MAREMED
MAritime REgions cooperation for MEDiterranean

INSTITUTO PORTUARIO DE ESTUDIOS Y COOPERACIÓN
DE LA COMUNIDAD VALENCIANA

EUROPEAN PROJECT MAREMED

"Maritime Regions Cooperation for the Mediterranean"

"Water Framework Directive"
"Implementation of the Water Framework Directive in Coastal Areas"

Identification of common issues among Mediterranean Regions

SUMMARY OF CONCLUSIONS

FEPORTS

GENERALITAT VALENCIANA

1 INTRODUCTION

The Water Framework Directive (WFD) establishes that Member States shall protect and enhance all artificial and heavily modified bodies of water, with the aim of achieving good ecological potential and good surface water chemical status at the latest 15 years from the date of entry into force of the Directive. In two years from now the main objectives set by the WFD have to be reached. However many improvements have still to be done. In 2013 Spain or Greece haven't yet published their River Basin Management Plans, France or Italy have to improve in a second phase some aspects according to the recommendations set by the Commission despite they are fulfilling the dates. The intercalibration process has still some problems to be tackled and the characterization of transitional waters is still quite unclear for certain parameters. On the other hand there's a general feeling among the experts of the Mediterranean regions that suggest the WFD doesn't face a quite common issue in this area: droughts and water scarcity. This document collects the results of some questionnaires delivered to the partners of MAREMED and the analysis of the situation on the implementation of the WFD based on interviews and presentations of members of the Water General Direction of the Valencia Region (Spain). Other sources of information have been used (reports of the EU, Mediterranean Regions, ONGs, etc).

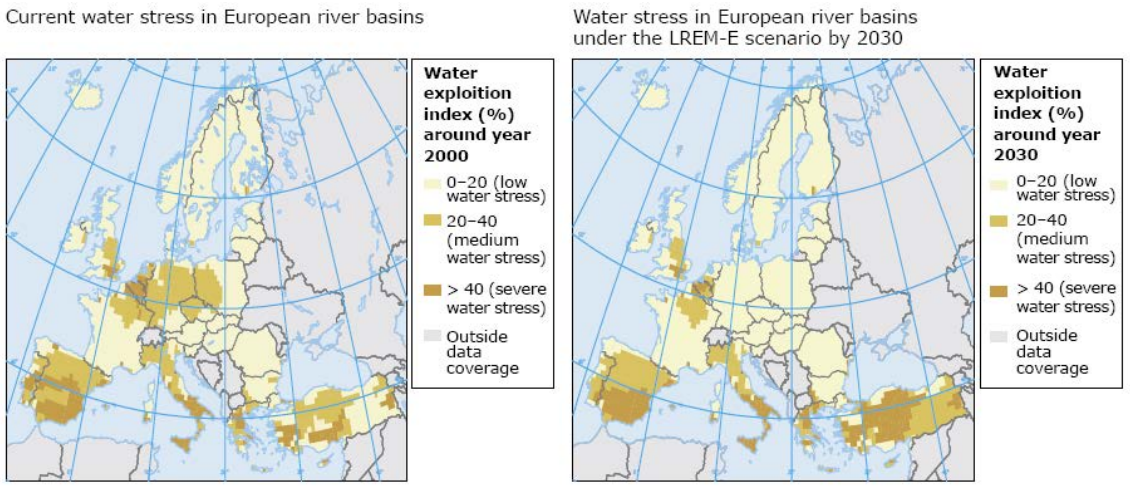
1.1 The problem

According to the European Drought Centre[1], although not consistent for all assessed regions due to the highly spatial and temporal nature of precipitation, a long-term trend (1900-2005) on droughts and rains could be observed, showing a significant precipitation increase for Northern Europe and a decrease for the Mediterranean region. Recent studies suggest there is a link between these two phenomena.

WFD focuses on water quality issues meanwhile in the Mediterranean Regions quality cannot be addressed while serious droughts problems are present. Despite water scarcity and droughts are different phenomena; they are liable to aggravate the impacts of each other. In some regions, the severity and frequency of droughts can lead to water scarcity situations, while overexploitation of available water resources can exacerbate the consequences of droughts.

The next map shows water stress in European river basins:

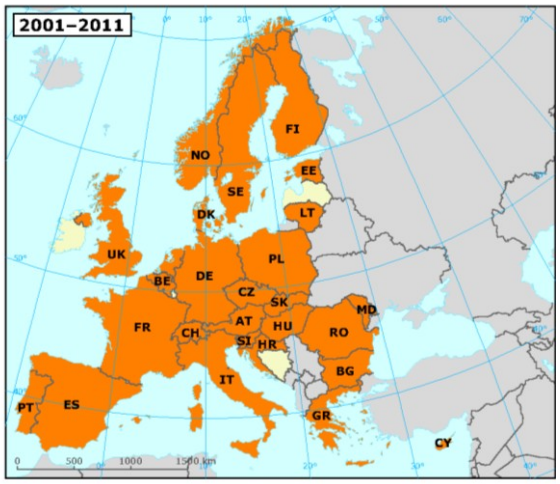
[1] Droughts and climate change. Henny A.J. van Lanen, Lena M. Tallaksen, Gwyn Rees - Hydrology and Quantitative Water Management Group, Centre for Water and Climate, Wageningen University, Wageningen.



