



Integrated Evaluation for Sustainable River Basin Governance

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Evaluation practices in water project decision-making processes: comparative analysis of Alqueva Dam (Portugal), Evinos Reservoir (Greece), Ythan NVZ (UK), The Grensmaas (The Netherland) and Ebro River Transfer (Spain)

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Work Package 2

HORIZONTAL REPORTS: ASSESSMENT

REPORT

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INDEX OF CONTENTS

1. Introduction
2. Analytical framework
3. Comparison of case studies
4. Conclusions

References

1. Introduction

The process of evaluating and authorising water-related projects is critical in the context of sustainable river basin governance. The new Water Framework Directive (WFD) asks for the prior evaluation of all new river basin interventions but does not provide extensive guidance to the river basin authorities on how to carry out such evaluations. Unless the evaluation procedure of new projects evolves into a multi-dimensional and multi-stakeholder participatory approach, that takes into account complexity, uncertainty and conflictive values in dispute, river basin objectives as expressed in the new WFD will be at stake (Funtowicz, O'Connor and Ravetz, 1996). ADVISOR's (Integrated Project Evaluation and Water Management) main objectives are to provide an integrated project evaluation framework and methodology and to develop a set of guidelines for EU river basin authorities and agencies responsible for water administration.

The aim of the first work-package of the ADVISOR project was to undertake an *ex-post* analysis of past evaluations of important river basin projects and policy interventions in Europe, i.e. Evinos reservoir, in Greece, River Ythan, in the UK, The Gresmaas in The Netherlands, Alqueva in Portugal and the Ebro River transfer in Spain. The barriers and opportunities to achieve sound evaluation were identified for each case study. The aim of the second work-package of the project, from which this report is an initial outcome, is to contribute to the development of an "Integrated Theory for the Evaluation of River Basin Projects in the EU" starting from the comparative (horizontal) analysis of these past evaluations.

For the purpose of ADVISOR, the integrated theory of evaluation encompasses four inter-related dimensions of analysis: information, assessment, participation and context. The horizontal analysis will apply specific analytical frameworks to each of the four dimensions of the 'evaluation tetrahedron'. Together, the horizontal analysis of the four vertices will provide a comprehensive understanding of the theorisation and shortcomings of the evaluation process to date.

The concrete aim of this report is to present the horizontal analysis of the assessment component of the 'evaluation tetrahedron' as applied to the five case studies. More specifically, the aim is to critically compare the assessment process in all of these cases.

2. Analytical framework

It is common for assessment to be understood as a formal and explicit part of the decision making or planning process, such as an Environmental Impact Assessment (EIA), Cost-Benefit Analysis (CBA) or more recently Strategic Environmental Assessment (SEA), contained or expressed in a technical report or document produced by the public Administration responsible of the project. However, for the purpose of this report – in the frame of the process, dynamic, and integrated approach of the ADVISOR project to decision making processes -, assessment is not seen as a single, formal evaluation but a dynamic process of informal and formalised learning that takes place throughout a project planning and development life-cycle (Munda, 2000). Thus, whilst a formal assessment may cover only one step in an overall process, such as the problem diagnosis or the consideration of different alternatives, the overall assessment component may extend to the entire project life, from conception to completion, expanding even to the post-decisional stage.

Figure 1 describes a generalised planning and development assessment cycle for major projects (of any kind) incorporating a number of distinct, but sometimes overlapping, stages. The lifecycle describes those stages that

Would ideally precede any decision, and those that may come afterward. However, ideally all stages should be subject to some degree of assessment prior to any decision to proceed. Initiation of a project can be through the government/public sector, or the private sector may identify a market opportunity. This is a fundamental stage of the planning process as it is at this stage that the need/problem/opportunity is formulated and described (mapped), the outcome of which will directly influence proposed responses. The remainder of the planning stage is largely concerned with the identification and evaluation of alternative solutions/management/policy options. It is at this stage that the more strategic formal assessment tools, such as Cost/Benefit Analysis (CBA) and Environmental Impact Assessment (EIA), are introduced into the wider assessment process. These formal and explicit assessment practices constitute key elements in the 'assessment vertex' as a whole, working as a central axis to which informal assessment activities are referenced (see table 1). The outcomes of these formal assessments generally play an important role in the process leading to project consent and resolving conflict. Following project consent, the assessment process continues through the construction, operational phases. Here monitoring and auditing are important aspects of the assessment process. The final phase of assessment relates to the final stages of the project's life, dealing with issues such as redundancy, decommissioning and policy withdrawal.

