POSITION OF THE INTERMEDITERRANEAN COMMISSION (IMC) OF THE CONFERENCE OF PERIPHERAL MARITIME REGIONS (CPMR) CONCERNING THE WATER SECTOR (WATER AND ENERGY WORKING GROUP).

Context:

In the globalisation process we are immersed in, water, energy and climate change form a triple focus for important national and international policies. For example, COP22[1] will be held this year in Marrakesh and should put forward policies to fight climate change risks at world level; in the European Union, the directive establishing a Community framework for action on water policy is at the review phase[2] and, although the future world energy market has yet to be defined, the European Union has been working for many years on an extremely complicated single electricity market, a considerable percentage of which is accounted for by renewable energies.

In this scenario, the Mediterranean regions show unusual features that must be taken into account when it comes to specifying and developing these policies. There are other areas of the world where the impact of climate change is likely to be greater, but in the river basins draining into the Mediterranean Sea its effects are already becoming clear: a considerable reduction in rainfall and, as a result, the water contributed, is being recorded, and there is an increase in temperature translated into a parallel increase in evapotranspiration. Ultimately, the sum of both effects leads to a worsening of the water balance, aggravated by the increase in frequency of droughts. The final consequence is that some of these Mediterranean river basins are at water stress levels and this is intensifying in intensity and in the area affected. The occasional use of unsustainable water management practices that end up over-exploiting the available resources has contributed to this situation. Overexploitation can result in a fall in surface river flows and the piezometric levels of groundwater, saline intrusion in coastal areas and a general worsening in water quality, as there is less flow to dilute pollutants.

[1] 22nd meeting of the Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC), which will be held from 7 to 18 November 2016.
[2] Directive 2000/79/EC of the European Parliament and of the Council of 23 October 2000, best known as the Water Framework Directive (WFD).

Some of the Mediterranean coast's most valuable assets are the high level of development of sectors like agriculture, fishing and tourism and the many natural areas it includes, where there is a high level of biodiversity. All this, however, is being put at risk by the pollution reaching the sea, the strong demographic pressure on the coasts and the decline of rural society. A very high percentage of bodies of water have serious difficulties in achieving a good state as defined by the WFD, conditioning the sustainable development of the regions where they are located. It is therefore appropriate to achieve greater protection for the wetlands of the coast, coastal waters and fishing resources, as well as maintaining and protecting the quality of agriculture and the protection of the rural environment where it is carried on.

On the other hand, the Mediterranean regions are historically at the forefront when it comes to designing solutions to water problems because of their strong agricultural tradition and the experience acquired by having to deal with frequent extreme hydrological phenomena (floods and droughts). The opinions and knowledge of these regions, which form an important part of the Intermediterranean Commission, cannot therefore be ignored when it comes to drawing up the policies mentioned at the beginning, particularly when the regional and local governments have powers to carry out a large proportion if not the majority of the measures proposed in the river basin management plans to achieve these purposes.

That is the reason why the adoption of water policy in the EU cannot be done without taking into account the fact that the Atlantic coast, which includes a large part of Spain and Portugal, receives precipitations from evaporated Atlantic Ocean water, up until a 100%. In the Mediterranean basin though, 80% of evaporated water comes from this area, one the one hand as result of cyclogenesis, and on the other of summer storms. In the current climate change and land-use scenario, these kinds of summer storms on the Mediterranean coast have almost disappeared, gradually increasing water shortages, whereas floods increase on the Atlantic coast. Both phenomena are feed-backing themselves, contributing to worsen the situation.

Objectives:

1.- To sketch out lines of action making it possible for Mediterranean regions to cope with current water challenges in the context set out in the present document, and to influence general policies in issues such as the elaboration of new regulations, policies, and plans, as well as the use of European funds and international aid.

Beyond developing more efficient system of water management through innovative solutions, it would be necessary to make the most of available resources flowing into the sea and coming from regenerated waters, and others proceeding from water desalination.

2.- Support research and the development of technologies to improve the yields and efficiencies of water conveyance, as well as the production of renewable energies. This would allow a decrease in the costs, while maintaining the food and agricultural sector and simultaneously stimulating technological leadership in Mediterranean Regions and employment.