Source: European Environmental Agency

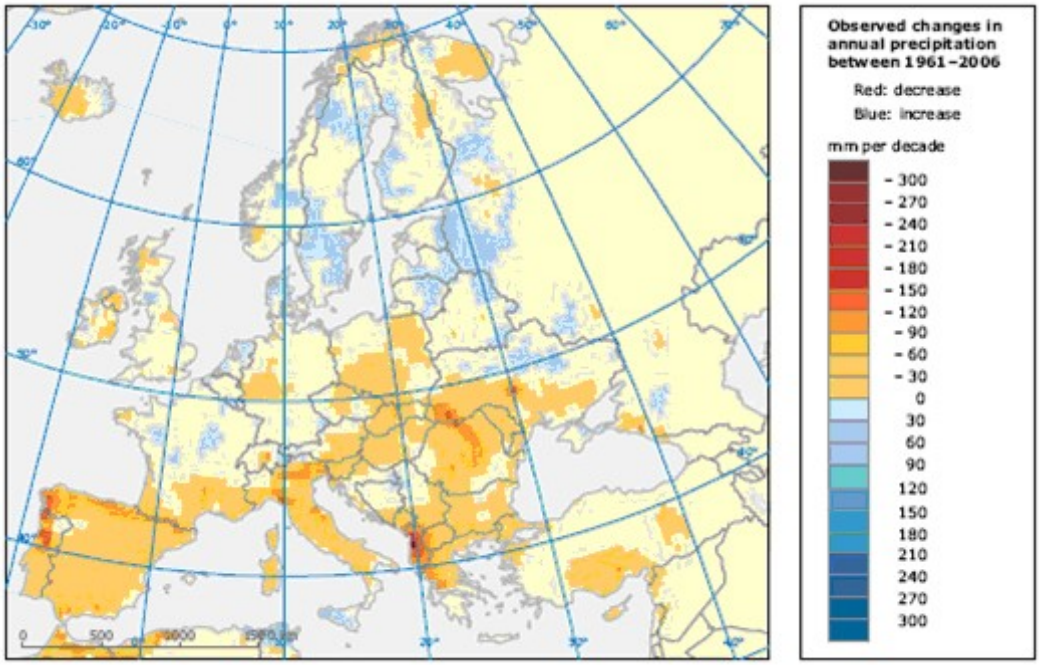
In the Mediterranean region, the Spanish coast, South of Italy and some areas in Greece present severe water stress. The rest of Mediterranean areas suffer medium water stress in general.

The next figure shows observed drought episodes in Europe during the last decade:



As it can be seen, drought is a phenomenon that occurs or has occurred practically in all Europe. The most severe cases are in those areas suffering high water stress. Over the past thirty years, droughts have dramatically increased in number and intensity in the EU. According to the European Environmental Agency, the number of areas and people affected by droughts went up by almost 20% between 1976 and 2006.

Several indicators can be taken into account to illustrate the severity of a drought event. The level of precipitation may be one of these indicators. The following graph shows the observed changes in annual precipitation between 1961 and 2006. The whole Mediterranean area presents a decrease of precipitations:



Source: European Environmental Agency

On the other hand, at present there are in the Mediterranean sites of high environmental value that have a clear anthropogenic origin (like some coastal wetlands, lagoons and marshlands). According to the WFD, "Member States shall collect and maintain information on the type and magnitude of the significant anthropogenic pressures to which the surface water bodies in each river basin district are liable to be subject", among them "estimation and identification of other significant anthropogenic impacts on the status of surface waters (…)", including impacts caused by agriculture or water transfers. The next case will show the complexity of the management of this issues in a typical Mediterranean region.

2 A CASE STUDY: THE JUCAR RIVER

2.1 Some data

The Jucar (in Valencian, Xúquer, in Aragon, Xúcar) is a river of the Iberian Peninsula, located in eastern Spain and belonging to the Jucar Basin, mainly located at the Valencia Region. It has a length of 497.5 km, passes through the provinces of Cuenca and Albacete (Region of Castilla-La Mancha) and Valencia (Region of Valencia), and flows into the Mediterranean Sea. It was called *Sucro* by the Romans. It rises at 1,700 masl, on the southern slope of the hill of San Felipe (Universal Mounts) in the area known as the Eyes of Valdeminguete and close to the springs of the rivers Cuervo (Tagus basin), Guadalaviar-Turia, Cabriel (Jucar basin) and Tagus itself, in the Iberian Mountain Range. Arguably the major mountain ranges of the border between Cuenca and Teruel, in particular, the Universal Mounts, constitute the main *divortium aquarum* or primary watershed between the rivers of the Atlantic slope and those draining into the Mediterranean including obviously, the Ebro river basin with the spring of Jiloca river in the underground of Pozondón moorlands (northern Universal Mounts).

The river system in its header is snowy-rainy origin with a spring maximum and a plentiful flow rate. In its middle and lower course it depends more on seasonal rainfalls, peaking in autumn coinciding with the "cold drop[2]" so characteristic of the Valencian lands. As a result of torrential rains, the Jucar has reached the highest flow rates in Spain after the Ebro.

2.2 River uses

The main uses of its middle course are for reservoirs. The river is stocked in a series of reservoirs for the production of hydroelectric power, the regulation of the river to prevent flooding and for irrigation and human consumption. The Cofrentes nuclear power plant uses Jucar waters for cooling the plant. In addition, the excess energy in peak hours is used to pump water to the reservoir of La Muela located on Cortes de Pallas butte, which helps to increase the hydroelectric power potential in the plants of the Jucar riverbed (Cortes de Pallas Hydroelectric Power Plant). The last sections of the course wedged between mountains provide underground feeding of some artesian springs.

Jucar River: Composition made with pictures of Wikipedia

[2] "Cold Drop" = Short and very torrential precipitation

In its low course, the Jucar opens in the plain after passing through the canyons and gorges where is located the Tous reservoir, and from that moment, flow levels decrease due to heavy use for irrigation on the upper and lower riverbanks (Ribera Alta y Baja). This area is the flood plain of great economic importance to agriculture, being the most densely populated area of the course. The plain is formed by contributions from both the same Jucar and its tributaries Magro and Albaida.

The reservoirs and irrigation channels, dams for hydropower production or industrial uses (examples of Cofrentes, where waters are used for cooling Jucar the thermonuclear plant, and many others), drinking water supply, inland waterways (in the last km and in the ditches that drain into the Albufera), freshwater fishing (sport fishing) and tourism are some of the important uses of the river, the most important and used in the Valencia. And the use of the waters of the Jucar in the final stretches of the river (marina and fishing contests) show the use so intense and therefore the enormous economic value of this river. It is likely that this river is, relative to its flow rate, the most used and the most economic value that is among the rivers of Spain.

So, summarizing, main uses of the Jucar River are:

- Hydropower production
- Cooling systems for thermonuclear power plant
- Industrial uses
- Irrigation
- Fishing
- Leisure boating
- Drinking wáter

2.3 Analysis

The Jucar River is a complex system from the point of view of its uses, actors involved and the environmental commitment set out by the WFD. On October 4, 2012, the European Court of Justice condemned Spain for failing the deadlines set by the Water Framework Directive covering the new water plans in a large number of Spanish River Basin Districts - they had to be approved in December 2009 - and their public consultation. Jucar Basin, which was selected as one of the “pilot basins” for the implementation of the WFD has not yet approved its River Basin Management Plan. This analysis will try to show the problems and difficulties in the management of this river and its basin and why the RBMP is still pending of approval.

