



**INTERNATIONAL CONFERENCE ON WATER MANAGEMENT IN  
FEDERAL AND FEDERAL-TYPE COUNTRIES**

***CONFERENCIA INTERNACIONAL SOBRE GESTIÓN DEL AGUA EN  
PAÍSES FEDERALES Y SEMEJANTES A LOS FEDERALES.***

**The coordination of water planning across jurisdictions**

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1. Introduction
2. The new cosmopolitanism
3. The WFD for water
4. The concept of cost effectiveness in measures programmes
5. Implications for cross-border rivers
6. Conclusions

Bibliography

## 1. Introduction

Rivers are routes for the transmission of environmental values and functions. Their heightened slopes and evolution towards areas of plains and where they flow out are living dynamic systems that link cultures, ways of life and economies. Half of mankind lives close to rivers which are born in mountainous areas and provide a high proportion of their resources (Messerli et al. 2008). The majority of the world's population takes water from and lives within international basins (Dinar et al. 2007). Global change is substantially altering the water regime of the Earth's river systems, particularly that which is happening in mountain areas. Hoff (2008) estimates that the volume of the Ganges will grow by some 30-40% in the next two decades due to the disappearance of the Himalayan glaciers and that it will fall by 50% from 2030. There will be similar changes in the Rhône, with a significant increase in the risks of flooding in low and medium lands (Bravard, 2008; Pahl-Wostl et al. 2008). Estimations show a similar direction for the Iberian basins: smaller runoff and greater variability (MMA, 2007).

All these changes, with their origins in the changes in the atmosphere, can be added to the increase in pressure with an anthropic origin. We depend on the rivers to feed ourselves and to have water for our homes and industries; additionally, we feed our spirit through their beauty, their flora and fauna, and for the history that they hoard to which we have born witness over millennia.

Since the Dublin Declaration in 1992 on water and sustainable development, water policy in any administrative orbit has been formulated on very similar bases. No government can ignore the magnitude of the challenges and the need to face them with determination. However, the environmental deterioration affecting many basins around the world is the fruit of human and natural processes which are difficult to reverse. In part, these difficulties are the result of jurisdictional or administrative fragmentation of the basins. Although the concept of sovereignty of each State was made more precise through the 1997 Convention on the Law of the Non-navigational Uses of International Watercourse of the United Nations, undoubtedly both sustainable planning and river management for cross-border rivers must overcome greater difficulties.

In the States that are federally constructed and have arid or semi-arid climates – such as Australia and the USA – each State has broad competence and sovereignty over the rivers which cross them. However, it is their federal governments which pass environmental laws that must be fulfilled and affect the quality of the environment, such as with the Clean Water Act of 1977 in America.

With good logic, the European Union (EU) follows a similar principle, which it has laid out clearly in the Water Framework Directive. From its article 13.2: “In the case of an international river basin district falling entirely within the Community, Member States shall ensure coordination with the aim of producing a single international river basin management plan. Where such an international river basin management plan is not produced, Member States shall produce river basin management plans covering at least those parts of the international river basin district falling within their territory to achieve the objectives of this Directive.”.

The current work aims to analyse the problem of rivers that cross administrations from a dual perspective. Firstly, there is an analysis of the new cosmopolitanism which, following Beck (2006), advocates a vision of global environmental problems that – going beyond the simple notions of globalisation – must overcome the vision of sovereignty based on the nation-state. This ambitious and forward-thinking vision clearly expresses how management of water in cross-border rivers must be understood. The second perspective, which is more practical and applied, analyses the implications of the WFD in the area of sustainable planning for the water demarcation. This angle should allow us to criticise the direction taken in Spain in the renewal of the statutes of autonomy for the Autonomous Regions. In any case, the analysis intends to centre itself in simple areas such as the search for cost-effective programmes and the simple application of economic and environmental management principles. The work concludes with some reflections on how a true application of the WFD can be achieved in a decentralised state.

