[376] Art.49, par.1, D.Lgs. n.152/1999
[377] Art.50, par.1, D.Lgs. n.152/1999
[378] Art.51, par.1, D.Lgs. n.152/1999
[379] Art.8, par.1, L. n.36/1994
[380] Art.8, par.1, L. n.36/1994
[381] Art.8, par.2, L. n.36/1994
[382] Art.9, par.3, L. n.36/1994
[383] Art.11, par.1, L. n.36/1994

Local bodies organize the integrated water service, according to efficiency and effectiveness principles[384], and choose the forms of management[385]. Local bodies provide the facilities for the management of the Integrated Water Service[386].

The subject managing the water services must employ adequate monitoring systems, in order to guarantee good quality water supply and verify discharges[387].

[384] Art.9, par.1, L. n.36/1994
[385] Art.9, par.2, L. n.36/1994
[386] Art.12, par.1, L. n.36/1994
[387] Art.26, par.1, L. n.36/1994

PART FOUR – PROPOSAL: WATER CODE

4.1. THE ITALIAN CASE: THE WATER CODE

Assuming the ultimate utility of consolidating, into one comprehensive Water Code, the diverse laws of any nation relating to its water issues, this next chapter considers the application of this process to the case of Italy. It proposes a practical approach for restructuring and consolidating the existing body of Italian legislation relating to water issues into a new National Water Code.

A National Water Code would provide a unified national standard, establishing fundamental principles of water law, which would govern the regulation and adjudication of both public and private water issues. Such a code would provide greater consistency of approach throughout the entire hierarchy of national, regional, and local regulations. The creation of such a National Water Code would effectively establish water law as a new, separate branch of Italian law.

In its formulation, this National Water Code should not simply reorganize existing, often antiquated laws, but rather, it should ultimately seek to form the basis of a more contemporary approach to water law, incorporating and reflecting the social values and scientific understanding consistent with life in an age of growing global water scarcity and national interdependence.

It is hoped that this initial proposal for the reform of water law in the Italian case might demonstrate the real feasibility of achieving such a purpose. As well, the framework outlined here can provide a useful reference point and a basis for comparison with other systems, for the purpose of stimulating meaningful discussion and debate regarding how best to create an effective common framework for coordinated national and international principles of water law.

4.2. WATER CODE

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[388] Art.1, par.1, D.Lgs. n.152/1999
[389] Art.1, par.1, L. n.183/1989
[390] Art.1, par.1, L. n.183/1989
[391] Art.1, par.1, L. n.183/1989
[392] Art.1, par.1, L. n.183/1989
[393] Art.3, par.2, L. n.183/1989
[394] Art.3, par.1, L. n.183/1989

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[395] Art.3, par.1, L. n.183/1989
[396] Art.3, par.1, L. n.183/1989
[397] Art.3, par.1, L. n.183/1989
[398] Art.3, par.1, L. n.183/1989
[399] Art.3, par.1, L. n.183/1989
[400] Art.3, par.1, L. n.183/1989
[401] Art.3, par.1, L. n.183/1989
[402] Art.3, par.1, L. n.183/1989
[403] Art.3, par.1, L. n.183/1989
[404] Art.3, par.1, L. n.183/1989
[405] Art.1, par.1, D.Lgs. n.152/1999
[406] Art.1, par.1, D.Lgs. n.152/1999
[407] Art.3, par.1, L. n.183/1989
[408] Art.3, par.1, L. n.183/1989
[409] Art.4, par.4, 5, D.Lgs. n.152/1999
[410] Art.3, par.1, L. n.183/1989
[411] Art.1, par.1, D.Lgs. n.152/1999
[412] Art.1, par.1, D.Lgs. n.152/1999
[413] Art.1, par.1, D.Lgs. n.152/1999
[414] Art.1, par.1, D.Lgs. n.152/1999
[415] Art.1, par.1, D.Lgs. n.152/1999
[416] Art.3, par.1, L. n.183/1989
[417] Art.1, par.1, D.Lgs. n.152/1999
[418] Art.3, par.1, L. n.183/1989