A sentence found in a recent newspaper illustrates the magnitude of the problem of water availability in the Valencian Region and in the Spanish Eastern coast in general:

"The municipqlity of Aspe received yesterday the first two cubic hectometres of water from the Júcar through the transfer to the Vinalopó, representing the culmination of a historical claim of 592 years and gives free rein to Alicante farmers to irrigate the fields" [3]

As seen, the problem isn't only political, geographical or social but historical. Even the implications are cultural. It also occurs in other areas of the Valencia fertile plains like in "L'Horta", where the millenial "Tribunal de las Aguas" (Court of Water) meets every Thursday in order to discuss, set and fix conflicts on irrigation water among the farmers in the irrigation communities of the area. Its origin is completely unknown to us, although it is likely to be an evolution, based on previous Andalusian traditions. Some historians place its origins in Roman times.

Of all the peninsular Spanish Districts, "probably the District affecting Jucar and Albufera is which is in a worse situation" according to some ecologist organizations (Xúquer Viu, SEO/BirdLife, Acció Ecologista-Agró, Ecologistes en Acció y WWF-Valencia)[4] . They have also indicated that, currently, the planning process of the Jucar District is paralyzed until the territorial delimitation occurs.

On the other hand, the position of the responsible of water resources and quality of the Valencia Government is that the River Jucar is a typical West Mediterranean river and its "natural status" corresponds to the reality. The features of this kind of rivers are:

- Short-lived
- Intermittent
- Present water during rain seasons
- Very poor flow rate at the end of the course

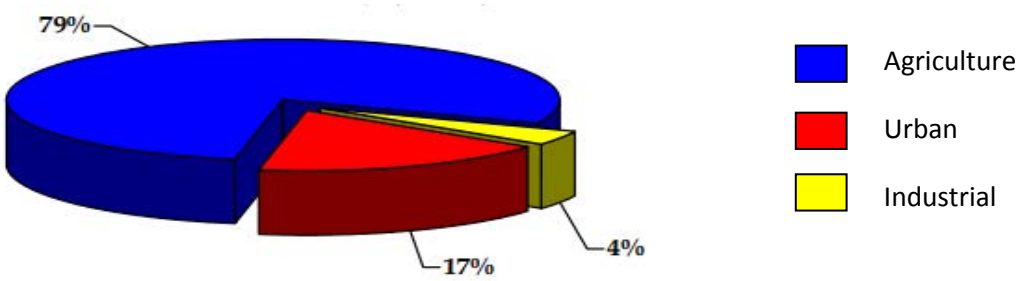
Ecologists state the poor situation of the river and its degradation is due to water transfers (Jucar-Vinalopó) and the high demand of its water for agricultural, industrial and urban uses.

Water demands

The main demand of water in the basin of the Jucar corresponds to agriculture, 2820 Hm^3 in 2005, representing nearly 80% of the total demand in the basin.

[3] LAS PROVINCIAS – Valencia, 21 September 2012 "El agua del trasvase Júcar-Vinalopó ya riega los campos alicantinos"

[4] EL PAÍS – Valencia, 5 Noviembre 2012 "La Directiva del Agua se incumple en el Jucar, denuncian los ecologistas"



The total demand was in 2005 of 3593,85 Hm^3.

The average flow of the Jucar river is around 49,22 m^3/s, although the river's flow is quite intermittent and torrential. This flow would suppose 1552 Hm^3 per year. Despite the rough calculation, clearly the demand (~3600 Hm^3/year) is very high (more than the double of the average flow). Clearly with these figures, it is expected the river hasn't got any flow near the end of its course. Indeed, this "rough" calculation coincides with the situation reported by the ecologist group "Xúquer Viu" (Júcar Alive) in January 2013[5], which condemned the lack of environmental flow in the river. In fact, 14 km from the river's mouth there's no any flow arriving the sea during weeks, even months; just a thin water layer flowed the day of their protest.

Representatives of the ecologist platform "Xúquer Viu" protesting in Cullera's Irrigation Dam on January 2013
Source: Blog del Agua – Actualidad del ciclo integral del agua - http://blogdelagua.com

So the low and irregular flow at the end of the river's course seems not only be due to the natural status of the river, the climatic circumstances, evaporation, filtration or the intermittence of precipitations but an intensive use for irrigation and the presence of water transfers from this "loss-making" river to another (Transfer Júcar-Vinalopó).

[5] Blog del Agua – Actualidad del Ciclo Integral del Agua, 5th January 2013

Water transfers always have been a polemic issue in Spain since there are many actors involved, from farmers, to private companies, passing by political interests.

Jucar Vinalopó Transfer[6]

The Jucar-Vinalopo transfer is a curious case of conflictive and long-lasting water planning management influenced by political interests and lobbies of users and different stakeholders. Historically this transfer is claimed since the XV century. This conflict is part of the reason by which the Jucar River Basin doesn't have yet its River Basin Management Plan.

We part from the basis that the Júcar River (south Valencia, Spain) has a deficit flow due to the high demands besides the natural features of a Mediterranean Spanish river and the Vinalopó aquifer (South Alicante) is overexploited (that's why a water transfer was needed).