## 2. The new cosmopolitanism

Beck (2006) convincingly upholds the idea that the political and sociological logic of the nation-state is not adequate to face global, environmental and safety risks. In the first of these, climate change is the best example but it is not the only one. The actions of a state can not halt the process of atmospheric changes which cause the effects of global warming, but it can marginally contribute towards reaching agreements which can mitigate them. The increasing cost of crude oil or agricultural products also help us to understand that the idea of national is gradually losing its relevance and, scientifically, is a road leading to failure. A nation-state can do nothing to prevent either process. Immigration processes supply another example: if a state unilaterally applies a policy, its effects would be felt in other states. Remember the role of Hungary in September and October 1989 when it opened its borders to the Germans of East Germany and, scorning their appeals for cooperation, allowed thousands of people to cross Austria to reach their desired destination which was West Germany. Consider also the difficulties of the EU to agree on a common policy on immigration.

To give another example, when faced with an environmental accident in the Danube, the effects will not respect borders and only through coordination among all the riverine States can its effects be mitigated. Any action between States means the loss of sovereignty so that it may be successful, given that it is necessary to submit to arbitrators and inspection systems that guarantee that each side that has signed an agreement holds up their end of the deal.

In transboundary rivers, from the Mekong to the Nile or the Danube, technical secretariats have been created that – while they have no executive or administrative power – take responsibility to make sure the agreements of the bordering countries are fulfilled. In the Danube quality control network, there is a control point on each border, so the eighteen river states can know the indicators of quality of the water that crosses each border. Therefore, there is a mechanism reporting to a cross-national entity, which has no jurisdiction but does have a mandate to coordinate the actions of the states.

The new cosmopolitanism comprises an ideal and a perspective on analysis that transcends the phenomenon of globalisation. It consists of understanding global

processes from the viewpoint of the global citizen. According to Beck (p. 81), 'cosmopolitanisation' differs from the national or global focus in use in important areas: (a) it systematically distinguishes between the perspective of social players and that of the social analysts who try to analyse them (therefore, according to Beck) this new cosmopolitanism is a notion that creates the world in a different way but it is also a new scientific paradigm); (b) it replaces the opposition among landscapes, flows and national or non-national networks with a typology that gives way to 'transnational', 'translocal', 'global-local' and 'global-national'; and (c) it affects the congruence or lack of congruence between the player and the observer, so that it is able to underline the inconsistencies between the options of the social and political players and the institutions, on the one hand, and plot its implications for concepts and theories in social sciences (conflict and integration, domination, inequality and the state) on the other.

Considering that – despite it appearing that there is little application for Beck's theories in the matter of water and federalism – they are an element of great interest in understanding the problems linked to the management of transboundary rivers. Note the relevance of the three distinctions seen previously when analysing the inter-regional water problems in Spain. Equally, to go a little across the border, the problems that characterise the management of the Iberian basins between Spain and Portugal.

It is worth asking in both cases – Spain and Iberia – if there is relevant literature on social and political analysis that has been adopted for the focus of the new cosmopolitanism. What the WFD correctly pursues is to impel a rationalism in the management of the basins which, allowing a certain degree of independence for each administration whose activities in any case must be transparent and justified, does not suffer from breakdowns or discontinuations due to the existence of administrative or political borders. In this sense, the WFD is a paradigmatic example of the application of 'cosmopolitanisation', if we are allowed to employ the concept over the whole of Europe.

Furthermore, the WFD enshines the democratisation of the planning process and water management, enabling the management of environmental risks, the apportionment of resources among users and across jurisdiction. This genuine democratisation, required to achieve the 'second modernity' that is so closely linked to the analysis of environmental risks as suggested by Beck (1999), is neither facilitated nor favoured by the jurisdiction fragmentation of rivers, creating administrating and command boundaries where they did not exist before.