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[419] Art.3, par.1, L. n.183/1989
[420] Art.3, par.1, L. n.183/1989
[421] Art.3, par.1, L. n.183/1989
[422] Art.1, par.1, L. n.36/1994
[423] Art.23, par.2, L. n.36/1994
[424] Art.1, par.1, L. n.36/1994
[425] Art.2, par.1, L. n.36/1994
[426] Art.1, par.2, L. n.36/1994
[427] Art.1, par.1, L. n.36/1994
[428] Art.1, par.3, L. n.36/1994
[429] Art.1, par.2, L. n.36/1994
[430] Art.24, par.1, D.Lgs. n.152/1999
[431] Art.24, par.1, D.Lgs. n.152/1999; Art.1, par.3, L. n.36/1994
[432] Art.1, par.3, L. n.36/1994
[433] Art.1, par.3, L. n.36/1994
[434] Art.1, par.3, L. n.36/1994
[435] Art.3, par.1, D.Lgs. n.152/1999
[436] Art.1, par.4, L. n.183/1989
[437] Art.3, par.2, L. n.183/1989
[438] Art.3, par.5, D.Lgs. n.152/1999; Art.62, par.1, D.Lgs. n.152/1999
[439] Art.1, par.3, D.Lgs. n.152/1999; Art.3, par.8, D.Lgs. n.152/1999; Art.1, par.5, L. n.183/1989; Art.33, L. n.36/1994
[440] Art.3, par.3, D.Lgs. n.152/1999; Art.53, D.Lgs. n.152/1999; Art.19, L. n.36/1994
[441] Art.3, par.4, D.Lgs. n.152/1999

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[442] Art.13, par.1, L. n.183/1989
[443] Art.23, par.2, 3, 4, L. n.36/1994
[444] Art.3, par.9, D.Lgs. n.152/1999
[445] Art.1, par.2, D.Lgs. n.152/1999
[446] Art.1, par.2, D.Lgs. n.152/1999
[447] Art.1, par.2, D.Lgs. n.152/1999
[448] Art.1, par.2, D.Lgs. n.152/1999
[449] Art.1, par.2, D.Lgs. n.152/1999
[450] Art.1, par.2, L. n.183/1989
[451] Art.1, par.2, L. n.183/1989
[452] Art.1, par.2, D.Lgs. n.152/1999
[453] Art.1, par.2, D.Lgs. n.152/1999
[454] Art.1, par.2, D.Lgs. n.152/1999
[455] Art.2, D.Lgs. n.152/1999
[456] Art.1, par.2, L. n.183/1989
[457] Art.4, par.1, L. n.183/1989

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[458] Art.4, par.1, L. n.36/1994
[459] Art.5, par.1, L. n.183/1989
[460] Art.8, par.1, L. n.183/1989
[461] Art.5, par.2, L. n.183/1989
[462] Art.8, par.6, L. n.36/1994
[463] Art.5, par.3, L. n.183/1989
[464] Art.4, par.2, 3, 4, L. n.183/1989; Art.4, par.2, L. n.36/1994
[465] Art.21, L. n.36/1994
[466] Art.7, L. n.183/1989
[467] Art.9, L. n.183/1989; D.P.R. n.85/1991
[468] Art.22, par.1, L. n.36/1994
[469] Art.10, L. n.183/1989
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APPENDIXES

Appendix I - THE DUBLIN STATEMENT ON WATER AND SUSTAINABLE DEVELOPMENT

(www.wmo.ch/web/homs/icwedece.html)

INTRODUCTION

Scarcity and misuse of fresh water pose a serious and growing threat to sustainable development and protection of the environment. Human health and welfare, food security, industrial development and the ecosystems on which they depend, are all at risk, unless water and land resources are managed more effectively in the present decade and beyond than they have been in the past.

Five hundred participants, including government-designated experts from a hundred countries and representatives of eighty international, intergovernmental and non-governmental organizations attended the International Conference on Water and the Environment (ICWE) in Dublin, Ireland, on 26-31 January 1992. The experts saw the emerging global water resources picture as critical. At its closing session, the Conference adopted this Dublin Statement and the Conference Report. The problems highlighted are not speculative in nature; nor are they likely to affect our planet only in the distant future. They are here and they affect humanity now. The future survival of many millions of people demands immediate and effective action.

The Conference participants call for fundamental new approaches to the assessment, development and management of freshwater resources, which can only be brought about through political commitment and involvement from the highest levels of government to the smallest communities. Commitment will need to be backed by substantial and immediate investments, public awareness campaigns, legislative and institutional changes, technology development, and capacity building programmes. Underlying all these must be a greater recognition of the interdependence of all peoples, and of their place in the natural World.

In commending this Dublin Statement to the World leaders assembled at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in June 1992, the Conference participants urge all governments to study carefully the specific activities and means of implementation recommended in the Conference Report, and to translate those recommendations into urgent action programmes for Water and Sustainable Development.

GUIDING PRINCIPLES

Concerted action is needed to reverse the present trends of overconsumption, pollution, and rising threats from drought and floods. The Conference Report sets out recommendations for action at local, national and international levels, based on four guiding principles.