The comparative analysis examines the different stages of assessment for the case studies with respect to five specific elements, i.e. **tools, criteria and values, timing, responsibility, and influence**, whose commonalities and differences in approach between case studies are identified with the help of cross comparison. The first element considered is the *technical tools and methodologies* used in the assessment, their type, scope and objectives. This descriptive information is accompanied by an explanation as to why these instrumental approaches were adopted in the context of each case study. The second element constitutes a kind of an *assessment axiology*, in as much as it considers the *assessment criteria* used and the weightings placed on these criteria, as well as the underlying *values*. The third element is the *timing* of assessment, factors that influenced the timing and how this influenced the overall decision-making process and the final outcome of the project. The fourth element is a consideration of the *responsibility* for initiating and undertaking the assessment, as well as the role of different stakeholders and networks in this component of the decision making process. The final element of analysis is concerned with the *influence* that the assessment had on policy, along with a critical analysis of its *role* in the whole decision making process and the factors that determined it.

Figure 1 Generalised assessment (planning and development) life cycle (adapted from Glasson, Therivel and Chadwick, 1994).

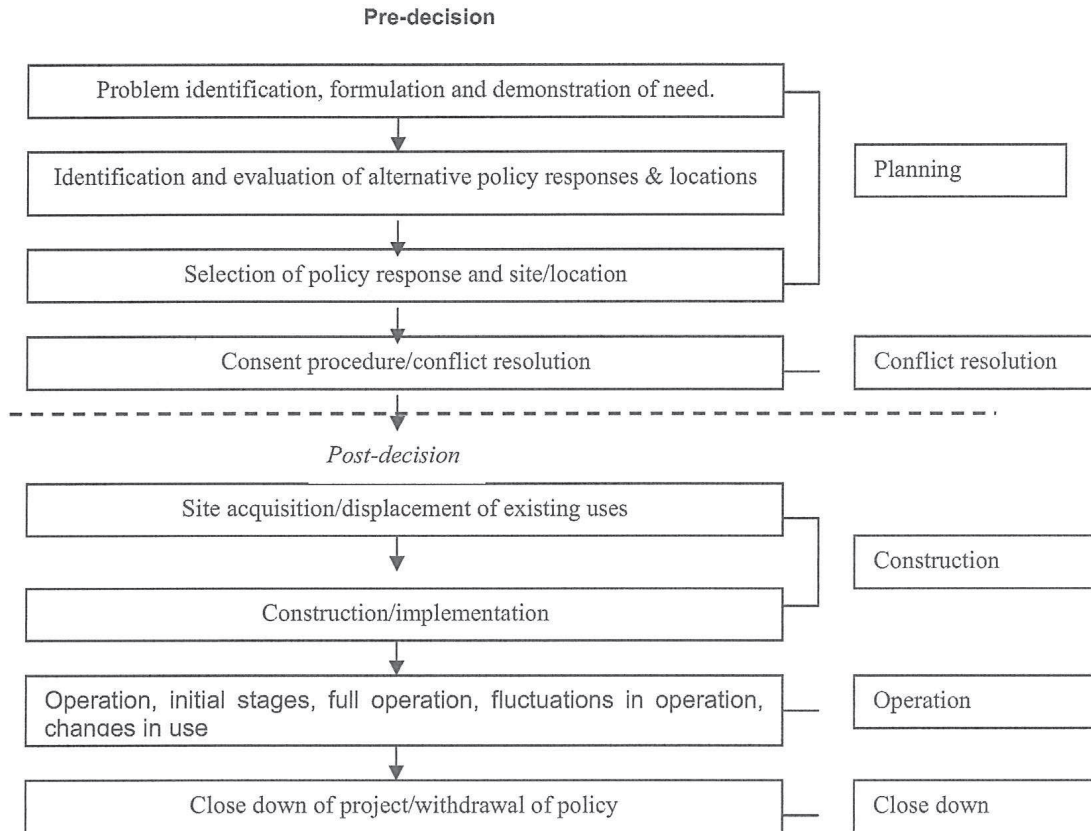


Table 1 – Process of Assessment considered in each case study	
Case Study 1 Alqueva Dam, Portugal	<p>- The first references to create a water reserve in the Guadiana river can be traced back 100 years.</p> <p>- 1957: decision of Arantes e Oliveira (Minister of Public Works) to begin the Alentejo Irrigation Plan drawn up in 1955.</p> <p>- 1975: The project was approved (Ministry Council Resolution of 12th December), following the Portuguese-Spanish Agreement of 1968, for the use of international rivers.</p> <p>- 1978: the transition government of Nobre da Costa cancels previous decisions and suspends the project (Normative Decision no. 326/78), following a negative statement from the Central Bank due to high water costs estimated for irrigation.</p> <p>There were two distinct phases in the assessment procedure. The first phase was in the 80's when several studies were promoted, culminating in the first Environmental Impact Study (EIS) of the Alqueva Project concluded in 1987. The second phase started a few years later after the Portuguese EIA law (Decree-Law no. 186/90 of 6 June 1990 that incorporated the council directive 85/337/EEC of 27 June 1985 in the Portuguese legislation), and resulted in an Integrated Environmental Impact Study (IEIS) of the Alqueva Project.</p> <p>In short, three Environmental Impact Studies were conducted:</p> <ol style="list-style-type: none"> 1) 1985/87 – First EIS by DRENA/EGF; 2) 1992 – Global Assessment Study of the Alqueva Project by a Luso-Belgium consortium (Hidrotécnica Portuguesa, Tractebel and SEIA), promoted by the European Commission (Regional Development Office); 3) 1994/95 – Integrated Environmental Impact Study by SEIA. Also promoted by the European Commission (Regional Development Office). <p>The report on Alqueva Dam focuses mainly on this latter IEIS because it is the most recent and complete EIA process, incorporating the public participation component.</p>