### 3. The Water Framework Directive

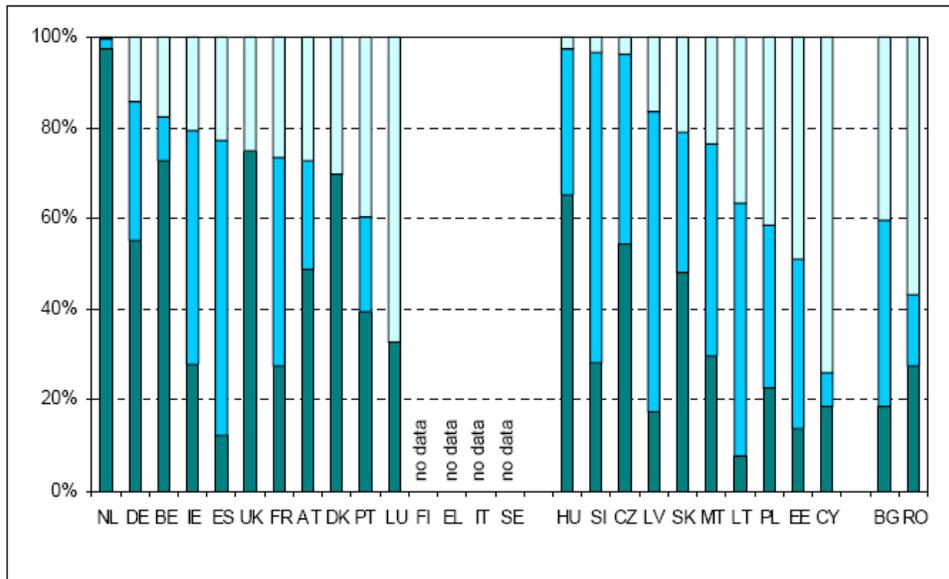
A great deal has been written about the WFD, so there is little to add in terms of its sense and meaning. What is important now is to analyse what its practical and real application will bring us. In part, there is already an evaluation report on the extent of the development of the work and the actions in a Communication from the European Commission to the European Parliament and the Council on the application of the WFD (CE, 2007).

The WFD is a notorious example of legal skill to orientate national policy on water without damaging sovereignty to any great extent but ensuring that Member States

receive positive and negative stimuli to fulfil their rules. It is useful to take a moment to analyse the reasons why judgment could be passed in this way.

Firstly, it is necessary to characterise all the bodies of water, which implies a diagnosis that has to be unitarian and univocal – even in the case of those bodies of water that cross borders. It is indicative to point out that Spain and Portugal agreed upon the mapping of their bodies of shared water in February 2008. The following graph shows the percentage of bodies of water at risk of not fulfilling the quality objectives (dark), the fraction for which there are no data (intermediate) and the percentage of the bodies that are not at risk (light).

Figure 1. Characteristics of the bodies of water according to the EC (2007)



In the case of Spain it is necessary to highlight the high percentage of uncharacterised bodies of water. But for Italy and Sweden there is no data at all. Only the UK and Denmark had characterised all their bodies of water. Note that this information is the responsibility of the Member States, whose social players could use it against their governments – demanding a greater fulfilment and effort in their compliance with the WFD.

The second reason that justifies a positive evaluation for the WFD is that it obliges the Member States to coordinate their basin plans or to create a common planning document for the complete water demarcation. The implications of this mandate will be dealt with in the fifth section, but it is opportune to mention here that this mandate is a de facto imposition of criteria by the EU through which the sovereign States face the management of their shared basins. And this is a positive imposition because it obliges cooperation to be the perfect way for the cooperators to be able to manage to get the support of their citizens and entities – arguing that it is something imposed by the EU and the legal power that implies. Another important nuance, and highly applicable in the Iberian case, is that until that moment when they were working on the commitments that expire in 2009 with the remission of the planning documents, the negotiation between