Principle No. 1 - Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment

Since water sustains life, effective management of water resources demands a holistic approach, linking social and economic development with protection of natural ecosystems. Effective management links land and water uses across the whole of a catchment area or groundwater aquifer.

Principle No. 2 - Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels

The participatory approach involves raising awareness of the importance of water among policy-makers and the general public. It means that decisions are taken at the lowest appropriate level, with full public consultation and involvement of users in the planning and implementation of water projects.

Principle No. 3 - Women play a central part in the provision, management and safeguarding of water

This pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources. Acceptance and implementation of this principle requires positive policies to address women's specific needs and to equip and empower women to participate at all levels in water resources programmes, including decision-making and implementation, in ways defined by them.

Principle No. 4 - Water has an economic value in all its competing uses and should be recognized as an economic good

Within this principle, it is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Past failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources.

THE ACTION AGENDA

Based on these four guiding principles, the Conference participants developed recommendations which enable countries to tackle their water resources problems on a wide range of fronts. The major benefits to come from implementation of the Dublin recommendations will be:

Alleviation of poverty and disease

At the start of the 1990s, more than a quarter of the world's population still lack the basic human needs of enough food to eat, a clean water supply and hygienic means of sanitation. The Conference recommends that priority be given in water resources development and management to the accelerated provision of food, water and sanitation to these unserved millions.

Protection against natural disasters

Lack of preparedness, often aggravated by lack of data, means that droughts and floods take a huge toll in deaths, misery and economic loss. Economic losses from natural disasters, including floods and droughts, increased three-fold between the 1960s and the 1980s. Development is being set back for years in some developing countries, because investments have not been made in basic data collection and disaster preparedness. Projected climate change and rising sea-levels will intensify the risk for some, while also threatening the apparent security of existing water resources.

Damages and loss of life from floods and droughts can be drastically reduced by the disaster preparedness actions recommended in the Dublin Conference Report.

Water conservation and reuse

Current patterns of water use involve excessive waste. There is great scope for water savings in agriculture, in industry and in domestic water supplies.

Irrigated agriculture accounts for about 80% of water withdrawals in the World. In many irrigation schemes, up to 60% of this water is lost on its way from the source to the plant. More efficient irrigation practices will lead to substantial freshwater savings.

Recycling could reduce the consumption of many industrial consumers by 50% or more, with the additional benefit of reduced pollution. Application of the "polluter pays" principle and realistic water pricing will encourage conservation and reuse. On average, 36% of the water produced by urban water utilities in developing countries is "unaccounted for". Better management could reduce these costly losses.

Combined savings in agriculture, industry and domestic water supplies could significantly defer investment in costly new water-resource development and have enormous impact on the sustainability of future supplies. More savings will come from multiple use of water. Compliance with effective discharge standards, based on new water protection objectives, will enable successive downstream consumers to reuse water which presently is too contaminated after the first use.

Sustainable urban development

The sustainability of urban growth is threatened by curtailment of the copious supplies of cheap water, as a result of the depletion and degradation caused by past profligacy. After a generation or more of excessive water use and reckless discharge of municipal and industrial wastes, the situation in the majority of the world’s major cities is appalling and getting worse. As water scarcity and pollution force development of ever more distant sources, marginal costs of meeting fresh demands are growing rapidly. Future guaranteed supplies must be based on appropriate water charges and discharge controls. Residual contamination of land and water can no longer be seen as a reasonable trade-off for the jobs and prosperity brought by industrial growth.

Agricultural production and rural water supply

Achieving food security is a high priority in many countries, and agriculture must not only provide food for rising populations, but also save water for other uses. The challenge is to develop and apply water-saving technology and management methods, and, through capacity building, enable communities to introduce institutions and incentives for the rural population to adopt new approaches, for both rainfed and irrigated agriculture. The rural population must also have better access to a potable water supply and to sanitation services. It is an immense task, but not an impossible one, provided appropriate policies and programmes are adopted at all levels: local, national and international.

Protecting aquatic ecosystems

Water is a vital part of the environment and a home for many forms of life on which the well-being of humans ultimately depends. Disruption of flows has reduced the productivity of many such ecosystems, devastated fisheries, agriculture and grazing, and marginalized the rural communities which rely on these. Various kinds of pollution, including transboundary pollution, exacerbate these problems, degrade water supplies, require more expensive water treatment, destroy aquatic fauna, and deny recreation opportunities.

Integrated management of river basins provides the opportunity to safeguard aquatic ecosystems, and make their benefits available to society on a sustainable basis.