The Vinalopó-Alicante system is a space characterized for the shortage of hydric resources but a great development of underground waters. These underground waters have allowed the water supply in most of the municipalities of the province and, at the same time, the development of a very advanced agriculture, well known for its efficiency and productivity. In order to alleviate the serious problems caused by an excessive exploitation of the underground water and to restore the former hydric balance, the Hydrologic Plan of the Jucar River in 1988, anticipated the necessity of creating an interbasin diversion from the Jucar River to the Vinalopó. This one was approved unanimously and it was declared of general interest by the State and their works were included in the Hydrologic Plan of 2001.[7]

The chronology of this transfer is:

In 1998 the Jucar River Basin Management Plan was approved. This plan included the piping Júcar-Vinalopó and the transfer of water resources from the Júcar to Vinalopó also was declared of general interest, under the government of Jose María Aznar (PP, 1996-2004). The maximum amount to be transferred yearly was set in 80 Hm^3. Once the environmental impact statement was approved in 2000, a year later it was approved the National Water Plan Act which included this transfer in the list of investments. Also in 2001 it was signed an agreement between the "Users Central Council of the Vinalopó" and the state company in charge of the transfer works, "Aguas del Júcar" which sets out the obligations and rights (finance, flows, rates, etc) for the construction and operation of the transfer. Of the 80 Hm^3/year it was expected that 45 were intended to irrigation and 35 to supply. In November 2002, under the same government that planned and approved the transfer, the first stone of the works was placed in Cortes de Pallas in the medium-high part of the river course in order to ensure high quality water for the supply and despite the flow rate problems that the river already had due to the high water demand.

[6] Information extracted and adapted from "Chronology of Júcar-Vinalopó transfer", CEDEX, 10 September, 2012

[7] LÓPEZ ORTIZ, María Inmaculada; MELGAREJO MORENO, Joaquín. "El trasvase Júcar-Vinalopó: una respuesta a la sobreexplotación de acuíferos". Investigaciones Geográficas. N. 51 (en.-abr. 2010). ISSN 0213-4691, pp. 203-233

The piping, of about 70 kilometers, was divided into seven sections, from the Cortes reservoir to Villena. The planned investment is 230 million Euros, financed by Aguas del Júcar (32.61%), ERDF funds (34.78%) and users (32.61%). In December 2003, the European Commission announced the award of 80 million Euros in ERDF funds to finance the implementation of the works, establishing a series of environmental conditions (environmental flow, pumping replacement program, contributions to the Albufera, etc.)

Cortes de Pallás Dam, the original intake of the Jucar-Vinalopó water transfer. Source: Ribera Express

In 2004, after the change of government (Jose María Zapatero, PSOE, 2004 - 2011), the Ministry of Environment constitutes the Jucar-Vinalopó Transfer Technical Commission. At the beginning of 2005, the Commission presents its conclusions. In September the Contract between Aguas del Júcar and the Users Central Council is terminated for failure. In October, the new Ministry of Environment (different party than in 2002) announced unilaterally the re-routing of the Júcar-Vinalopó, moving the point of extraction to the Marquesa Dam in the low course of the river Júcar (near its mouth). This fact presumably would reduce the environmental impact on the lack of flow of the Júcar but the quality of water would be worse or useless for supplying purposes (more suspended solids due to returns of irrigation channels and high salinity) and there will be an increase of the power costs (water has to be pumped in all the stretches). The change in the routing would also triplicate the costs of the works, since the works with the original routing were already ongoing. In that year there's a strong social movement in Alicante against the change of the extraction point, since the people (irrigation communities and general population) wanted the better quality of water and not to delay more the transfer. This demonstration is also supported by the regional government (PP). On the other side there are ecologist groups, left-wing political parties (PSOE, EU), the communities of irrigators of the Júcar River and the Central Administration (State) through the Ministry of Environment.

Demonstration in 2005 in Alicante supporting the former routing of the Júcar-Vinalopó Transfer
Source: UCE

On July 2005 the works of the original routing were stopped when they were almost 70% finished. In June 2006 the Environmental Impact Statement for the new route is approved. In July the works of the five new stretches are awarded. In December, the European Commission announced the increase of ERDF funds to finance the infrastructure to 120 million Euros.

On February 2007 Aguas del Júcar signs a new agreement with the Júcar Basin Authrioty whereby the latter will be responsible for distributing the flow rates of the water transfer for future users of the conduction. In July, the Government Commissioner in Valencia, Antonio Bernabé, placed the first stone of the new route in Llanera de Ranes.

New routing of Jucar-Vinalopó Transfer (from Cullera to Villena) - Sorce: vinalopodigital.net

The new route of the conduction has an approximate length of 90 kilometers, including the last 3 sections of the original layout. The planned investment is 320 million Euros, financed jointly by the European Commission with ERDF funds and the Government of Spain. This amount doesn't consider the money already invested in the prior routing.

In 2010, Acuamed a public Company under the Ministry of Agriculture, Feed and Environment, absorbs the functions of Aguas del Júcar and Aguas del Segura. This company also manages the desalination plants along the Spanish Mediterranean coast. On November 19, Júcar water begins to fill the pool of San Diego in the Upper

Vinalopó. Water comes from Cullera, in the lower part of the course.

In September 2012 there's a new agreement between Acuamed and the Community to empty the pool of San Diego (5 Hm^3) and to fill it again with 12 Hm^3 more once the works for repairing some leaks are done.

San Diego Pool in Villena, the end point of the Júcar-Vinalopó transfer. Source: fecoreva.es

Finally in January 2013, one year after the change of government (Mariano Rajoy, PP, December 2011) the community of irrigators and Acuamed deal the change of the transfer routing to the original project supported by the former government of Jose María Aznar and which was stopped in 2005 by the government of PSOE.

This new negotiation is expected to be hard since the Valencian irrigators (Community of irrigators of the Júcar) are against the transfer from Cortes de Pallás because it would mean in theory a decrease in the supply to their fields.

2.4 Conclusions

This conflict seems to be far away of its resolution. The European Commission conditioned the funding of the original routing of the transfer (and the following modification) to the fulfillment of certain conditions related to the WFD in the Júcar River: environmental flow rate, pumping replacement program, water contributions to the Albufera, etc. This would mean an increase in the price of water for paying the infrastructures. Just to mention that the price of water in Spain is one of the lowers in Europe, being 4 times lower than in Netherlands, for instance. The EU sets the principle that "who uses the water, must pay". In 2010 the cost of this resource for the user should have been the cost of the service. A report released by the EU in July 2007 states that the construction of water infrastructure "should be considered an option when others have been totally discarded." Thus, the transfers, the construction of desalination plants and dams appear as an extreme option for the environmental or social damage which can lead to. The EU considers that the "major projects" have feasibility

problems "and cause social and political problems between donors and receivers." Therefore, the UE points out that these infrastructures are not the most appropriate. It's important to note that both options in the transfer routing were planned and approved coinciding with each change of political sign in the government and also both passed the Environmental Impact Statement. This millionaire infrastructure has been put over any consideration of the environmental or social damage at long term. With a historical perspective, it seems quite clear that also political interests have influenced in each option. On the other hand, public information sometimes is insufficient and depending on the interests could be oriented to a favorable stance or just to the contrary. Local lobbies often convince the general population to adopt certain positions based on the lack of knowledge and to the protection of the immediate interests both in time and space. Sometimes a solution for a region is a problem for another one. This is the case. That's why it is very important to manage these issues from a global point of view. The problems of a river basin are the problems of the whole river basin district since, as we have shown, the decisions and actions of one river inside the same basin could affect other areas in the same basin; and we cannot only consider the economical damage in a certain moment of the History and in a certain area of the geography; even historical claims not always are rightful since a claim of the XV century has never taken into account the environmental impact or the sustainability of present and future generations.

