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THE NEW CULTURE OF WATER IN SPAIN: A PHILOSOPHY TOWARDS A SUSTAINABLE DEVELOPMENT.

ABSTRACT

The semiarid conditions of most of Spain have allowed for the existence of very rich historical "water cultures", what considered water both as a necessary resource and a source of spiritual well being.

The Spanish "Regenerationism" of the ideologist Joaquín Costa, at the beginning of the 20th century, proposed the construction of hydraulic public works and the transformation of dry lands into irrigated ones, as a means for the economic and social development of the country. During the second half of the 20th century the powerful technology and public funding allowed for the construction of hundreds of irrigation and hydroelectric reservoirs and a few out-of-basin diversions. Along with the increase of water pollution, these systems caused a severe environmental impact that has been described as the "Spanish Hydrologic Holocaust" (Martínez-Gil, 1997).

Although Spain already has one of the highest dam/habitant and dam/surface ratios in the world, the recently approved Spanish National Hydrologic Plan (NHP) will oversee the construction of more than 100 new reservoirs and an out-of-basin diversion of 1000 Hm^3/year from the Ebro River towards the SE littoral provinces of Spain. This will have a major environmental and social impact in some Pyrenean valleys, the Ebro Delta and the receiving provinces (Del Moral-Ituarte, in press), clearly opposed to the principles and objectives of the European Water Framework Directive (EWFD, 2000/60/CE). It will also support the unsustainable urban and tourist development of the Mediterranean Littoral provinces (Arrojo-Agudo, 2003).

The New Culture of Water (NCW) is a social and scientific movement that assuming the ecosystemic perception of the EWFD also considers the relationships of water with human spiritual facet, therefore proposing a certain water ethics. The NCW positions itself in a "holistic" perception of water.

The NCW claims for the strict observance of the environmental laws in use (with special regards to the EWFD), and the preservation and improvement of the Spanish fluvial patrimony. Coherently with the EWFD, the NCW proposes the development of water resources through their efficient use, implementing "demand management" policies. The NCW impulses the intelligent and prudent application of modern technologies (depuration, desalinisation, reutilisation, conjunctive use of alternative resources…), the reformation of Spanish Basin Administration Organisms, and the effective social participation in the planning process. According to NCW the existent reservoirs' management must be optimized, "flood management" measures (related to the environmental management of floodplains) be adopted, and the knowledge and playful use of the aquatic ecosystems be strongly

encouraged. The Spanish NCW is a culture of dialogue and peaceful debate towards a sustainable development in the field of Water Management.

Keywords: Water management, European Water Framework Directive, New Culture of Water, Spanish National Hydrologic Plan, water ethics, sustainable development.

1. INTRODUCTION

The Spanish National Hydrologic Plan (NHP) foresees the construction of more than 100 new reservoirs and the out-of-basin diversion of 1000 hm^3/year from the Ebro River towards the SE littoral provinces of Spain (MIMAM, 2001). These regions have undergone very important economic and urban development in the last decades based upon tourism and irrigation agriculture. In many areas the latter has been carried out outside any planning and even legality, affecting groundwater reserves and traditional irrigation agriculture based on natural springs.

The public hydraulic works contained in the NHP represent huge expenses that will require European Union funding. The latter is probably not compatible with the environmental and social impacts derived from the NHP in the Pyrenean Rivers, the protected Ebro Delta, and the receiving basins, opposed to the European Water Framework Directive (Del Moral-Ituarte, 2003).

Massive demonstrations in Zaragoza (8-X-2000, 400.000 people), Madrid (11-III-2001, 500.000 people), Barcelona (10-III-2002, 500.000 people), and other cities, and the walking "Blue March" to Brussels (9-IX-2001, 10.000 people) against the NHP (**Fig. 1**) have demanded the application of a "New Culture of Water" in Spanish Water Policy. The articulation of a strong social movement loaded with scientific arguments has raised the international interest, as proven by the acquisition of the 2003 Goldman Prize for Europe by Pedro Arrojo-Agudo, as the current president of the "New Culture of Water Foundation".

In this paper we present the historical context in which the social and scientific movement towards a "New Culture of Water" has appeared as well as its main principles and proposals for water policy.

Figure 1: The "Blue March" to Brussels gathered people from the Ebro Basin and the rest of Spain and after a long walking journey arrived to Brussels in the summer of 2002 in an attempt to stop the European Union funding of the NHP, under the lemma "For a New Culture of Water". At the time of writing this paper the EU funding is temporally blocked due to the possible incompatibility of the NHP and the EU Environmental Legislation.

2. WATER: A RESOURCE AND SOMETHING ELSE

Besides being a necessary ingest for people on a daily basis, water has been used as a productive and economic resource since Neolithic. In the semiarid conditions of most of Spain, an adequate supply to agricultural crops allowed guaranteed and improved yields. At the same time that many civilizations have tried to increase their irrigation surface, and have used hydraulic power for industrial purposes trough time, all of them have maintained other kind of relationships with water. The latter have been in connexion with the human spiritual world, and are firstly expressed in the location of Necropolis and cave paintings close to streams and springs.