Resolving water conflicts

The most appropriate geographical entity for the planning and management of water resources is the river basin, including surface and groundwater. Ideally, the effective integrated planning and development of transboundary river or lake basins has similar institutional requirements to a basin entirely within one country. The essential function of existing international basin organizations is one of reconciling and harmonizing the interests of riparian countries, monitoring water quantity and quality, development of concerted action programmes, exchange of information, and enforcing agreements.

In the coming decades, management of international watersheds will greatly increase in importance. A high priority should therefore be given to the preparation and implementation of integrated management plans, endorsed by all affected governments and backed by international agreements.

The enabling environment

Implementation of action programmes for water and sustainable development will require a substantial investment, not only in the capital projects concerned, but, crucially, in building the capacity of people and institutions to plan and implement those projects.

The knowledge base

Measurement of components of the water cycle, in quantity and quality, and of other characteristics of the environment affecting water are an essential basis for undertaking effective water management. Research and analysis techniques, applied on an interdisciplinary basis, permit the understanding of these data and their application to many uses.

With the threat of global warming due to increasing greenhouse gas concentrations in the atmosphere, the need for measurements and data exchange on the hydrological cycle on a global scale is evident. The data are required to understand both the world's climate system and the potential impacts on water resources of climate change and sea level rise. All countries must participate and, where necessary, be assisted to take part in the global monitoring, the study of the effects and the development of appropriate response strategies.

Capacity building

All actions identified in the Dublin Conference Report require well-trained and qualified personnel. Countries should identify, as part of national development plans, training needs for water-resources assessment and management, and take steps internally and, if necessary with technical co-operation agencies, to provide the required training, and working conditions which help to retain the trained personnel.

Governments must also assess their capacity to equip their water and other specialists to implement the full range of activities for integrated water-resources management. This requires provision of an enabling environment in terms of institutional and legal arrangements, including those for effective water-demand management.

Awareness raising is a vital part of a participatory approach to water resources management. Information, education and communication support programmes must be an integral part of the development process.

FOLLOW-UP

Experience has shown that progress towards implementing the actions and achieving the goals of water programmes requires follow-up mechanisms for periodic assessments at national and international levels.

In the framework of the follow-up procedures developed by UNCED for Agenda 21, all Governments should initiate periodic assessments of progress. At the international level, United Nations institutions concerned with water should be strengthened to undertake the assessment and follow-up process. In addition, to involve private institutions, regional and non-governmental organizations along with all interested governments in the assessment and follow-up, the Conference proposes, for consideration by UNCED, a World water forum or council to which all such groups could adhere.

It is proposed that the first full assessment on implementation of the recommended programme should be undertaken by the year 2000.

UNCED is urged to consider the financial requirements for water-related programmes, in accordance with the above principles, in the funding for implementation of Agenda 21. Such considerations must include realistic targets for the timeframe for implementation of the programmes, the internal and external resources needed, and the means of mobilizing these.

Appendix II - PARIS DECLARATION

(www.oieau.fr/ciedd/ang/frames/final/declarfin.htm)

We, Ministers and Heads of Delegation meeting in Paris for the International Conference on Water and Sustainable Development, 19 – 21 March 1998,

Convinced that freshwater is as essential to sustainable development as it is to life and that water has social, economic and environmental values that are inter-linked and mutually supportive,

Guided by the conclusions of the United Nations Conference on Environment and Development (Rio 1992), in particular the Rio Declaration and Agenda 21 and its Chapter 18, and of the Special Session of the United Nations General Assembly in June 1997,

Recalling previous deliberations on water by the international community, in particular the conclusions of the meetings at Mar del Plata (1977), New Delhi (1990), Dublin (1992) and Noordwijk (1994),

Noting the ongoing preparatory process to the VI session of the Commission on Sustainable Development, including the contributions made by the expert group meetings recently held in Harare and Petersberg,

Seriously concerned by a situation in which a quarter of the world's population does not have access to safe drinking water; more than half of mankind lacks adequate sanitation; poor water quality and lack of hygiene are among the primary causes of death and disease; and scarcity of water, flood and drought, poverty, pollution, inadequate treatment of waste and lack of infrastructure pose serious threats to social and economic development, human health, global food security and the environment,

Also concerned that constraints on access to water, in terms of quantity and quality, could become a major limiting factor in sustainable development,

Determined to take advantage of the opportunities to tackle these problems by promoting local and national systems for managing the sustainable use of water resources, based on an integrated approach linking development with protection of the natural environment, participation of all actors and interested parties, the involvement of both men and women, and recognition of the social and economic value of water,