Spain and Portugal in the framework of the Albufeira Treaty of 1998 had taken place in a global form for the five shared basins. On the contrary, the WFD obliges the creation of coordinated plans for each basin, which means that the logic of the negotiation maintained to now, in which there were compensations among various aspects of one basin or another, was no longer reasonable. Specifically, the WFD intends that the global negotiations between countries not finish with the sacrifice of environmental interests in one basin in order to obtain benefits in another. The spirit of the WFD would have been in grave doubt if Spain and Portugal had continued to have their focus on global negotiation, sacrificing the principles of the individual and independent negotiation for each basin. It is beyond the bounds of this work to mention that the coordination of the international basins would have been non-viable until the spring of 2008 because Portugal did not have a coordinated administrative structure in basin organisms analogous to the Spanish one.

The third reason why the WFD might have positive implications for citizens and the environment is that the exceptions or repeal that a Member State asks for with the intention of gaining acceptance from the EC to lower or defer objectives must be formally justified. This means that if in one water body the quality objectives are considered unreachable or unapproachable within the period established, whatever the reason, the Member State must accompany its repeal petition with a justification report which includes an evaluation of the costs and an estimation of the social impact. Thus the WFD reverses the burden of proof, obliging the Member States to justify the reasons for their failure to comply.

Globally, Spain has been evaluated negatively by the EC in three areas: (1) the characterisation of the risk to the bodies of water in not fulfilling the WFD; (2) the implementation of the administrative side, where Spain features in 12<sup>th</sup> place in the EU-15; and (3) in the quality of reports sent in, where it received the same evaluation. However, in economic studies related to article 5, Spain was rated in 6<sup>th</sup> place (EC, 2007).

#### 4. The concept of cost effectiveness in measures programmes<sup>1</sup>

One complex aspect of the WFD, something that has cross-border implications, is the criterion of cost effectiveness when selecting a measures programme.

In selecting the criterion of cost effectiveness (CEA) instead of the more complex cost benefit analysis (CBA), the WFD has opted for pragmatism. In theory, the difference lies in the fact that in the first case the objectives to be met are established independently of the cost incurred in applying them, while the CBA evaluates and compares both cost and benefit for the objectives. In the case of the CBA, as the programmes and their costs are going to last for some time – not just spatially – it is necessary to employ a discount rate to homogenise the flow of costs and benefits. However, the inherent difficulties in calculating environmental costs and benefits are avoided or simplified in part through the use of the CEA.

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<sup>1</sup> This section borrows to a large extent from Gómez and Garrido (2008)

On the other hand, the WFD assumes that the social decisions concerning water management are made in an iterative manner. The starting point should be the establishment of the desired status of ecological quality on the basis of knowledge of the aquatic ecosystem. The procedure happens in the following stages: firstly, a first objective of 'good ecological state' is marked out for the different bodies of water in the basin; secondly, the combination of measures to achieve the objective at the lowest cost is selected; thirdly, the social benefits associated with the improvements are identified, even if they are not evaluated; fourthly, costs and benefits are brought before the public for their participation and for the opinion of the social players to check to see whether they believe these to be approachable and reasonable. If the response is positive, matters proceed to the identification of institutional barriers and the evaluation of the redistributive effects of the measures, as well as the financial restrictions, and other aspects that require consideration in the implementation of the basin plan. If, however, it is considered that the costs are prohibitive, the ecological objective state is modified, selecting less demanding objectives or by extending the planned deadline to achieve them.

In the WFD, the identification of improvements in economic health is not used to set the objectives of the water management policy, instead it is used to evaluate if the benefits are greater than the costs of the best alternatives to achieve them.

Obviously, the CEA is an intermediate stage in the designing of the programme of measures for the basin and it does not substitute the decision making process. It takes into account the economic studies in order to achieve a 'good ecological state' or simply a 'moderate ecological state' in the basin. The results of the CEA are particularly relevant because in the subsequent CBA process, such as the consultation process, which brings the final decision closer on objectives, deadlines and demands, they will be employed as a fundamental part of the analysis.