The Roman Empire constructed the oldest preserved Spanish dams and irrigation systems, while infinity of Thermae were built in the cities and thermal springs were located and exploited for leisure and socializing (**Fig.2**). Spanish Muslims, reputed irrigators, very much appreciated water's reflections and murmurs and widely used them in their amazing architecture. Water was identified as an inspiration for poets and as a key factor for the quality of life.

Figure 2: The thermal spring and bathing facilities of Tiermas, in the Pyrenees Mountains, were flooded by the construction of Yesa Reservoir on the Aragón River. Although it is nowadays exposed and enjoyed by many visitors at the end of the summer, when the reservoir is at its lowest levels, the enlargement of the reservoir proposed in the Spanish National Hydrologic Plan will cause these originally Roman bathing facilities to be definitely lost, as it already happened to the homonymous village of Tiermas due to its construction.

The metaphysical perception of water of all human cultures has generated rich water symbolisms. Water has represented purity and fecundity for most of them, and its continuous flowing has been evoked as life renovation by thinkers of all times and places (Martínez-Gil, 2003).

The strong connexion within human psychic world and rivers can be commonly found in Literature. Herman Hess' *Shiddarta* acquired absolute comprehension, after a life of struggling and frustration, simply staring at a flowing river. Nohad Seattle, in his famous "letter to the white man", affirmed that "*the crystalline water that flows in streams and rivers is not just water, it represents the blood of our ancestors. (...) The murmur of water is the voice of the father of my father... you have to teach to your children that rivers are our brothers, and yours too, and accordingly you have to treat them*".

Unfortunately, raw materialism and absence of values prevailing in our modern societies have broken our ancestral spiritual connexion with water and rivers, being those the ultimate causes of the continuous degradation of the fluvial patrimony.

3. A MILESTONE FOR WATER MANAGEMENT: SPANISH REGENERATIONISM OF JOAQUÍN COSTA.

At the end of the nineteenth century, Spain had lost most of its colonies after a long period of decadence and was undergoing a situation of both economic and social crisis. This situation was especially severe in the rural areas, where local caciques owned most of the land. The peasants depended upon the rainfalls to feed themselves, being usually subjected to starvation. As Spanish economy was fundamentally based upon agriculture, draughts were also a menace for public economic health, and a matter of state.

In this context, the thinker, philosopher, poet and politician Joaquín Costa saw in irrigation the means to "regenerate" Spain and solve most of its problems (**Fig. 3**). Irrigation was the magic formula that, taking advantage of the Spanish sunny weather, would energize the nation's economy, conquering international markets with the overseas exportation of fruits, meat and wool.

Figure 3: Irrigation projects were the main goal of Spanish Water Policy since the beginning of the 20th century, and represented the development of a country used to starvation. Although the situation has radically changed and irrigated agriculture faces a deep transformation, irrigation projects keep being the justification for most of the hydraulic public works, and are a priori considered as positive for an important part of the society, supported by the insistent official speech.

He dreamed of transforming a major part of the "dry" Spain, predominantly cerealist, into a "green" Spain, covered with fruit trees and furrowed by channels, where long caravans of agricultural products would arrive to the revitalised ports (Martínez-Baselga, 1918). This economic development would be accompanied by social development; schools would be built in the rural areas and elsewhere, the Spanish people would be motivated, and the country would be ruled by ideal institutions directed by thousands of straight and honest functionaries.

Joaquín Costa saw water management as "a sublimation of the economic policy, through the agricultural policy" (Costa, 1998). He supported the construction of the already projected dams and canals. Those works would allow the irrigated area to grow from 1,2 million hectares to 2 million hectares, in a predominantly agricultural country of nearly 18 million people at that time.

As the irrigation projects were beneficial to the whole country, Costa postulated that it was the State who had to plan and develop the construction of big dams and channels (Fernández-Clemente, 2000). The idea of using the public funding to finance the hydraulic constructions was Costa's major achievement, happened after he died.

The Spanish thinker always demanded a paced progress towards irrigated agriculture, with small transformations first, carried out by the local administrations. He emphasised the need of education and formation of the peasants. The major hydraulic infrastructures were to be

built only at the end of the process, after meticulous and prudent studies from the Central Administration (Costa, 1998).

Costa´s proposals started to be applied at the beginning of the 20th Century, at the same time that similar ideas were adopted in the USA. The "Confederación Sindical Agraria del Ebro" was the first watershed management organism of the world. It was followed by its Californian homologue, and both countries shared the leadership in water management at that time.

4. SPANISH WATER POLICY DURING THE TWENTIETH CENTURY

After the civil war (1936-1939) Spain was an economically and politically isolated country. The ailments existed long after the war was finished and there were no economic means for improving them. In this context the production of agricultural products was a priority for the government of dictator Franco. Assuming Costa's ideas, his government soon started the transformation of vast areas of dry land into irrigated crops, by means of large dams and irrigation channels. The incipient industrialisation of some areas demanded increasing amounts of electricity, and some of the biggest dams were built for hydropower purposes.