To fulfil such a goal, options could be to create research groups involving administrations, universities, and companies of Mediterranean Regions, which results would help define plans, programmes, and specific actions.

It is worth noting that conveyance and reuse of regenerated water, in addition to efficient technology availability, need to demonstrate the reliability and efficiency of renewable energies in this sector. They should also show the way nutrients coming from treated water interact with coastal ecosystems. Considering consumer confidence also implies conducting thorough studies on the potential impact these actions could have on public health.

In this context and generally speaking to favour the fulfilment of both goals, it is fundamental to keep creating collaborative spaces between Mediterranean Regions, as the exchange of good practices, of knowledge, and other lines of research with the common objective of protecting the Mediterranean basin in its whole as its inhabitants.

Criteria:

The following general principles have been considered in the choice of these lines of action:

1º) Hierarchisation of water policies, to prioritise the lines aimed at achieving greater efficiency in managing the available resources. This means, firstly, the promotion of saving water resources and, secondly, regenerated water reuse (closing the urban water cycle) and the use of desalinated water.

2º) Sustainability. Having already considered the economic and environmental points of view, this sustainability is difficult to achieve without working on the water-energy relationship, and other innovative solutions, even more so if we consider the effect both resources have on adaptation to climate change.

3º) Horizontal nature of policies. So that the proposals to solve the problems detected in the water sector also have favourable or synergic effects on the policies applicable in other sectors, such as energy, climate, health, employment, rural development, scientific research, technological development, stimulus to private investment, and obviously in technologic leadership and employment creation.

Ultimately, the lines proposed are aimed at the implementation of decisions and projects adapted to the requirements of an intelligent, sustainable, integrating economy coinciding with the growth strategy put forward by the European Union for the next decade.

Lines of action:

A.-Research projects

Following the criteria set out, it has been considered appropriate to put forward three preferred lines of action to develop applied research projects, developed as follows:

1ª) Relationship between available water and energy. Alternative energies.

The reduction in available water resources means there is a greater need to transport water to the areas where it is in shortest supply, whether this involves sending regenerated or desalinated water or connecting with other alternative supplies. The shortage requires greater energy consumption to meet the areas' water needs.

The over-exploitation of resources is unsustainable and generates serious environmental problems in the ecosystems associated with water. It also causes a fall in the piezometric levels of groundwater requiring still greater energy consumption for pumping.

Any water loss (mains leaks, inefficient watering systems, etc.) is translated into excessive energy costs, as greater volumes of water than are really needed to meet demand are mobilised, making it necessary to over-dimension pumping and treatment.

Ultimately, greater water needs require greater energy consumption and water losses are translated into energy losses. Alongside this, greater energy consumption is incompatible with the aim of reducing CO_2 emissions to halt climate change.

In regions where it is necessary to use unconventional water resources (regenerated and desalinated water) to prevent deficits in the water balance and/or the over-exploitation of conventional water resources (surface water and groundwater), energy exploitation and building costs are becoming obstacles to achieve financial balance.

To deal with these problems, an initial solution must be saving water, which will also reduce energy requirements. For this reason, some regions have made a very considerable effort to modernise their watering, moving from gravity watering to localise watering, as well as improving their supply and sanitary networks to reduce leaks.

However, when it is necessary to resort to the use of unconventional resources, greater energy consumption is both inevitable and often inviable because of its cost to potential users. It must be borne in mind that these resources are largely concentrated on the coast (because the population is there, which means the waste water generated is also there, along with the seawater) while the main uses (agriculture) are further inland. For this reason, energy optimisation in transporting water and promoting the use of alternative energies, such as photovoltaic or wind energy, which reduce energy costs, are put forward here as a second solution.

The use of these alternative energies makes it possible to reduce energy costs and reduce the emissions resulting from conventional energies. It is, therefore, a choice making it viable to use unconventional energy sources which, in some cases, would otherwise be unviable because of the energy cost, putting them beyond the reach of

some of the potential users of the water. However, an initial investment is required which, in many cases, determines failure to adopt them. The cost recovery principle operates in these cases in the opposite sense because it makes the use of unconventional water resources more expensive even though these could prevent or reduce the use of conventional water resources on which this principle acts, or should act, as a real economic instrument of environmental policy.