Case Study 2 Evinos River Reservoir, Greece	<p>- The project was conceived in 1964.</p> <p>- 1988: the Ministry of Environment, Physical Planning and Public Works assigned a technical study to the Department of Water Resources, Hydraulic and Marine Works of the National Technical University of Athens (Koutsoyannis et al 1990), that examined three alternative dam dimensions</p> <p>- 1990: “Study of the enforcement of Athen’s water supplies for the coverage of water demands until the year 2030”, carried out from June to September by 14 of the most renowned technical offices in Athens (YPEHODE 1990). Five alternatives were examined. Evinos dam was proposed as the best solution.</p> <p>- The Hellenic Ornithological Society (HOS), that raised strong objections to the project, proposed five alternatives of which four had already been examined by the YPEHODE study.</p> <p>- 1991: “Preliminary study on the enforcement of water potential of the Mornos reservoir from the Evinos River Basin”, whose objective was to assess more thoroughly the feasibility of the project (available water quantities, stability of the structures, geo-technical data, evolution of water consumption issues, first estimation of the cost of the project. First and second phases of call for tenders.</p> <p>- 1992: The construction works started. Some months later, the Environmental Impact Assessment (Panagopoulos et al. 1992) is presented. It concluded that some impacts are expected but consider that none of them is irreversible or impossible to be dealt with.</p> <p>- 1993: Report on cumulative effects of the Evinos and Acheloos diversions by Greek and two EU external experts (Heurteaux & Soulios 1993) (p. 26)</p> <p>- 1997: a complete cost-benefit analysis was carried out (p. 28).</p>
Case Study 3 River Ythan Nitrate Vulnerable Zone, Scotland	<p>- 1991: Approval of the EC Nitrate Directive (91/676/EEC) by the EC Environmental Council.</p> <p>- 1993: The North East River Purification Board (NERPB) proposed the Ythan Estuary as a candidate for designation due to eutrophication.</p> <p>- 1994: Public consultation on two proposed areas for designation as Nitrate Vulnerable Zones in Scotland, including the River Ythan and estuary.</p> <p>- 1996 Government decides not to designate the River Ythan and estuary on the grounds of inconclusive scientific evidence of a link between agriculture and eutrophication in the estuary.</p> <p>- 1997 Scottish Environmental Protection Agency (SEPA) proposes the River Ythan and estuary as a candidate for designation in accordance with the obligations of the Directive.</p> <p>- 1998 Once again Government decides not to implement recommendation of designation due to the lack of conclusive scientific evidence.</p> <p>- 1999 Government warned by European Commission that evidence of eutrophication from agriculture is sufficient to designate the River Ythan and estuary a NVZ under the Directive. Scottish Executive issue a public consultation paper on the proposed boundary of the area to be designated the River Ythan and estuary NVZ.</p> <p>- 2000 The River Ythan and estuary is designated on 8th May as a NVZ.</p> <p>- 2001 Scottish Executive issues a public consultation paper on the action programme measures to apply in the Ythan NVZ. Scottish Executive issues a public consultation paper on the action programme measures to apply in the Ythan NVZ.</p>