The idea that Nature and natural hydrological regimes were hostile or wrong was adopted by Society and transmitted to Civil Engineers. For the first time they had the technology and the public financial support to change and "improve" it. Rivers had to be "regulated" to serve human production; Spanish Hydrology had to be re-balanced.

Dams were the symbol of Spanish unquestionable agricultural and industrial progress, and thus of the unquestionable economic development of that period (**Fig. 4**). Franco himself inaugurated most of them, as could be seen in the NO-DO, the news program of the Regime.

Figure 4: Dams became the symbol of progress and development in Spain during the 20th century. They represented the power of Men upon Nature, the domination of rivers by means of technology and public funding. Dams and other hydraulic public works have become objectives by themselves for the Civil Engineers commanding water administration, in the belief that any more regulation, any more control on hydrological regime of rivers, is positive for society.

The flooded historical villages, the magnificent canyons, the beautiful valleys that remained flooded forever under the reservoirs could not be seen in the NO-DO. They will not ever be seen again in their original state. Only production and economical growth mattered, in a conception of development that has prevailed during most of the 20th Century. "Environment" did not have the same meaning as it does today, and the civil rights of the inhabitants of the flooded valleys, usually in depressed mountainous areas, were (and still are) brutally ignored.

The words of the Spanish writer and poet Julio Llamazares, whose native village was flooded by a reservoir, can approach us to the sacrifice undergone by those people: "*Anyone who has not had the nightmarish sight of a village emerging out the waters after the years, will ever know how much desolation is hidden in the bottom of the reservoirs. Anyone who has not his souvenirs, his roots nor his house will never imagine how much pain was buried forever in those cemeteries which silently rot under the water*" (Llamazares, 1996).

The Esera and the Noguera Ribagorzana Rivers, described as a nature spectacle of brave waters by 19th Century travellers, flow nowadays through hydroelectric pipes and channels for most of their length (**Fig. 5**). The prior famous canyons of the Cinca River, and an important part of its valley, remain under the waters of two important dams. Their names, Mediano and El Grado, refer to the villages that were flooded as a consequence of their construction.

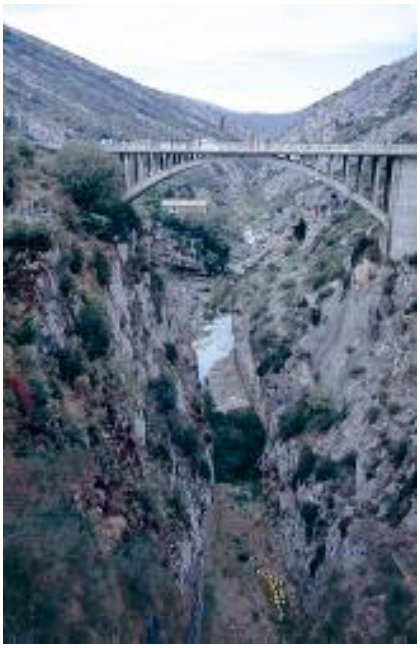

Figure 5: The Esera River, in the Congosto de Olvena gorges. A prior spectacle of water motion and thunderous sounds, admired and described by travellers at the beginning of the 20th century, has been despoiled of most of its magic due to the hydroelectric diversions, which during most of the year left the river bed dry for about 5 Km.

As the irrigated surface in Spain increased up to 4 million hectares, and the use of mineral fertilisers was generalised, rivers received an increasing amount of nutrients and pesticides. The industrial activity produced new and dangerous pollutants that were poured into surface

and ground waters without any control. The rivers, debilitated by the strong detractions, had also to face the raw urban wastewater of a population that, by the end of Franco's dictatorship, had stabilised in about 40 million people. The effects on the water quality were thus devastating.

In the 1960's, thousands of people used to go bathing and fishing in Zaragoza's Ebro River. Only 25 years later no one dared to get in contact with its waters, and although the situation is improving, there is a lot of work to recover the bathing and fishing functions of the river.

Speculative occupation of the floodplains has diminished the extension of gallery forests and other wetlands to their minimum (MIMAM, 2000). Meanwhile, the constructed levees and other "flood control" structures do not manage to palliate flooding economic and human losses, which have been continuously increasing during the second half of the 20th century (Jiménez-Torrecilla and Martínez-Gil, 2003).

Floodplains transformation, dams, hydroelectric diversions, detractions, and pollution caused major damage to Spanish rivers, converting most of them into mere cloacas. Economic development came together with what has been described as "the Spanish Hydrologic Holocaust" (Martínez-Gil 1997). Very few branches of the rivers escaped from the degradation, and some of these, like the Pyrenean Esera, Irati (**Fig. 7**), Gállego and Aragón Rivers are now under the menace of the Spanish National Hydrologic Plan (NHP).