If among the possible solutions of the overexploitation of the Vinalopó aquifer without jeopardizing the local economy we don't consider the possibility of carrying out important infrastructures, what could have been done? It seems clear that restoring the aquifers in the Vinalopó needed the supply of water from somewhere, and letting the local economy (agriculture mainly) to die wasn't an option. Therefore, a solution environmentally acceptable and energetically efficient would need an important infrastructure, a fact that was supported by all the parties involved, even the EU. However the management of this issue has been from the beginning at the mercy of each governing party and the pressures and interests of the different stakeholders. Perhaps a major change at European level in the governance on these issues (vital resources like water), that last over the pass of the years and the different governing terms should be considered in order to avoid to perpetuate situations that affect the society and the environment at long term.

3 ANSWERS TO QUESTIONNAIRE ON IMPLEMENTATION OF WFD

A set of questions were delivered to the regions involved in MAREMED. These are the main conclusions obtained from their answers:

3.1 INTERCALIBRATION

Conclusions:

With respect these answers and the remarks given by the interviewees, it seems clear the Intercalibration Process is a very good tool since the sharing and linking of scientific data facilitates the comparison and then the harmonization of thresholds by quality elements. Intercalibration of water bodies is especially important since often overcomes administrative

boundaries, because River basin Authorities detain prerogatives upon one or more regions within a same state, and also because EU water bodies ignore also Member States' boundaries (International River Basin). Intercalibration method is also relevant for territories which share similar geo-physical and hydrological features (Liguria/PACA or Languedoc-Roussillon/Cataluña for instance). However there's a feeling on the intercalibration process that has not allowed for the moment an exhaustive comparison among European Regions, and it has not allowed developing common indicators which are then finely-tuned on regional specificities.

3.2 WATER PLANNING (River basin management plans- RBMP)

Conclusions:

In general all the river basins count on several studies, reports and documents containing elements that establish the previous situation of these basins before the development of the new RBMPs according to the WFD. Some of them are clearly specific documents such as "Strategic Environmental Assessments" or "Water Plans". Other documents are reports based on data from which conclusions the preliminary status could be deduced. Despite Jucar Basin in Spain has a very specific document published in 2009, their RBMPs are still to be approved[8]. Greece is still pending on approving their plans, since the consultations started between November 2011 and November 2012 (in the case of Crete, consultations started in November 2012, so there is a great delay in the deadlines). Respect to Italy, despite having approved all their RBMPs, general recommendations made by the EU Commission are about the provisional nature of their plans, which have to turn into permanent systems; and about the lack of transparency in certain aspects such as pollutants, priority substances, application of exemptions and designation of Highly Modified Water Bodies. Other aspects to point out are the high percentage of water bodies that have an unknown status and the absence of objectives in some River Basin Districts, etc. With regards France, in general, recommendations are similar but fewer than Italy: assessment methods for biological quality elements and chemical status need to be further developed and improved, exemptions have to be more clearly justified, more transparency has to be implemented in the identification of pollutants and in the Programmes of Measures, etc.

It is important to remark that the different Member States have their own planning traditions, which means they all have their own long-established manners of adjusting developments in society, with corresponding division of roles and allocation of tasks between public and private sectors. In order to implement the Directive in a socially acceptable manner, every Member State should be able to inform, capacitate and promote the active involvement of stakeholders and the public which may mean that the current planning can be improved and revised.

[8] According to the last information of the Spanish Ministry of Environment, RBMPs of the basins of Guadalquivir, Guadiana and Eastern and Western Cantabric received a positive report from the Government in December 2012. These approvals are added to other 5 already approved during 2012: Distrito Fluvial de Cataluña, Galicia-Costa, Tinto-Odiel, Guadalute-Barbate and Cuencas Mediterráneas Andaluzas. Despite this positive report, these plans are still to be approved, published and notified to the EU Commission.

3.3 WISE SYSTEM

Conclusions

WISE is a really powerful tool addressed to European, national, regional and local administrations, scientists and research institutions, professionals in private and public organizations and the general public. Its utility for the moment is partial since there is an important lack of data and even some data is wrongly treated or shown so in certain cases it is possible to misunderstand some graphs or figures; however this tool is dynamic and it is in constant improvement. On the other hand, it seems there is a lack of diffusion of this tool since despite it is known; it isn't really widely used at least by the regional authorities consulted in this survey. Also some actions should be addressed to keep updated the information since things change quite quick as regards water bodies.

3.4 TRANSITIONAL WATERS

Conclusions

In general, criteria used for the sizing of the transitional water bodies are the same for all the partners (each country uses the same criteria within the same territory). Typically it is water bodies of 0,5 Ha or larger. There are some exceptions depending on the features of the water body. Some regions haven't identified transitional waters since they don't have, at least, in the terms defined in the WFD (Crete, Marche). Problems in the characterization of these waters are all of them related to the lack of criteria for defining certain indicators for these waters. It is quite difficult to establish which is the "natural" status of a transitional water body since salinity varies; the characteristics of a transitional water body are unique and hardly comparable to other ones.

3.5 SAMPLING

Conclusions:

The most recurrent problems are those related to threshold levels and detection ranges and financial issues. Other problems are operative, directly related to sampling process. Region Marche summarizes quite well the problems identified by the interviewees:

With specific regard to monitoring, the most critical aspects are:

- Technical instruments with high sensitivity are very expensive, the scarce financial availability does not always allow to purchase these sophisticated instruments;
- The choice and number of sampling points are not always exhaustive: the areas that should be monitored are often very big and thus a trade-off between position and number of sampling points on the one hand, and cost of sampling activities on the other, must be found.