The logic behind the CEA is shown in Figure 2. The diagram shows the marginal cost of achieving a given environmental quality level ( $Q$ ). An example of this could be the concentration of some polluting substance, the water temperature or the volume. The marginal cost curve reflects the cost of improving a given attribute and it is obtained from arranging all the possible alternatives according to the marginal cost to acquire improvements in  $Q$ .

The minimisation of costs means, according to Figure 2, that to achieve objective  $Q_{GEQ}$  (GEQ, denoting Good Ecological Quality) it is necessary to apply a combination of measures whose marginal cost should not exceed  $M_{g_{GEQ}}$ . Area A shows the total cost in monetary units necessary to achieve these standards.

**Figure 2. Marginal cost associated to the improvement of quality indicator**

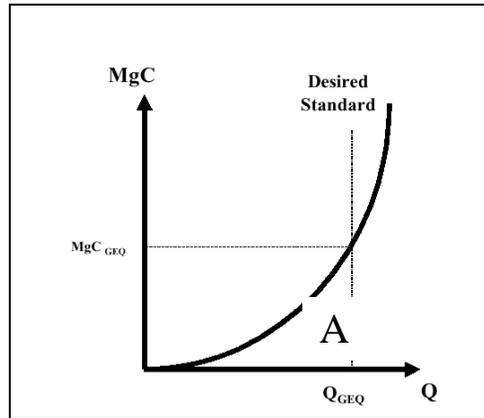
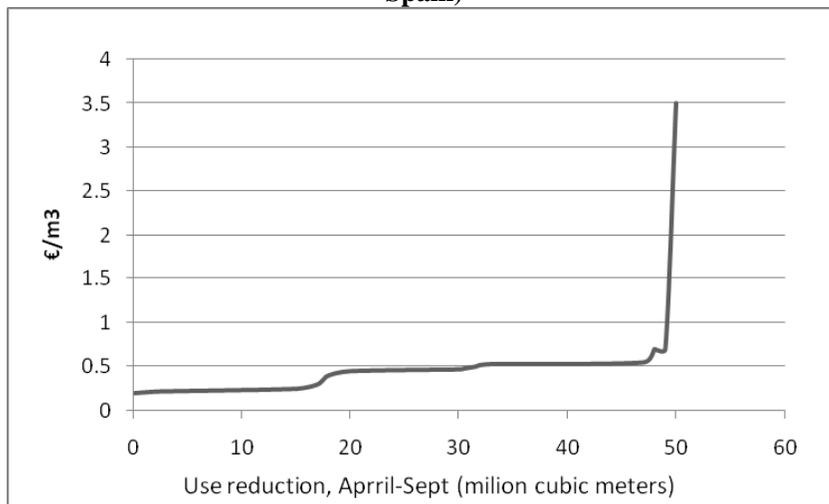


Figure 3 shows the results of the application of the CEA principles on the Jalon basin (Ebro basin, Spain) (Maestu and Domingo, 2008). It presents the marginal and median costs linked to the reduction of water use in the months of April through September.