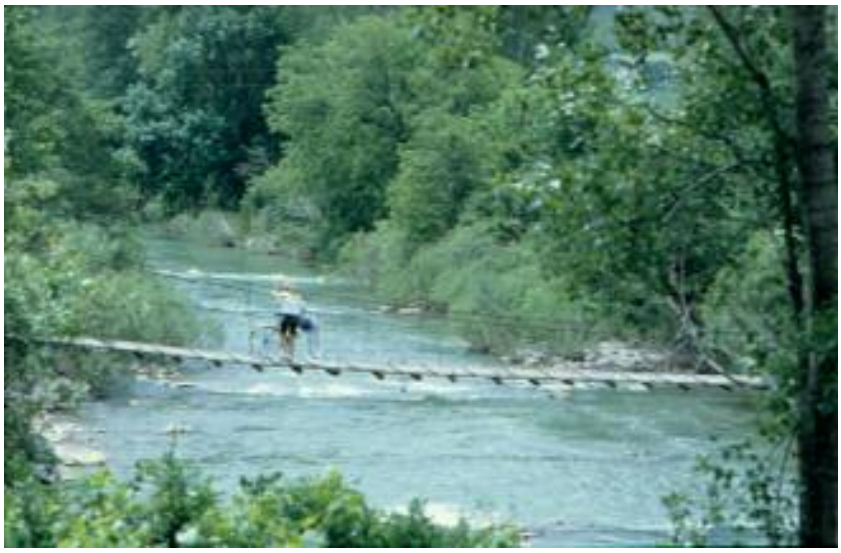

Figure 7: The river Irati in the nearby of Itoiz village. At the time of writing this paper, both this branch of the river and the millenary village are being flooded by the filling of Itoiz Reservoir, with the desperate opposition of Itoiz inhabitants and ecologist and social associations, grouped in the Itoiz Platform. The filling of the Itoiz reservoir is being carried out even though it has two open processes in the Justice Tribunals, related to the risks related to slope instability in the dam site, and to the irregular declassification of a protected natural park that is going to be flooded by the reservoir.

The powerful technology, the public financial of hydraulic works, and the absence of any neither environmental considerations nor ethics in Spanish water policy, have caused a degradation of our rivers far beyond acceptable limits. Yet to go further is planned, giving "another turn to the screw".

5. THE SPANISH NATIONAL HYDROLOGIC PLAN (NHP).

During the late twentieth century water policies in Europe and the world have shifted towards "demands management" and have incorporated the utilisation of new technologies in depuration and reuse. They prime the protection of aquatic ecosystems and point towards sustainable development. The European Water Framework Directive (EWFD, 2000/60/CE) represents these tendencies, incorporating the principles of "*aquatic ecosystems protection"*, "*transparency and social participation*", and "*full cost recovery"* (Del Moral-Ituarte, 2003).

Meanwhile, the Spanish National Hydrologic Plan (MIMAM, 2001) proposes the speculative development of the SE littoral provinces through the public funding for the construction of more reservoirs and an out-of-basin diversion of 1000 hm^3/year from the Ebro River (**Fig. 8**) towards the aiming regions. The NHP shows no consideration for the environmental and social impacts for the inhabitants of the flooded valleys, the Ebro Delta, or the target basins, and has been authoritarianly approved without the desirable social and scientific participation (Grande, 2001). It does not fully consider more cost-effective alternatives nor the implementation of saving policies or utilisation of alternative sources such as desalinisation of marine waters. How can this huge contrast within the NHP and the EWFD be understood?

Figure 8: The Ebro River in El Bocal (Navarra). The most full flowing river of Spain is completely dried most of the summers in this spot of its medium course, due to its Mediterranean regime, the intense regulation and the irrigation diversions. Although this river is already very much depredated, the Spanish Water Administration intends to "give another turn to the screw" to this degraded ecosystem with an out-of-basin diversion and more reservoirs in its Pyrenean Basin.

The "Law of Waters" of 1985, approved in 1985 after the arrival of Spanish Democracy, postulated the national hydrologic planning as a means of "forever solving the water problems of Spain".

Unfortunately, planning has become an objective by itself, while the complex problems of the hydrologic reality remain unanalysed with deepness. The inertia of the public water institutions, whose directives have not been renewed, causes construction of dams and other expensive and notorious public works to be the only "planning" considered.

The need for justifying an old list of dams and out-of-basin diversions has generated a "false official speech" (Martínez-Gil 1997), based upon propagandistic concepts such as "deficitary" and "excedentary" basins, the handy "general interest" (a concept that should be reviewed to fit sustainability), the already traditional "hydrologic unbalanced condition of Spain" or the very much appreciated by politicians "hydrologic solidarity". It is still very common that representatives of the Environment Ministry (prior Ministry of Public Works) formulate that "any fresh water poured into the sea is a waste" or "half of Spain is thirsty while the other half has too much water".