<p>Case Study 4 Meuse River, The Netherlands</p>	<ul style="list-style-type: none"> - 1990-1992: 'Conceptual phase' (feasibility studies). - 1990: publication of "The future for the gravel river" report ("Concept Stroming"). The province of Limburg made an agreement with the Ministry of Transport, Public Works and Water management to supply 35 million-tons of gravel for national needs. - 1992: The Province of Limburg, in collaboration with the Ministry of Agriculture, Nature Management and Fisheries and the Ministry of Transport, Public Works and Water management, presented the "Grensmaas project" (GM) intention-declaration, aiming at the recovery of gravel and the development of large-scale natural area. - 1994: 'Initiative phase' (announcement of intention). Publication of the EIA 'notice' "Nature Development for Gravel". - 1993-1995 floods resulted in the addition of safety as a third objective of the project. The Ministry of Transport, Public Works and Water Management formed the "Deltaplan Grote Rivieren". - 1996: 'Preparation phase'. The EIA of the GM project is drawn up. - 1998: Publication of the IEA of the GM project by <i>Maaswerken</i>. - ? Drawing up, assessment and approval of local and provincial spatial plans. - ? Judicial processes affecting GM project, spatial planning, transborder agreements. - 2001: in August the national government asked for twice as much gravel as was decided in the year 1990. In December, an inquiry on the quality of the soil revealed that the soil is more polluted than was expected. <i>Milieu defensie</i> claimed for an independent investigation. - 2002: The direction of the project organisation <i>Maaswerken</i> resigned.
<p>Case Study 5 River Ebro Interbasin Water Transfer, Spain</p>	<ul style="list-style-type: none"> - 1933: First formal proposal of the national-wide interbasin water transfer (National Hydraulic Works Plan). - 1970-1980: partial implementation (interbasin water transfer from Tagus river to the Segura river). - 1985: The 29/1985 Water Law introduces the current planning framework. - 1988: The present process of hydrological planning starts (<i>Basic Information for the River Basin Hydrological Plans</i>). - 1993: The Ministry of Public Works and Urban Planning presents the first National Hydrological Plan (PHN) Draft. - 1994: <i>Scenarios Analysis Document of the PHN and Modified PHN proposal</i>. - 1998: The new Ministry of Environment published the "White Paper on Water in Spain" that reassessed the hydrological situation of the country. - 2000: The Ministry of Environment presented the new PHN Draft accompanied by five technical reports. Reports by experts after a request of the Ministry of Environment. - 2001: The PHN draft is discussed in the National Water Council (January). The PHN is passed by the Spanish Parliament (June). A claim against the PHN is submitted to the European Commission. - 2002 (January) The Ministry of Environment submits to European Commission the <i>Strategic Environmental Assessment of the PHN (SEA)</i>. - 2002 (September): The Ministry of Environment submits to public consult a <i>Memory-Resume</i> of the Environment Impact Study, starting the formal process of Ebro transfer evaluation.

4. Comparison of case studies

4.1. Tools

a) Alqueva Reservoir

The assessment process was dynamic evolving into three Environmental Impact Studies (EIS) that increased in scope and coverage over time. These related studies employed some complex decision support tools- Multi-criteria Analysis (MCA), the Saaty method and Value Path Display¹ (VPD) method - to evaluate different project alternatives and were focussed at different scales.

The first of the three studies, the DRENA/EGF EIS (1985–1987), considered the impacts of the Alqueva Dam, and the proposed Hydroelectric plant on the surrounding area only. The second EIS, the Global Assessment Study (GAS) (1991-1992), was considerably broader in scope, considering the impacts of 24 different project alternatives. However, the GAS was not a typical EIS in that it had a very strong emphasis on economic and financial impacts, thus playing down the environmental impacts of the Alqueva project. The third study, the Integrated Environmental Impact Study (IEIS) (1994-95), was the most comprehensive comparing feasible project alternatives using a diverse set of socio-economic and environmental components in the analysis.

¹ The VPD is a graphical representation method applied for decisions with multiple criteria.