Another part that should not be forgotten is the need to strengthen Mediterranean Regions technological leadership, in way that besides improving energy efficiency and reducing costs, the development of these technologies be a good source for employment creation in those sectors, which – as it appears – will greatly expand in the near future.

2ª) Emerging pollutants.

The growing concern over the effects on health and the environment of what are known as emerging pollutants (such as some medicines or personal hygiene products) and plant health products (any kind of biocide or pesticide, such as insecticides and weed killers) present in water is clear.

Research in the field of these pollutants is an essential challenge with several different fronts: the improvement and cost reduction of detection and measurement measures; research on the effects they have when entering the food chain; research on treatments to effectively reduce or eliminate them more cheaply, and drawing up regulations to provide safety and homogeneity.

The regions can play an active role on all these fronts, often because they are responsible for the application of the quality standards and compliance with them. They are also important in other areas, as the owners of water treatment plants.

Knowledge improvement, measuring, and processing of contaminants present in water resources build confidence and safety for and from consumers.

In most countries, considerable investment in water treatment has been made, in accordance with the applicable standards (largely Directive 91/271/EC). Adding new treatments to the plants built to reduce these emerging pollutants requires that the new investment and application of new technologies that must be implemented in the existing treatment systems should be planned as efficiently as possible, concerning both investment and future operating costs.

3ª) Impact of discharges on the coastal environment.

The Mediterranean regions have a common concern: preserving the quality of sea water against the continual discharges that arrive from continental waters.

Although all these discharges comply with established emission limits, the impact of the accumulation of the tonnes of nutrients and other pollutants that are annually discharged there from various sources is not sufficiently known. Currents and the mobility of marine fauna can transfer these impacts from one part of the sea to another, so action must be joint and coordinated.

Another important source of nutrients getting to the sea also proceeds from drained water. It usually comes through irrigation channels or can as well end up directly in coastal waters.

The impact that swimming in these marine waters could have on human health is not the only concern, there is also the effect on the various prairies of phanerogams (particularly protected species like *Posidonia oceanica* or *Cymodocea nodosa*), other aquatic species and biotope, and fisheries.

B.- Plans or programs on regenerated water reuse through the use of renewable energies

Of course, the most effective coastal protection measure is to prevent these discharges, and this can be approached in two different ways: on one hand reducing spillages, as once the problems of collecting and treating waste water have been solved, these are the main source of eutrophication of coastal waters, and, on the other hand, replacing the final discharge of treated water with reuse.

In terms of safety, it would be necessary to construct adequate barriers to intercept flooding from water purification systems (e.g. storm tanks or artificial wetlands).

Water reuse is an efficient way to avoid costs that construction and running of tertiary treatment installations and infrastructures would imply. It is also useful to get the most out of nutrients to develop crops, and can represent an important water source as long as transportation costs towards interior lands remain financially sustainable.

Final considerations:

As we see, the use of regenerated urban water, which would complete the urban water cycle, has many advantages: it provides an additional water resource costing less than others (transfer or desalination); it means the nutrients in water can be used as fertiliser if the reuse is agriculture, and it prevents discharge into the water environment. It also contributes to reducing water treatment costs and provides users with a very high guarantee of availability of resources, as treatment is a continuous process, etc.

Treatment to regenerate water, the construction of desalination plants and the implementation of alternative energy sources not only provide water and reduce the use of non-renewable energies in the latter case, they develop technologies, create employment and make it possible to fix population in the areas to which the water is sent.

The suggested lines meet all the criteria indicated in the corresponding section and their development by some regions would undoubtedly contribute to achieving the objectives pursued by the WFD, as well as those of other EU policies, cooperation programs, institutions and multilateral agencies in the Mediterranean basin.

However, they require a financial effort by the regions, as well as by other key stakeholders with which they cooperate, such as Universities that can hardly commit without specific aid plans or measures (similar to the plan previously implemented to achieve waste water treatment) from the European Union or Mediterranean countries.

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