Irrigation projects keep being the justification, on the paper, of most of the projected dams and out-of-basin diversions. It is deliberately ignored that the agricultural activity faces a deep crisis in Spain and has lost most of its economic and social profits in the rural areas. The recent Irrigation National Plan (INP, MAPA 2000) impulses the modernisation, with the subsequent water saving, of more than 400.000 hectares, and only foresees the creation of 148.000 new hectares of irrigated crops. The INP is thus in contradiction with the construction projects of Yesa, Santa Liestra, Itoiz and Biscarrués Reservoirs in the Pyrenees Mountains, included in the NHP, which consider the transformation into irrigation of more than 500.000 new hectares only in the Ebro Basin.

The "Irrigators Communities" (controlled by few dominant landowners through a system that relates the surface owned with the number of votes emitted) support the construction of those Pyrenean reservoirs also support the realisation of the out-of-basin diversion from the Ebro River. It is a widespread thought that they intend to "sell" the water necessary for that diversion, in the belief that they will "own" the regulated resource (Trasobares, 2003, www.yesano.com).

It is not possible to fully understand the actual Spanish Water Management, and its a-priori obsession for constructing dams and out-of-basin diversions, without talking about the strong economical interests of the big constructing holdings (Martínez-Gil, 1999). The connivance within the public water institutions and these holdings has put high rank directives of the Environmental Ministry (including the prior President of the Ebro Basin Administration Institution, Tomás Sancho, and current high level representatives as Benigno Blanco) in the prisoner's seat, while the irregularities found in the Pyrenean Santa Liestra and Yesa Dam projects are investigated. (EFE, 18-III-2003, www.yesano.com).

That connivance, together with the ideological inertias mentioned before, might play a significant role in the consideration of any big important public hydraulic work as desirable by the Spanish Basin Institutions. This aprioristic positive consideration of huge public hydraulic works causes economic arguments not to be seriously taken into account or even

intentionally manipulated (Arrojo-Agudo, 2001; Avellà-Reus, 2001). It is therefore not surprising that more rational and sustainable alternatives are quickly rejected (Genovés, 2001; Samper-Calvete, 2001, Mujeriego-Sahuquillo, 2001), or that the effects of the climatic change might be ignored (Ayala-Carcedo, 2001). It might also one of the reasons for environmental impacts not being properly studied (Prat, 2001; Mairal-Buil, 2001, Martínez-Gil, 2001).

Finally, prepotence and allotment of the resource within the traditional users (fundamentally irrigators' societies and hydroelectric companies) have supplanted the desirable social and scientific participation in water management (Martínez-Gil, 1997).

In this context, The New Culture of Water in Spain arises as a social movement that demands a necessary change in the water management dynamics, a movement loaded with both scientific and moral arguments.

6. THE BIRTH OF A SCIENTIFIC AND SOCIAL MOVEMENT

As a result of a suggestion by two ecological associations, CODA and Greenpeace, the "Association of people affected by big reservoirs and out-of basin diversions" ("*Coordinadora de Afectados por Grandes Embalses y Trasvases*", COAGRET) was born in the springtime of 1995. COAGRET represents all the people "affected" by the construction of dams and out-of-basin diversions. Taking into account that water is understood to be a multi-functional valuable good that belongs to all, its bad management "affects" everybody.

COAGRET is integrated by many collectives of people directly affected by the construction of a dam in the land they inhabit, ecologist groups, and social associations, soon joined by scientists and technicians who work on water under different scopes and believe that a change in Spanish water policies is compulsory.

A number of "working sessions" about water policy during the years 1995-1996 were organised by COAGRET in different regions of Spain. Those "working sessions" were the origin of a new conception of water and its management (www.coagret.com).

As a means to communicate the new ideas for water management, a collection of scientific and technical reports was published under the generic title "New Culture of Water" ("*Nueva Cultura del Agua*", Bakeaz Publishers). "The New Culture of Water in Spain" was also the title of the first, introductory issue of that collection (Martínez-Gil, 1997), and soon the phrase "The New Culture of Water" was used to refer to the whole new water perception and proposed policies, as well as to the social movement that supports them.

Scientist from different organizations soon created the "New Culture of Water Foundation" ("*Fundación Nueva Cultura del Agua",* www.unizar.es/fnca), whose first achievement was the organisation of the first Iberian Congress on Water Planning and Management, that took place in the University of Zaragoza in 1998 (www.us.es/ciberico). The congress was primarily conceived as a forum for the debate and the exchange of ideas within scientists and experts, and there was no intention of producing any common document. Surprisingly, the participants in the meeting found out a notable coincidence of opinions in all the debated subjects, and asked the organisers to present a list of conclusions.