There was no explicit mention of environmental cost benefit and/or cost effectiveness analysis in the case study, although the socio-economic and environmental impacts of the project may have been included in the complex decision frameworks used. By applying the Saaty method, the complex decision problems in river basin project assessment process was decomposed hierarchically for better analysis. There is some indication that weighted averages, quantitative and qualitative analyses of the different components were factored into the decision framework.,

b) Evinos River Reservoir

The case study is characterised by a series of independent, but related, formal assessments. The type and scope of assessment methodologies used for each assessment partly reflect the aims of each assessment. The formal Government sponsored assessments undertaken by Altigos *et al.* (1964), Tetrakys-Komi (1977), Koutsoyannis *et al.* (1990) and YHEHODE (1990) were primarily concerned with the evaluation of alternative options, either options for alternative projects, or alternative approaches to the Evinos project. Whilst not explicit, it would appear that these studies adopted a Cost-Effectiveness Assessment (CEA) approach to evaluate the alternative options. Effectiveness was generally measured using multiple-criteria, including technical feasibility, water storage capacity and supply capacity, longevity etc. Costs were generally limited to construction and operational costs. It is not clear as to why CEA was adopted as opposed to a more detailed Cost-Benefit Analysis (CBA). However, the decisions were likely to be due to economic, scientific and political issues.

In terms of the scope of the assessments, nearly all options considered were to increase capacity, rather than managing existing supplies more effectively (i.e. avoiding leakage and illegal use), or managing demand.

The YPEHODE (1991) study also adopted a CEA approach. Unlike the other CEA studies this was not a comparative study, but aimed to evaluate the selected option in greater detail. However, the scope of the study was similar in that it focussed primarily on the financial costs of construction and operation.

The assessment process also included two Environmental Impact Assessments (EIA). However, the Panagopoulos *et al.* (1992) and Heurteaux & Soulios (1993) studies came after the CEA assessments. The Panagopoulos *et al.* (1992) EIA was concerned solely with the environmental impacts of the selected Evinos option. The Heurteaux & Soulios (1993) EIA was wider in scope being focussed on the combined effects of the related Evinos and Acheloos diversion projects.

A CBA of the project was carried out in 1997. Up to this point, little or no reference was made to environmental costs or benefits, nor were the economic benefits of income and employment to the local community been raised. No details are available as to the scope of this assessment. The project itself is set in the context of water supply and demand management assessments for the city of Athens commencing in the 1920's. These assessments are long-term and consequently are subject to high degrees of uncertainty in predicting demand.

c) River Ythan NVZ

The designation of the Ythan estuary as an NVZ was the final outcome of a series of policy decisions under EC Nitrate Directive. There is no requirement for a formal assessment under the EC Nitrate Directive. Consequently, the UK case study is characterised by a series of informal assessments. The decision making criteria specified by the Directive are environmental, requiring a scientific assessment of cause and environmental impact. Consequently, the majority of the informal assessment process falls within what might be considered to be environmental impact assessment. No economic assessment of costs or benefits was undertaken as part of the designation decision making process.

Once designated the Directive requires a more formal "Regulatory and Environmental Impact Assessment" process. This process was essentially interpreted as a requirement to undertake a cost-effectiveness assessment of alternative management options under the proposed Action Programme (AP).

d) The Grensmaas, The Netherlands.

Under Dutch Law projects such as the Grensmaas require an EIA and this forms the main focus of the assessment module for the Dutch case study. The EIA was designed in consultation with the public and was used to explore and aid design of the preferred project plan. The EIA begins with a comparative assessment of four alternative "visions" for achieving the three main objectives of the project: flood defence, habitat development

and gravel extraction. The visions were developed from data collected on five main environmental, socio-economic and cultural themes: river management, nature, landscape, cultural historic and archaeology, environmental quality and socio-economic functions. These were summarised in 8 sub-reports. The visions were evaluated against the themes using a participatory multi-criteria assessment approach. A preferred project plan is developed from the comparative assessment. No attempt appears to have been made to estimate costs or benefits of the visions in monetary terms.

e) Ebro River Transfer

The 1993 PHN Draft was not accompanied by any formal environmental and socio-economic assessment. The proposal was basically supported on a hydrological evaluation of water surplus and deficit of the different river basins considered, taking into account 'available water resources' and 'water demands'. The latter, mainly irrigation demands, were not justified in economic terms. Nevertheless, the 1994 *Scenarios Analysis Document* envisages a total of 24 water balance scenarios for the year 2012, which were the result of a combination of six water demand scenarios with four water availability assumptions.

The December 1998 *White Paper on Water* made a complete and in some way innovative revision of concepts, practices and methodologies habitually used in water management and planning, but ended with the acceptance of the conclusions of the River Basin Hydrological plans, that had already been passed in the same year (July 1998), based on the traditional 'balance between water resources and water demands' approach.