**Figure 3. Marginal cost derived to reduce water use in the Jalón Basin (Ebro, Spain)**

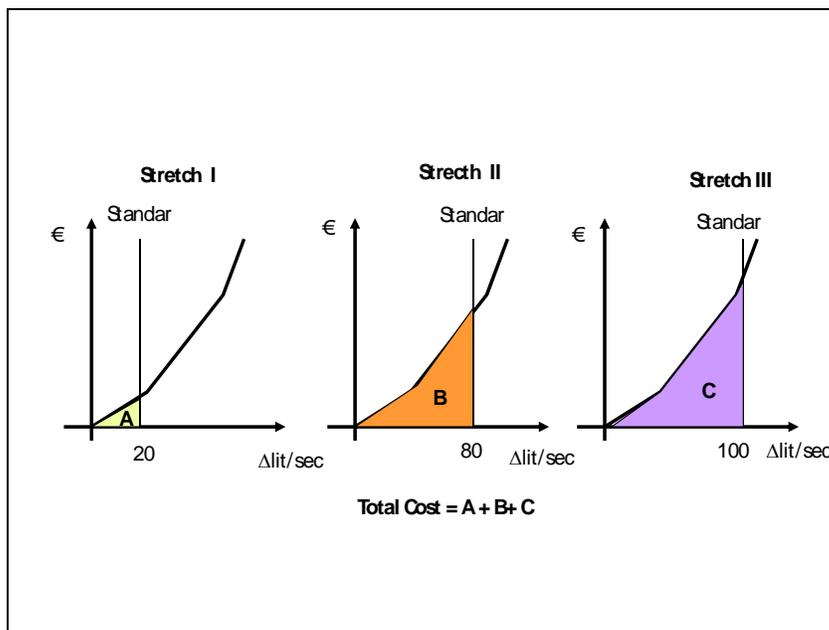


Source: Maestu & Domingo (2008).

The CEA must be integrated and should be applied across the whole basin, a crucial aspect for the purpose of the present work. In the first stage the CEA is performed in one section of the river. However, the analysis to integrate all the CEAs is so that the process brings a plan of measures nearer for the whole basin. Thus, generally speaking, any gain in the quality and quantity of the upstream flows has a material benefit in the lower parts of the river. This means that there is an intimate relationship among actions, location and assumption of costs, all of this on show across the whole of the basin including, logically, the lower stretches and the transition area. In technical terms, economists refer to these effects as spatial, cost and time externalities: whoever performs an action creates repercussions in another agent, another place and even at a later time. These externalities, whether positive or negative, can be evaluated economically and expressed in monetary units.

To simplify the analysis, it is assumed that there is only one single key parameter that indicates the quality of a river: the flow that circulates, measured in litres per second. Let us suppose that the river is segmented in three stretches – each one representative of a sub-system or body of water. Figure 4 shows these stretches, detailing the objectives to be reached in each of them: 20 in the first, 80 in the second and 100 in the third. The curves represent the marginal costs associated with the increase in flow in each stretch – obtained from the optimal combination of alternatives, ordered from least to highest cost.

**Figure 4. Costs associated with the increase of flows in each stretch**

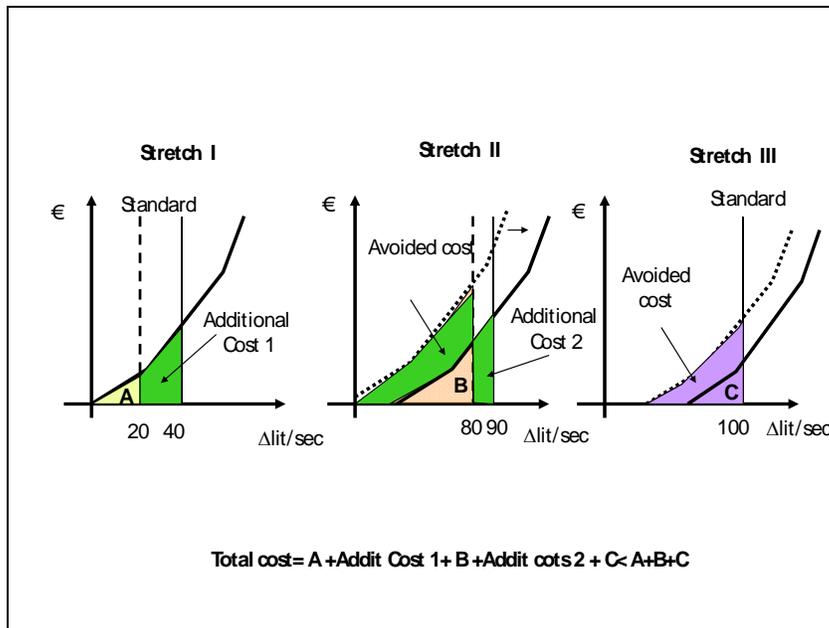


Source: Gómez & Garrido (2008)

The question asked with the CEA is what is the minimum cost to achieve the increase in flow in the three stretches. If each stretch is analysed separately, it would revolve around coordinating the measures represented by the three marginal cost curves until the levels of 20, 80 and 100, shown in Figure 4, were reached.