This general consensus within the scientific community of both Portugal and Spain has been verified in the two other Iberian Congresses that have been organised until present: in the Portuguese Aveiro in the year 2000 and in Spanish Sevilla in 2002. In these forums the increasing number of participants have demanded a change in Spanish water policy. They have also condemned the construction of the Pyrenean new dams and the out-of-basin diversion from the Ebro River proposed in the NHP (Arrojo-Agudo and Martínez-Gil, 1999; Grande et al. 2001, Del Moral-Ituarte *in press*; www.us.es/ciberico). Unfortunately the Ministry of Environment has rejected until present to participate in the debates held in these congresses, even though the insistence of the organisers.

The rejection to the NHP has motivated the NCW Foundation to form, together with COAGRET and other organisations, the "Platform for the Defense of the Ebro River" (*Plataforma en defensa del Ebro*). The Platform has organised massive demonstrations against the NHP in Aragón and Cataluña, two regions of the Ebro basin that would be most directly affected: the first one mainly for the construction of the Pyrenean reservoirs needed for the out-of-basin diversion, and the second one for the damage to the Ebro Delta. It also organised the walking Blue March to Brussels, which gathered people from all Spain in the headquarters of the European Commission, trying to stop the European funding to the NHP.

The articulation of a strong social movement supported by firm scientific arguments, to rally against an environmentally very aggressive NHP, was positively valorised by the Goldman Foundation. Pedro Arrojo, current president of the NCW Foundation, was consequently awarded the 2003 Goldman Prize for Europe.

The now popular phrase "New Culture of Water" has been in the forefront of demonstrations by thousands of people, and is commonly used by all the political parties that are not in the current government of Spain. And yet, most of those same politicians and many of the people participating in the demonstrations do not have a clear idea of what the “New Culture of Water" represents and whose are its postulates for water policy and management.

7. THE NEW CULTURE OF WATER IN SPAIN

The NCW relies on a different perception of water compared to present water management in Spain, as described in Martínez-Gil (2003). Four different levels of perception of water and rivers, related with different water policies can be distinguished. Those are the *hydraulic, hydrologic, ecosystemic* and *holistic* levels, which can be summarised as follows:

- The *hydraulic level* considers water just as any other productive resource, and thus its management consists in constructing reservoirs and canals to transport it where it can yield the maximum profitability at a given time, solving the “pathologies” of natural hydrologic regime such as floods and low water periods. The policies inspired in this perception might be justified under certain situations typical of developing countries, although they have motivated the degradation of rivers and other aquatic ecosystems all around the world (Abramovitz, 1998). This perception and policies predominate in present day Spanish Water Administration and in the NHP, even though the economic and social situation of Spain is nowadays far from those which might justify purely hydraulic policies.

- The *hydrologic level* is aware of the dynamicity of water and thus of its great singularity, and considers some of the equilibriums maintained by its interactions with lithosphere and atmosphere. This level integrates management of floods, draughts, dissolved solutes, transported sediments, relation with groundwater, etc. within the complexity of water policy, applying the "caution principle" and undergoing meticulous studies before acting to any part of the hydrologic system, in order to keep the hydro chemical and geomorphologic processes maintained by the water cycle inside the unity of the basin. Public hydraulic works are not considered an objective by themselves but a necessary impact whose consequences should be minimised.

- The *ecosystemic level* includes the previous level and considers the interactions of water with the biosphere. It postulates the good ecologic condition of the aquatic and riparian ecosystems both as a goal by itself and as a means of preserving water productive and supply functions for humans. This is the level represented by the European Water Framework (EWFD) and should rule the policies of all European countries (including Spain that has been one of the most reticent countries during the redaction of the EWFD) in the future.

- The *holistic level* considers not only the interactions of water with lithosphere and biosphere, but also with the spiritual facet of humans. A river is not only a very dynamic system interrelated with geomorphological and ecological processes, but also the feelings that it evokes in the inhabitants of the territory around it, the relations of the river with their wellbeing and their linkage to the whole territory. The NCW is located in this humanist level and thus introduces the human rights of the minorities not to be expulsed from their historical settlements, and the right of future generations to enjoy the hydrological patrimony (Martínez-Gil, 2003).

The foundation of the NCW relies therefore on a holistic vision of both water and the human being. Once our basic needs for feeding and drinking are satisfied, we have other, spiritual but also legitimate needs that pure economic development can not satisfy. Under this point of view, rivers are not just a resource for economically productive activities, but also a huge potential source of well being and an invaluable natural, cultural and social patrimony.

A river can generate pleasure from staring at it, walking by its forested banks, fishing in it, rafting it (**Fig. 9**)… A living river is also a major sign of identity for the people living in a certain territory, it is a consubstantial part of that territory (**Fig. 10**), and the water flowing in it can not be treated like a conventional resource such as coal or electricity. It is a patrimony that can not be transvased somewhere else, in the same way as the Alhambra Palace of Granada can not be transported to Madrid or Brussels, even if in that case more visitors would buy their tickets and there could be an economical profit.