The September 2000 PHN Draft was accompanied by five *Technical Reports* which back the proposals and serve as its economic, environmental, hydrological and social basis: 1) Analysis of water systems; 2) Delimitation and Assignment of Shared Groundwater (among different river basins); 3) Environmental Analysis; 4) Economic analysis; 5) Background analysis and evaluation of previous transfers. The assessment included in the *Technical Reports* just referred to one option, i.e. how to divert 1,050 hm³ to the Mediterranean Arch. The discussion was about the different alternatives in term of which rivers could be involved and the path of the needed canals. The techniques employed consist of cost-benefits analysis and environmental and socio-economic impacts of the transfer. These latter are characterised by lack of spatially detailed assessment of impacts which are postponed to future concrete EIA for each section of the inter-basin transfer scheme, i.e. work by work, each one by itself.

A *Strategic Environmental Evaluation* (2002) was presented seven months after the approval of the PHN. The main innovation of the *Strategic Environmental Evaluation* (2002) was the inclusion of four general basic alternatives ("strategic options"), i.e. Option 0. No intervention; Option 1. Programmed demand reduction in water deficit basins; Option 3. Large scale desalination and Option 4. Inter-basin transfers. One of the most significant considerations already put forth concerning the treatment of alternatives in the SEA is the lack of a hybrid strategic option, i.e. combinations of two or more of the options offered in the document.

The 'formal' process of Environmental Impact Assessment starts in September 2002, when a *Memory-Resume* of the environmental study is submitted to public discussion.

4.2. Assessment Criteria and values

a) Alqueva Reservoir

The overall emphasis of the IEIS was on regional development impacts (i.e. economic viability of the project). Environmental and social dimensions were integrated into the analysis using some kind of assessment criteria based on a) economic viability of the project (perceived regional impacts); b) environmental impacts from the perspective of measurable impacts on climate, water quality, soils and land use, desertification, sedimentation, air quality, noise, flora and vegetation, fauna, invertebrates, archaeological values, etc.

Impacts of the project were rated on an eleven-point scale ranging from - 5 to +5, integrating two factors: magnitude and significance of impacts. These were subsequently ordered by relative importance using the SAATY Method. The problems of aggregation were addressed by the semi-compensatory approach. This gives an impression that a comprehensive environmental impact decision framework was applied in the case study, but there is limited information as to how the data used for rating the different components analysed were generated.

Irrigation of Alentejo, the justification of the project, is felt as a national enterprise which is capable, not only of playing a decisive part in solving agricultural, economic and social problems, but also in 're-shaping' the Geography of the Region. The most clear expression of this belief is the systematic presentation of Alqueva as a

'strategic project'. In fact this objective, explicitly and usually uncritically presented, coincides with what has been defined as "'strategic irrigation' schemes, i.e. those which focus on territorial production for the 'State reproduction', to be implemented at whatever cost that is necessary" (Faggi, 1996)

b) Evinos River Reservoir

The CEAs of Altigos *et al.* (1964), Tetrakys-Komi (1977), Koutsoyannis *et al.* (1990) and YHEHODE (1990) measured effectiveness using multiple-criteria, including criteria such as technical feasibility, risk of project failure, security (reliability) of supply, water storage capacity and supply capacity, water quality, longevity, speed of project completion, human displacement etc. Costs were generally limited to construction, operational and compensation costs.

There is insufficient information to identify weights given to the various criteria. However, the YHEHODE (1990) study was carried out under severe time pressure resulting from the drought of the 1980's. Consequently, the speed of project delivery appeared to carry greater weight than it may have done in different political circumstances. The Evinos was also selected because it was independent from the Yliki reservoir ensuring greater security/reliability of supply (p25).

The Panagopoulos *et al.* (1992) EIA examined a range of environmental impacts including coastal erosion, salinisation, habitat and aesthetic impacts. Limited detail is available but criteria used to evaluate the relative severity of these impacts included irreversibility.

Overall, the case study report provides insufficient information to examine criteria and values in any detail. However, there is a significant bias towards the assessment of the financial costs of alternatives with limited regard for the wider costs and benefits, suggesting that the water demands of the growing Athenian population take a higher political priority than the protection of the environment.

c) River Ythan NVZ

The designation criteria under the EC Directive are solely environmental. This implies a very strong assumption on the part of the EU, namely that the benefits of environmental improvement arising from the imposed action programme will be unquestionably greater than the associated costs of implementation.