- Public Administrations have very small financial resources, and therefore the monitoring activities indicated by the European Directives on water quality cannot always be planned and implemented.

Solutions proposed are always related to increase funds availability or to a better allocation of funds, since more budget would result in purchasing better equipment, more adapted to the strict threshold levels requested by the WFD for certain substances (priority substances for instance). Besides more funds would imply a better management of sampling frequencies and procedures. However no interviewee contributes with a constructive solution but Marche Region:

"A better allocation of funds could help to solve many issues and to duly fulfill the WFD requirements. Indeed, it would be good if the WFD itself included a specific Financial Planning section, so that the allocation of financial resources could be more easily carried out at the national and Regional level. In this regard, there is often a "governance" problem, since competences are tranferred from the EU to the national to the Regional level, but the same is not done for funding."

3.6 PRIORITY SUBSTANCES

Conclusions:

Almost all interviewees coincide in the very strict threshold levels required by the WFD for the priority substances which often are incompatible with the detection level of the available equipment (Mercury, TBT, etc). Other problems are the blank samples used for instance for zinc, which zinc level is over the level present in sea water. Other problems were reported respect to the analysis procedures for sea water.

The Mediterranean French regions state they take into account some analysis detection thresholds in seawaters are clearly higher than the WFD thresholds and the fact that the transit of contaminants in the water column is particularly variable and in Mediterranean often at an extremely low level (under analysis detection). It is particularly the case of Corsica in which water quality is still in most of the cases very good. To solve the problem, agencies in charge (Agence de l'Eau RMC, IFREMER) decide to work with biota integrators (mussels) and passive integrators (DGT) that allow integrating the water column transit of contaminants. The results are treated after to fit with EQS ("Environmental Quality Standards"). Today, methods of evaluation of the sea water by integrators of the different types are clearly important and an efficient way that anyway needs to be improved (particularly for some substances) through new developments.

French regions counts on a "chemical pollution monitoring network". Until 2007 inclusive, the national environmental observatory network measured metals (Ag, Cd, Cr, Cu, Hg, Ni, Pb, V, Zn), polyaromatic hydrocarbons (PAHs), PCBs, lindane and DDT residues.

Since the implementation of the WFD, environmental monitoring of chemical pollution is decentralized in the Water Agencies which cover the water column. The chemical surveillance coordinated and conducted by Ifremer just concerns the 3 metals regulated under health

surveillance (Cd, Hg and Pb). In 2006, in orderto assess the quality of coastal and transitional waters of Rhone and Mediterranean and Corsica districts, AERM&C entrusted IFREMER the project management of the first monitoring campaign of all water masses withheld under the monitoring campaign of the WFD. The year 2009 was dedicated to the second monitoring campaign of surveillance, enhanced from the first campaign of operational control. The results of this campaign were processed and synthesized in the years 2010 and 2011. Data are available in the reports 10-19 and 10-20 "Water Framework Directive - Monitoring controls / operational (DCE Campaign 2009). The year 2011 was devoted to the programming of the next campaign of surveillance monitoring (2012).

Although information reported by Crete states the priority substances monitoring campaigns are still underway and thus there are no available data, there are some studies with respect to these measurements such as the one published in 2003 in the Journal of Environmental Monitoring 2003 Aug; 5(4):593-7. This campaign was performed by the Water and Air Quality Laboratory, Department of Environmental Studies, University of the Aegean. This study states that the priority substances of List I, 76/464/EEC Directive, some of which belong to the Water Framework Directive 2000/60/EC, were monitored in the surface waters of Greece through the developed network of 53 sampling stations. The results showed the presence of several priority substances in Greek surface waters, in most cases at concentrations well below the regulatory limits. However, non-compliance was observed for a limited number of compounds. A conclusion of such study was both the monitoring network and the analytical determinations have to be expanded to more water bodies and more priority substances, in order to safeguard the quality of Greek surface waters.

Respect to the list of priority substances that are being monitored, there is no a specific identification of them. French regions monitor “all the priority substances”, Italian regions monitor “all substances included in the European lists, with special regard to priority dangerous substances”. Specifically, Liguria monitored all the priority substances during the campaign 2009-2001.

In general, PS are not being monitored in port waters (Italy considers ports as pressures) and in France some of them are monitored under certain studies not directly related to the WFD (France). At least the Port of Valencia (Spain) performs one sampling campaign per year for priority substances.

Cyprus monitors the following synthetic compounds in biota samples from coastal sites: a-HCH; b-HCH; c-HCH (lindane); HCB; p,p’-DDE; p,p’-DDD; p,p’-DDT; aldrin; Heptachor epoxide; Diedrin; Endrin; cis-chlordane; trans-chlordane and trans-nonachlor; Anthracene; Benzo(a)anthracene; Benzo(a)pyrene; Benzo(b)fluoranthene; Chrysene; Fluoranthene; Fluorene; Naphtalene; hexachlorobutadiene and 10 PCB congeners: IUPAC-101, 105,118, 138, 153, 156, 180, 28, 31 and 52. The heavy metals that are monitored in the seawater (some of them also in biota) are: Cu, Zn, Pb, Ni, Cr, Cd, Fe and Hg.