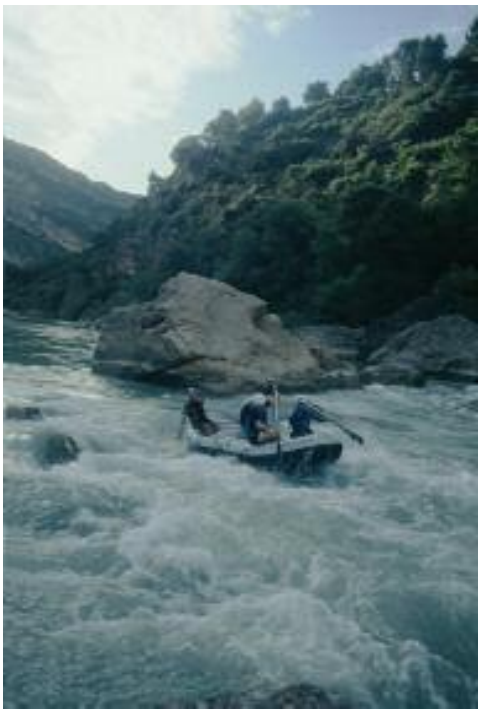

Figure 9: Gallego River in the projected Biscarrués-Mallos de Riglos Reservoir area (Zaragoza). Rafting, or navigating in calmer rivers, represents a nearly irreplaceable experience to fully understand the values offered by the most precious pieces of the hydrological patrimony. Environmental education while navigating appears as a useful tool in order to wider the productive perception of rivers.

Figure 10: The Gallego River in Biscarrués. The river cuts its way out of the Pyrenees Mountains shaping a very attractive landscape that is enjoyed by thousands of brave waters paddlers every year. The proposed construction of the Biscarrués-Mallos de Riglos Dam would finish with these activities and therefore with the most promising economical source for the inhabitants of this increasingly tourist area, compatible with its sustainable development, besides destroying one of its main signs of identity.

Rafting, or navigating in calmer rivers, represents a nearly irreplaceable experience to fully understand the values offered by the most precious pieces of the hydrological patrimony. Environmental education while navigating appears as a useful tool in order to wider the productive perception of rivers.

Once rivers and the other aquatic ecosystems are considered as a patrimony, there are some limits in their productive utilisation, limits that can not be trespassed in order to preserve all its functions and values. The destruction generated beyond those limits is not acceptable for the society, and herein rises the concept of sustainability for water management.

The actual Spanish water policy is based upon increasing the offer to the potential users, traditionally irrigators and more recently golf fields and tourist urbanisations, through the construction of reservoirs and an out of basin diversion financed by the public administration (including the UE). This policy increases the consumption of water and supports the appetency of the potential consumers for a cheap resource, thus leading to more predation on a continually degraded resource, building more and more expensive public works, flooding mountainous valleys and disarticulating the communities that inhabited them, in a clearly unsustainable process.

Spain is one of the countries with the highest number of dams in relation to its surface and its number of inhabitants in the whole world. In this context, to propose a NHP whose main content is a list of more than hundred big dams and a 1000 $hm^{3/}$year out of basin diversion, to be financed with public funds, is to avoid the historical rendezvous with the challenge of sustainable development (Del Moral Iriarte, *in press*; Arrojo-Agudo, 2003). The new conception of development requires a new conception of water management, which in Spain is represented by the NCW.

The NCW is, first of all, **a culture of dialogue and peaceful debate**, opposed to the prepotency, authoritarianism and bridling policy of the actual Spanish water administrations. An example of the latter can be found in the polemic public declarations of Minister of Agriculture Arias Cañete, in 2002. According to this minister, the president Aznar had told him that the actual NHP was going to be carried out as a "military stroll" (EL PAIS, 14/11/2000). Far from these attitudes, the society should be properly educated and informed in order to guarantee its full participation in the debates (Martínez-Gil and Antoranz, *in press*).

The singularities of the water as a resource require the existence of a legislation **that does not allow its completely free merchandising**, guaranteeing the preservation of its natural and patrimonial values, and the legitimate right of everyone to an adequate supply.

Although **the strict observance of the environmental laws in use** should be obvious, examples from the Spanish water management of the last decade show this exigency to be most pertinent. In the case of Itoiz Reservoir (Navarra's Pyrenees), that remains still unfilled, the limits of a Natural Reserve were modified in order to avoid the projected flooding area, receiving a condemnatory sentence from the National Audience. The challenge represented by **the European Water Framework Directive must be completely accomplished** in the proposed deadlines.

The NCW proposes a deep **reformation of the Spanish basin administration organizations** (*Confederaciones Hidrográficas*), which nowadays depend upon the Hydraulic Works General Direction (*Dirección General de Obras Hidraúlicas*, DGOH). Water management is (or should definitely be) more complex than just building public hydraulic works. It is necessary the incorporation of professionals from different disciplines, diversifying the professional profiles of the direction and staff of those organizations and incorporating a younger generation of civil engineers.