The different interpretations of the "precautionary principle" adopted by the EU and the UK government also highlights differences in the implementation of the designation criteria in a situation of scientific uncertainty. Whilst the UK government initially required conclusive proof of cause and effect, it shifted over time towards the EU's lower standard of proof, specifically "on the balance of evidence". The initial differences may reflect different approaches to risk management and risk distribution. It could also be interpreted as the UK government questioning the EU's implicit assumption regarding the benefits of designation, or simply placing a lower value on the environment. Although the UK government stated that the final decision to designate was based on an interpretation of the science, there were undoubtedly political dimensions to the decision. However, the weights placed on the different dimensions of the final assessment are unclear.

d) The Grensmaas

The criteria used to evaluate the visions were based around five main environmental, socio-economic and cultural themes: river management, nature, landscape, cultural historic and archaeology, environmental quality and socio-economic functions. The case study report does not make clear what weights were attached to the different assessment criteria and by whom.

e) Ebro River Transfer

The criteria of assessment encompassed in the *Technical Reports* accompanying the PHN September 2000 or that arose in the social debate about the project after its presentation are: The criteria to determine river basin water surpluses or deficits, including hydrological and socio-economic factors. This implies criteria of the economic, social and environmental role of water in surplus river basins as well as the approach to causes that lead to the over-exploitation of resources throughout the water recipient areas (Mediterranean coast).

- 1) The criteria for the evaluation of the socio-environmental impacts on the donor and recipient areas. The former affecting the Ebro Delta (process of subsidence and regression, water quality problems; impact on river solid load; socio-economic impacts) and the areas affected by new reservoirs entailing the flooding of

inhabited towns and valleys. The latter concerns the effects of water transfer on the demand-increasing trend in the recipient regions.

- 2) The criteria for the economic analysis, i.e. budgets; amortisation periods, estimation of the energetic costs of pumping and energy that can be produced, agricultural benefit assessment, cost of water regulation (reservoir) costs (not included in the economic evaluation of water transfer), costs of purification of the poor-quality flow from lower Ebro River (not included), value of urban water supply, full-cost recovery principle, desalination technologies.
- 3) Criteria to deal with uncertainty, mainly, i. Irrigation policy and the international position of Spanish agriculture, ii. Evolution of water quality and effects of climate change on the hydraulic assessment.

In the *Strategic Environmental Assessment* (2002) the four strategic options considered were evaluated in accordance to the following explicit criteria: 1. Planning area; 2. Caution and preventive action; 3. Quality of basic environmental resources; 4. Environmental values, ecosystems and habitats; 5. Economic rationality; 6. Social and territorial balance.

Once the 'best strategic option' was selected (inter-basin transfers), the different 'transfer alternatives' (Douro, Tagus, Ebro and Rhone) were comparatively analysed according with the following criteria: 1. Compatibility with the general water planning framework; 2. Incidence of the alternatives on exporting basins; 3. Incidence of the alternatives on territories that hold conduction infrastructures; 4. Incidence of the alternatives on recipient territories.

The document on 2002 *Strategic Environment Assessment* of the PHN constitutes undoubtedly a step forward in the justification of the transfer. Nevertheless, its formulation and presentation after the Plan's approval conditions directly its contents. The information it uses is basically that already presented in the technical documentation of September 2000.

The key concepts on which the transfer project rests are within the traditional perspective of water management, the *hydraulic paradigm* (supply-side and subsidies oriented) well defined in Spain and in other countries (Allan, 1999). In its deepest cultural facet, resistance and continuity of this model up to the present have as their mainstay a system of values concerning the relation between nature and society which is deeply rooted in the *symbolic universe* (Berger and Luckmann, 1968) which prevails in both countries. In recent surveys society's tendency to relegate the environment to secondary positions is clear, as is privileging productive activities. The devaluation of recreational and leisure is confirmed, which is related to a perception of water alien to the idea of space of social enjoyment and appropriation (Paneque and Pedregal, 2000).

4.3. Timing

a) Alqueva

The environmental impact studies were conducted at different times of the project development, but the major drivers for the timing of the studies seem to have been political/institutional and socio-economic factors. The European Commission promoted both the GAS and the IEIS. However, the IEIS started when the government had already decided to implement the Alqueva project (based on the GAS) and there was little margin to evaluate new alternatives. Such ex-post studies are often used as a form of "rubber stamping" of decisions already taken by government. This limited the scale and number of alternative projects evaluated in the IEIS. It also limited the scope of the analysis, where the cost effectiveness of operating scales of the dam and the costs and benefits of other geographical options could have been analysed.

b) Evinos River Reservoir

The timing of the various formal assessments are largely driven by a reactive approach to water supply management. This reactive management can be traced back over decades and relates to the inability of planners to foresee the rapid increases in Athenian water demand that have occurred in the latter part of the 20th century. The Koutsoyannis *et al.* (1990) and YEHODE (1990) studies are perhaps the most obvious examples of reactive planning. The timing of the Panagopoulos *et al.* (1992) and Heurteaux & Soulios (1993) EIAs, coming after the initiation of project, also reflects the political pressure to initiate the project at the earliest possible date to meet water demand and avoid political unrest.