However, the three stretches are connected and, therefore, the cost of achieving the Good Ecological Status (GES) in the intermediate stretch depends on the flow received from the first one. An alternative solution to that presented in Figure 4 would be to obtain the GES in stretch 1, assuming a cost of A, then, secondly, the effect that this would have on the second stretch would be calculated and the additional effort needed to achieve GES, cost B', would be estimated, before, finally, doing the same thing with the third stretch. This process is shown in Figure 5 and, in contrast with the sum of the costs shown in Figure 4, it does manage to substantially reduce the cost (now resulting from the sum of A+Additional cost 1+B + Additional 2 +C).

**Figure 5. Least cost program**



Source: Gómez & Garrido (2008)

To find them and to take advantage of the positive impact of the positive spillovers, the analysis of the basin must be approached in a global form, considering the stretches to be interconnected. Looking at Figure 5, it can be seen that if the flow is increased in the first stretch, the standard of 20 is surpassed and, even more importantly, the marginal costs curve is pushed to the left for the intermediate and lower stretches. As the sum of B and C is higher than that of A, the opportune cost for the increase in flow in the upper stretch – even surpassing the standard – is really negative.

Therefore, the correct procedure to achieve the combination of measures at minimum cost consists of explicitly taking into account the positive spillovers in the ecosystem. This solution is presented in Figure 5 and results from equalling the net marginal cost derived from increasing the flow in the three stretches, taking into account that the GES is reached in the whole basin. This is achieved by raising the flow above the minimum demanded, which later can reduce the cost of the programme of global measures for the whole basin.

## 5. Implications for cross-border rivers

The previous analysis is no more than the application of common sense and an entire river basin perspective to the problem and a mere economic calculation. To not do it would mean the waste of resources for the economy and, therefore, a welfare loss.

Now, if there are borders between the stretches analysed that separate territories whose peoples have non-overlapping sovereignty, then the application of the CEA principle has significant implications. The first and clearest of these is that the benefits and costs of the measures should not be distributed in a different way in space or, if possible, in time. If a greater effort is wished for in stretch 1, there will need to be economic compensation to the agents or institutions that make this effort. Logic says that such effort be compensated through provision for the lower stretches. However, while the effort in stretch 1 is easy to assign to people, agents or particular institutions, the benefit in the lower stretches will be generally more diffuse and difficult to assign. Thus, a first paradox emerges here.

If the two stretches correspond to different jurisdictions, then payment to the two jurisdictions is simple and immediate. In Spain, we have the case of the Tajo-Segura transfer which includes a payment from one basin to the other and there existed the proposal between basin agencies in the Ebro transfer (NWP [National Water Plan] Law in 2001). Dinar (2008) shows that in 34% of international treaties between just two countries with cross-border rivers, there is provision for the payment of compensation for the activities undertaken by the one in favour of the other. Thus, it would appear that the integration of minimum cost measures shown in Figure 5 would be more viable between stretches in different jurisdictions (and, therefore, different administration). The first paradox is that the fragmentation into different jurisdictions in the same basin could facilitate better agreements between different stretches because it eases payment and activity schemes.

However, the previous supposition is based on measures that have specific and particular players, responsible for seeing things through, and diffuse or anonymous beneficiaries down river. In that case, the responsibility for the improvements in the lower stretches can only be a different administration from the previous one. Thus, it can be concluded that the agreements between 'regions' or 'federal states' could be more useful in the case of improvements in the same basin than in the case of one where there is only a single administration or jurisdiction for the whole basin.