In Spain most of the irrigation systems, which consume 85% of the available resource, have 50% losses of water and the mean efficiency in the urban supply does not arrive to 70%. The NCW demands **an efficient use of the resource, developing policies based in the "demand management"** rather than the "offer management". These policies include modernisation of the irrigation and urban supply systems, consciousness-raising campaigns within the society towards saving attitudes, land-use planning and control (illegal irrigation systems keep being created in SE Spain at the moment), assumption of economic and environmental costs by all users, etc.

The **utilisation of the existing reservoirs must be optimised**, preparing management plans for the dry periods, adding environmental objectives to their traditional goals (i.e. maintaining a more stable level, or building recreational facilities), and monitoring their eutrophication and sediment filling process in order to prolong their functional life.

The NCW requires **strict scientific rigour in the studies and planning process**, both in technical, social and economical issues. A good planning starts with a serious diagnosis of the real situation and its problems, which have not been deeply analysed in the NHP. The *a priori* assumption that building dams and out-of-basin diversions is positive, a sign of modernity and a contribution to "development" of Spain, has caused that the studies from the administration are just intended to justify the already mentally approved public works. When other studies do not support the intended constructions, they are ignored or underestimated. The Ministry of the Environment ordered a review report of the NHP to at least 80 reputed scientists, from different disciplines, within Spanish Universities and Research Centres. Those reports were not published afterwards by the Ministry, nor facilitated to the public, even though the continuous demands from the NCW Foundation to reach them, and even though they had been paid with public funds. When the NCW Foundation gathered 67 of those reports directly from the authors and published them, it was verified that all of those reports were very critical with the NHP and yielded a negative verdict (Arrojo-Agudo, 2001b).

The **intelligent and prudent application of modern technologies** in desalinisation, reutilization, conjunctive use with groundwater, sewage treatment and other fields can be very helpful in the achievement of sustainable development and offers much cheaper solutions to the supply objectives of the NHP. Desalinisation of marine waters in SE Spain is about 50% less expensive than transporting the waters from the Ebro River to the same regions (Arrojo, 2003).

Improving the water and ecological quality of rivers, wetlands and estuarine waters must be a priority in water policies. This might be achieved by minimising the sources of pollution, both from industries and urban areas, increasing and completing the treatment facilities (still

absent in many Spanish villages and industrial complexes), and creating or restoring wetlands to diminish agricultural Non-Point Source Pollution.

The recent floods in the Ebro valley motivated organisation by the NCW Foundation and the University of Zaragoza of a scientific seminary that concluded that **flood management measures should be adopted,** such as proper land use planification in flooding areas and using natural lamination capabilities of riverine wetlands, instead of the traditional flood control ones such as levees, reservoirs, etc. (Jiménez-Torrecilla and Martínez-Gil, 2003). Flood management is not only more cost-effective but also contributes to the preservation of the fluvial ecosystem and patrimony. Actually chaotic flood control measures should be revised by competent organizations, and might be restrained to the protection of consolidated urban areas in the future.

The **knowledge and recreational use of rivers** and the other aquatic ecosystems must be strongly encouraged. People can not appreciate what they do not know. Navigation, bird watching, fishing, riverside hiking or cycling can be popularised in a compatible way with the preservation of the ecosystem's values. Environmental education activities in rivers should be carried out within scholars, being the fluvial navigation a nearly unsubstitutable experience for discovering their beauty. Living with our backs to the rivers supports their continuous destruction.

Finally, it must be stressed that the NCW recognises the necessity of some kind of **water ethics observance,** which would guarantee the rights of all the minorities affected by the construction of a dam (**Fig.11**) and especially the right of the future generations to use and enjoy the world's hydrological patrimony. Given that a river is not just a mere resource for human beings, but might also be a significant part of their territorial identity and their natural patrimony, its management surpass technical discussions alone and comes into moral debate.

At the time of writing this paper, the millenary village of Itoiz (Navarra), expropriated for the construction of the homonymous dam, has been demolished with the desperate opposition of its inhabitants, 30 of whose were arrested during their forced evacuation. The demolition has been carried out even though the filling of the already constructed dam is paralysed by the courts, with the only apparent objective of punishing the inhabitants' legal struggling. The pain generated by actual water management was already responsible of suicides during the filling of Riaño Reservoir. How long will the human rights of present and future generations will be absent of water management?

The menaces to rivers and villages represented by the NHP require at least a national open debate, which nowadays is considered one of the basic claims of the NCW Foundation.

Figure 11: Demonstration "for the dignity of Mountain [people], for the dignity of Aragón" in Zaragoza (2002). The New Culture of Water assumes a certain "water ethics", consisting in setting limits to what is an acceptable behaviour of the water administrators, recognising the civil rights of the minorities living in an area affected by the construction of a reservoir and the right of future generations to use and enjoy the hydrologic patrimony.

8. CONCLUSIONS

Rivers, wetlands, estuaries, deltas... are part of an Environment which is a Mankind's patrimony; a natural, social and cultural Heritage that does belongs to all of us and to the future generations. Assuming the sacred value of its preservation should lead us to a general sustainable development, which in the field of Water Management is the NCW's final objective.

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