Underline that:

- water resources are essential for satisfying basic human needs, health, energy and food production, and the preservation of ecosystems, as well as for social and economic development;

- the protection of ecosystems is essential for the maintenance and rehabilitation of the natural hydrologic cycle in order to manage freshwater resources in a sustainable manner;

- water is a key natural resource for future prosperity and stability, which should be recognised as a catalyst for regional co-operation;

- it is crucial to improve knowledge and understanding at all levels of water resources in order to develop, manage and protect them better and to use them in a more efficient, equitable and sustainable manner;

- a high priority should be given to strengthening institutions, in particular local institutions, and improving training and awareness of professionals and users alike;

- the development, management, use and protection of water should be:

- promoted by a partnership between the public and private sectors, thus mobilising good practice and long term financing,

- based upon a participatory decision-making process open to all users, in particular women, people living in poverty and disadvantaged groups.

The role of NGOs and other socio-economic partners remains essential.

- international co-operation should play a key role in achieving these objectives, at national, regional and global levels.

Call upon the international community, public authorities at every level and civil society to give priority to providing access for all to safe drinking water and sanitation.

Also call upon the international community, to develop an agreed statement of the principles to be applied in developing and implementing local and national water management systems and international co-operation to support them, taking into consideration the outcome of the Harare Expert Meeting.

Commit ourselves to support the implementation of the following guidelines, where appropriate and in the framework of national and local strategies, taking into account each country's specific situation:

- **Promote the integration of all aspects of the development, management and protection of water resources**, by developing plans which set out to satisfy basic needs and to promote efficient and equitable allocation of water resources, the protection of ecosystems and the maintenance of the hydrological cycle.

To this end, the creative development and evaluation of a wide range of options and their benefits and risks, together with the ongoing co-ordination of watershed development, management and protection, are essential. Public authorities at every level and civil society should play their part in this process and related decision making.

Governments have a crucial role to play in creating enabling frameworks for local and national water resource management through legislative, economic, social and environmental measures.

Shared vision between riparian countries is important for the effective development, management and protection of transboundary water resources.

International conventions such as the Framework Convention on Climate Change, the Convention on Biological Diversity, the Convention to Combat Desertification and the Ramsar Convention can make a contribution on the integration of their special interests in the sustainable use of water.

Thinking on approaches to integrated water development, management and protection should be facilitated by all relevant institutions, including the World Water Council, and supported by exchanges of experience through informal networking between stakeholders within the framework of existing institutions.

- **Mobilise adequate financial resources from public and private sectors** and, as an important part of that task, enhance the effective use of available resources.

To this end provisions for progressive recovery of direct service costs and overheads, while safeguarding low income users, should be encouraged.

Both the polluter-pays principle should be promoted and user-pays systems should be encouraged, at national and local levels, and measures should be adopted to facilitate private funding in the financing of water and sanitation projects, taking into account the specific conditions in each country and region.

Official development assistance should complement and focus on programmes designed for creating enabling frameworks, meeting basic needs, sustainable development, management and protection of water, protection of ecosystems and capacity building. Co-operation and co-ordination between bilateral and multilateral donors and recipient States should be strengthened. In this context, a range of international organisations, including the Global Water Partnership, could have a notable role to play.

- **Improve knowledge, training and information exchange** by encouraging increased transfer of technology and expertise, the development of monitoring and information systems related to water resources and their different uses, and support programmes for vocational and continuous training. In parallel, people living in poverty and disadvantaged groups, indigenous communities, youth, local authorities, leaders of local communities and NGOs should be enabled to become more involved in the decision-making process. Women should be enabled to participate fully in project definition and implementation.

In this spirit, **emphasise** the importance of following up the guidance contained in the Programme of Priority Actions developed by the experts workshops during the Conference, as set up in the annex to this Declaration.

Submit this Programme of Priority Actions to the CSD for consideration at its VI session during its deliberations on a strategic approach for the sustainable use of freshwater resources.

Suggest that relevant international organisations and institutions follow up the actions derived from the recommendations contained in this Declaration and its annexe.

Stress the need to ensure that the problems of achieving sustainable development, management and protection, and equitable use of freshwater resources are kept under review, to improve co-ordination between UN Agencies and Programmes and other international organisations, to ensure periodic consideration within the UN system, in particular the Commission on Sustainable Development, of the proposed priorities of governments for action and to emphasise the role of UNEP in the field of environment.

Emphasise the need for continuous political commitment and broad-based public support to ensure the achievement of sustainable development, management and protection, and equitable use of freshwater resources, and the importance of civil society to support this commitment.

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