A Dissemination Workshop / JRC Innovation Transfer Event held by ISPRA on 29-30 October 2012 titled “Chemical Monitoring under the Water Framework Directive (WFD) - Current Challenges” concluded that some PS are very difficult to analyse (Tributyltin, Chloroalkanes)

and values for EQS are very low. In fact the new proposal for EQS for certain PS are in the range of picograms (10^{-12} g) or even femtograms (10^{-15} g). Specifically for coastal waters:

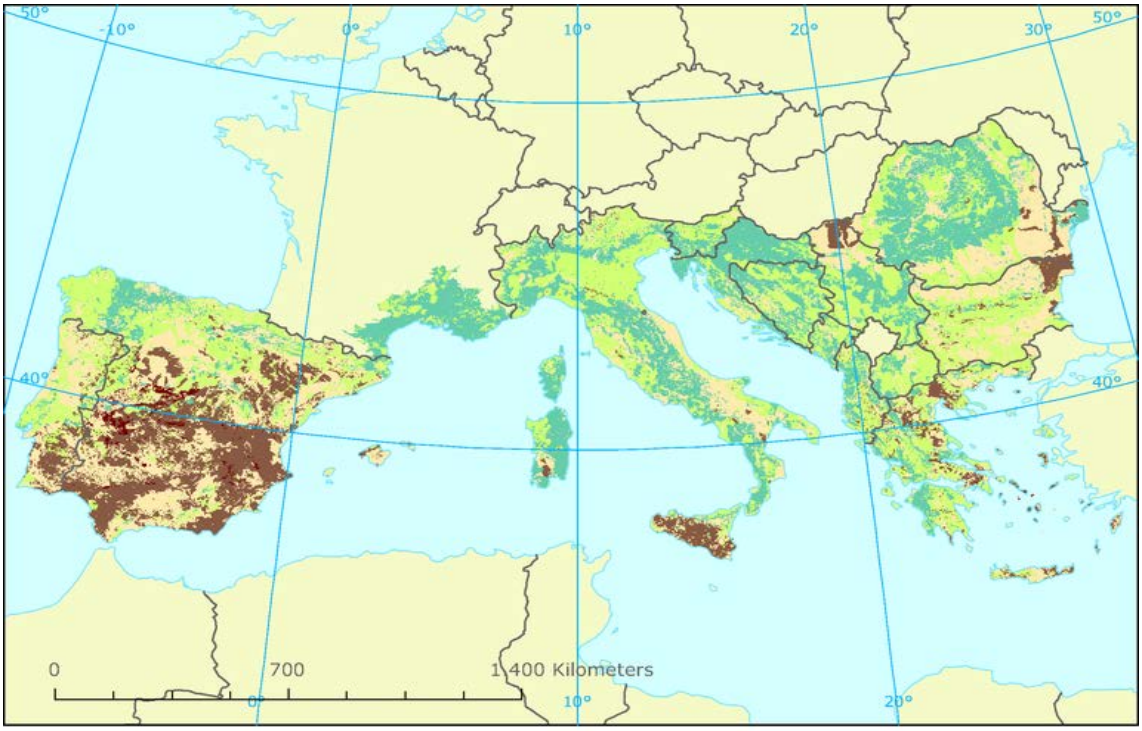
- Cypermethrin: 8 pg/l
- Dichlorvos: 060 pg/l Dicofol: 32 pg/l
- 17-alpha-ethinylestradiol: 7 pg/l
- 17-beta-estradiol: 80 pg/l
- Heptachlor/Heptachlorepoxide: 10 fg/l
- PFOS: 0.13 ng/l

This means that apart from the problems of certain laboratories for analyzing certain PS due to the detection range of their equipment and other circumstances, future PS will be in a range of detection that surely will precise of new high technologies and investments that hardly could be affordable for the regional budgets.

4 SOME MESSAGES TO THE EUROPEAN UNION

The issue of droughts and water scarcity cannot be obviated in the European policies related to water quality and thus in the WFD. In fact, the word drought appears only 5 times in the WFD, four of them in the “Whereas” section. Terms such as “water or hydric stress” or “scarcity” don’t appear in the Directive. To this respect; some issues have been identified by the team working in WFD issues under MAREMED project together with the Head of Resource Planning and Water Quality of the Directorate General of Water - Valencian Regional Ministry of Presidency. Main examples have been taken from the Valencian and Spanish experience in these matters in order to better illustrate the situation in the Mediterranean European countries.

MAREMED diagnosis phase and the following surveys carried out suggest WFD was released without taken into account the huge differences between countries that don’t present droughts or water scarcity problems and those countries presenting severe scarcity, hydric stress and lack of water resources.



Index of sensitivity to desertification (SDI), 2008

< 1.2	Non affected areas or very low sensitivity to desertification
1.2–1.3	Low sensitivity areas to desertification
1.3–1.4	Medium sensitivity areas to desertification
1.4–1.6	Sensitive areas to desertification
> 1.6	Very sensitive areas to dersertification

Source: European Environmental Agency

Big areas of Spain, Sicily and some spots in Greece are sensitive or very sensitive to desertification. The presence of sever water stress matches with high sensitivity to desertification.

These countries have historical conflicts for water distribution, especially Spain, which depends on water transfers between rivers, which complicates the adoption of suitable river basin management plans.

For over 100 years, water policy and management in Spain have been instruments of economic and social transformation. Significant public and private investments in water supply infrastructures have equipped Spain with over 1,200 major dams, 20 major desalination plants – with more under construction – and several inter-basin water transfers. The system has been apparently very successful, with an increase in overall water availability, strong associated economic development and few urban water supply shortages. This success has been supported by a widespread consensus among a strong and largely closed water policy community made up of water managers, irrigators, electric (hydropower) utilities and developers. However, today this historical agreement is in crisis. The environmental damages caused by past policies are now evident, but there are still unsatisfied claims for water,

especially in those regions with devastated water ecosystems, such as the Segura, Jucar or Tajo river basins. On the other hand, there is a growing ecological consciousness that is supported in its claims by the water policy objectives of the WFD. Water users and stakeholders who previously had little say in policy decisions are also contesting the long-term privileges of large historic water users with long-term use rights over water. In addition, the growing power of the country's autonomous regions means that inter-regional conflicts over water allocation decisions are becoming more frequent.

Water Transfers in Spain Source: Revolve Magazine - Nuria Hernández-Mora & Francesc La Roca

The recent Marine Strategy Framework Directive however has a degree of flexibility for its implementation that is not considered in the WFD. This flexibility is surely a result of the poor experience in the implementation of the WFD.

The Marine Strategy Framework Directive sets in the recital number 34 that in view of the dynamic nature of marine ecosystems and their natural variability, (…) it is essential to recognise that the determination of **good environmental status may have to be adapted over time.** Accordingly, it is appropriate that programmes of measures for the protection and management of the marine environment be **flexible and adaptive and take account of scientific and technological developments** (…).