The second paradox is that when the agreements between stretches contain clauses or protect purchase-sale operations for water, the operations are achieved with fewer difficulties within a single jurisdiction than between two jurisdictions. This statement takes into account the fact that between basins there are specific connecting infrastructures to ease the exchanges. However, in the case of Australia and the USA, the exchanges of water between agencies in different States has been much less frequent than that occurring within them.

In the case of Spain, the PBOs (Public Buyout Offers) of Guadiana and the Júcar have had no greater problem than that derived from the financial cost, which was later paid by the central government. However, the transactions made between basins have been the source of major controversy, partly caused by the Governments of the Autonomous Regions (AR) which have seen with displeasure that their agencies are ceding resources to agencies of other basins. We have also witnessed how the AR of Aragon has taken up an ambivalent position on the debate raised by the mini-transfer to Barcelona – despite the representatives of the irrigators of Aragon not having formulated any objection to ceding rights of usage without any economic compensation at all.

Let us place the water transactions in the context of the programmes of minimum cost measures for the basin plans that should be sent to the EC in 2009. In the case of Spain, it is possible that the economic instruments be employed to achieve increases in the flow from the irrigation water rights being recovered in perpetuity or temporarily. In this case, the uniqueness of administration and basin eases the exchanges and reduces the risk of troubles. If the administrative uniqueness of the basin is spoilt, then the option of the exchanges should always be established between jurisdictions or, through these, between agencies submitted to a distinct regulation.

In the case of the cooperation between Spain and Portugal over their shared basins, payments have never been contemplated, but neither have they come to the point where the planning could be qualified as coordinated. In the case of the Danube, on the other hand and despite its great size, complexity and diversity of States (in the EU and outside), there has been a joint defining of quality objectives and they have coordinated a quality control system on each of the border points (Liska, 2008). EU article 5 reports have been jointly sent and they are working on coordinated planning. At the same time, the Danube International Commission has promoted a joint sample-taking system with their own boats, with the intention of creating data bases using a common methodology.

## 6. Conclusions

The borders which segment their water basins in distinct jurisdictions are not the expression of absolute sovereignty, not even between independent States. Within a single State, or within the EU, the different jurisdictions through which a basin runs mark areas of juxtaposed sovereignty, whether or not this is in a federal State. Neither is the EU a Federal State, nor is Spain a centralist State.

On the practical and applied level, the processes of change caused by global warming stir up agreements between States and orientate the action plans towards the whole of the basins. However, the impact and the pressure, as well as the solutions which must be

passed to mitigate them, have in many cases an expression in time and in space. If there is no specific agent responsible for the pressure, then it is the administration that must account for the state of the basins that cross their territory.

Spain is going through a redefinition process of its competences over water between its Government and that of the ARs. All of this is occurring in parallel with the application of the WFD on all basins in the EU. The integration of the measures over the whole basin is the way to make sure that the quality objectives are achieved at minimum cost. It is very likely that the combination of programmes of minimum cost measures requires greater effort in the upper zones of the basins, strategies that will allow for benefit to be taken from the overflows of costs. Between different jurisdictions, this should only be applied through payments or compensation from above to below. If these are impossible or non-viable politically or administratively, the average plans will be cost-inefficient. However, it has been argued that it is precisely the existence of borders between jurisdictions which eases this type of agreement, as opposed to basins with a solitary sovereignty. The reason is that it is much easier to create representatives of the 'public commodities' when separate jurisdictions exist in different stretches of the rivers.

However, in the context of water scarcity, where voluntary reassignment via markets could have greater potentiality and reach, it has been seen that in the Federal States exchanges are rare and do not have the support of the state or regional administrations. This occurs because the efficiency gains that are derived from the exchanges on the part of the grantor are only capitalised on by the ceding agencies; meanwhile, on the side of the purchaser, the gains are capital income and work. Although globally the exchanges can be beneficial, the distribution of those benefits can be greater for the purchasing area. From the doubts about the division of benefits come the difficulties that there are in water transactions between jurisdictions. From this, we conclude that where water is scarce, the fragmentation of the basins is not positive for the administration of the scarcity.

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