To this respect, 'flexible' deadlines or even a 'moratorium' could be considered in order to adequate the situation of certain regions/countries to the reality of the present time. Perhaps this could be "unfair" since other countries have done a great effort for meeting the deadlines; however, when talking about water resources and quantity, it isn't the same Denmark than

Greece. Maybe these considerations were not taken into account when the WFD was conceived.

Problems like the one that is facing the Jucar River Basin is a clear example of the 'snake biting its tail': Investments such as water desalination plants should comply with the River Basin Management Plan, which is under development and not yet approved; however there is an urgency from the EU in order these plants to begin running when several criticalities are not yet solved due to economical factors.

After 2004, Spanish water policy appeared to abandon large hydraulic works in rivers and focused instead on the promotion of desalination as the new supply alternative. The new "AGUA" program (Actions for Water Management and Use) envisaged the construction of some 20 desalination plants along the Mediterranean coast (from Barcelona to Almeria) to provide the water that would otherwise have been supplied through the Ebro transfer. At the same time the implementation of the EU-WFD was prioritized, with an increased emphasis on economic rationality, demand management, ecological conservation and social participation.

However, the reaction of the traditional water policy community was effective enough to change the course of action after the 2008 reelection of the socialist government. The new management team in the Ministry of the Environment, Rural and Marine Affairs – which is responsible for water policies – was unable to complete the planning process under the EU-WFD, which has been blocked until now, while the inter-regional conflict gained momentum. New national elections in 2011 had once again changed the territorial balance of power, producing a new political map dominated by the conservative party, both at national and regional levels[9].

The WFD departs from an ideal situation in which water masses should be as they were at their origin. However, in many Mediterranean basins, water shortages, flooding problems, together with the particular characteristics of soil and climate, have led to an IRREVERSIBLE transformation of the territory, so that the main ecological spaces have at present, in many cases, a human origin. What is considered as a pressure for the WFD shouldn't be considered as such. The Spanish East, for example, without agriculture would be a desert today.

The WFD considers water uses as anthropogenic pressures, but in certain regions these uses not only create economic wealth, but environmental and ecological wealth being these water masses artificial sites (anthropogenic origin).

For instance, la Albufera is the result of the returns of traditional irrigation. Since 1990, the Albufera Nature Reserve has been included as a Ramsar Site in the list of wetlands of international importance for birds. The growing of rice is a traditional use of these waters since the 18th century; it has great economic and environmental importance because in the rice fields are where the water of the lake is purified and there still exist plant and animal species that have disappeared from the lake itself. These also provide food and shelter for many birds.

[9] Revolve's Water Around the Mediterranean special report in association with the Union for the Mediterranean, pages 61-63.

Albufera in Valencia, an example of antropic-origin high environmental value. Source: Juan Luis Moreno

The salines in the south of the region have a high environmental value and they have industrial origin. The two salt lakes of Torrevieja and La Mata are a protected natural park.

La Mata and Torrevieja Salines. Source: http://www.yourspain.net

The salt lake of La Mata is declared an important area for bird life. The history of the lakes goes back to the 13th century when the first licenses were given by the king for the harvest of salt. Now, they are still the biggest and oldest salt lakes in Europe, they are producing the salt for the cold winters on the roads of Northern Europe. The salt lakes are connected by the sea by two channels allowing the depth of the lakes to be altered for the salt production. There is very little vegetation in the salt lake (to high level of salinity) but they are at least 2000 different species of birds, like 1500 flamingo's.

Water policies in Mediterranean basins should be different than in Atlantic or Northern basins. Water scarcity suggests a different management model. The same premises could not be applied for such different conditions between countries with water abundance and those suffering severe hydric stress.

The WFD only addresses ecological water quality problems in ecosystems. It neither considers the ecological quality in areas where water uses are produced thanks to that same use (as we remember, for the WFD, an use is a pressure), nor considers the problems of quantity, which are precisely our basins basic problem. Many of our quality problems derive from the problem of the quantity.

A typical Mediterranean dry river bedin Valencia Region Source: Google Maps

Knowledge of the regions in water management is basic in order to solve water quality –and quantity- problems. In order not to get wrong in the diagnosis of the real problems, regions should be taken into account in a wider way.

Regions have at present more powers or competencies in water management issues which supposes necessarily their involvement in the implementation of the European Policies. The problem lies perhaps in the political interests which underlie in the management of scarce resources in the Mediterranean as water for irrigation or human consumption.

The criticalities for the implementation of the WFD in Mediterranean countries are at technical, financial and administrative levels. A better allocation of funds could help to solve many issues and to duly fulfill the WFD requirements. Indeed, it would be good if the WFD itself included a specific Financial Planning Section, so that the allocation of financial resources could be more easily carried out at the national and Regional level. In this regard, there is often a “governance” problem, since competences are tranferred from the EU to the national and to the Regional level, but the same thing is not done for funding.

According to the WFD, the use of economic instruments by Member States may be appropriate as part of a programme of measures. The principle of recovery of the costs of water services, including environmental and resource costs associated with damage or negative impact on the aquatic environment should be taken into account in accordance with, in particular, the polluter-pays principle. An economic analysis of water services based on long-term forecasts of supply and demand for water in the river basin district will be necessary for this purpose. Despite these economical assessments were carried out, at present there important financing problems and uncertainties with regards the establishment specific budgetary lines to the WFD implementation.

In coastal areas, the interfluve areas (areas that do not belong to any basin, located between the mouths of different riverbeds) are numerous and constitute the largest part of the coast. That's where populations are often located and where productive irrigation are situated. Clearly the interconnection at coastal level between different basins is essential to implement efficient measures to solve the problems. Pedagogy should be made on this issue and put in

value the importance of interconnections between river basins and users as optimal route for a more efficient management of water resources.

Rivers in Valencia Region and interfluves areas Source: Author and Wikipedia

This idea corresponds precisely with the concept of river basin district, as unit of management and planning, a concept that is above of the river basin, ie, the management can and must be done by the conjunction in the same area of several indivisible river basins. The concept of river basin should never be limiting to this integration of several basins for a better shared management. Only in this way the deficits of a basin can be compensated with the surpluses

from another one; alternation which also occurs occasionally. This management type allows taking advantage from synergies, to take a better profit from the hydric works and, in many cases, it is the only option.

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