c) River Ythan NVZ

Under the EC timetable for the implementation of the Nitrate Directive, Member States were required to designate as NVZs all areas draining into waters vulnerable to nitrate pollution within 2 years. Hence, in 1993 the NERP recommended the Ythan for designation following their initial scientific assessment of the eutrophication problem. Despite the Directive's timetable, the UK Government did not make a decision on the designation until 1996, some 3 years after the recommendation. During this time, the Government initiated a public consultation on the proposed designation and instigated a number of research projects.

The Directive also required a review of the designation of NVZs at least every four years, consequently, the second recommendation for designation (by SEPA) in 1997 came only a year after the initial policy decision. The extent to which the scientific assessment had actually progressed in this time is unclear. However, SEPA's recommendation was followed relatively swiftly in 1998 by the Government's decision not to designate, suggesting that the scientific assessment had progressed relatively little.

The final policy decision to designate was prompted by the intervention of the EC, who had undertaken their own assessment of the scientific evidence available. This intervention suggested that the EC considered the UK Government's interpretation of the scientific evidence to date to have been incorrect. This is the first explicit intervention of the EC in the assessment and decision-making process, the timing of which was influenced by the complaint to the EC from the environmental pressure group, the SWCL.

d) The Grensmaas

The project was initiated in 1989 following a report on gravel extraction in the Province of Limburg. The timing of the initiation of the assessment was driven by the regulatory requirement of an EIA under Dutch and European Law. The assessment spanned a period of some 10 years from 1989 to 1999, followed by an execution phase from 2000-2012. It is not clear from the Dutch case study report as to why it was considered necessary for the EIA to span such an unusually long period.

e) Ebro River Transfer

An explicit assessment, including alternative options to the water transfer, has only been formally drawn up after the approval of the PHN (2000-2001), in *the Strategic Environment Assessment* (2002). Nevertheless, considering the process as a whole, a noteworthy evolution is to be observed, at least since the first draft from 1993 up to the SEA of 2002. This evolution does not affect the content and central objectives of the project, but change substantially its features.

A *Scenarios Document* is presented in 1994, which opened a discussion that the previous document (1993) avoided. In 1998 the *White Paper on Water in Spain* presented a revision of the whole water management that could have led to reconsidering the project. The final 2000 proposal was accompanied by five *Technical Reports*, which for the first time included a cost-benefit analysis of the project, albeit contested by several independent experts.

Overall, the evaluation process evolved behind the social debate on the project and the surrounding changing trends (changes in the Community's agricultural policy, new Water Frame Directive, increasing importance placed on the market factors). Each document attempts to recover part of the project's legitimacy, incorporating debate discourses that cannot be ignored. As a result, the number and magnitude of the works have been downgraded and their economic rationality increased.

4.5. Influence

a) Alqueva

The assessment process in the case study supported decisions to the extent that they demonstrated the socio-economic impacts of the project and provided supportive evidence to Government's decisions. The fact that results of the Global Assessment Study (1991-1992) indicated the positive impacts on the regional development policy of the Alqueva Project, the Government was happy to approve the project on the condition that negative environmental impacts are monitored and accounted for. This was prior to the more comprehensive IEIS. When the formal environmental impact assessment process started in 1994 the governmental decision to implement the Alqueva Project was already taken and there was little margin to evaluate new alternatives. This fact shifted the

focus of the assessment to the importance of the global environmental management of the project. The IEIS did not suggest any major project modifications, and the emphasis was put on the implementation of compensation and mitigation measures to minimise the impacts.

The final conclusion from the IEIS is that the benefits (e.g. regional development and strategic importance) of the Alqueva Project are not clearly demonstrated, and there are several uncertainties about the magnitude of most of the impacts. However, the socio-economic context of the Project had a very significant role in the decision because the local authorities and communities see the Alqueva Project as the only solution for the development of the Alentejo region. Negative environmental and social impacts were acknowledged in terms of minimisation of compensation measures to be adopted. This led to the environmental management program for the project area e.g. knowledge transfer and impact monitoring programme, heritage minimisation programme, natural impact minimisation programme and other evolving regional plans (PROZEA, POAAP) that tried to establish rules for land use in the Alqueva area.

b) Evinos River reservoir

The assessments of Altigos *et al.* (1964) and Tetrakys-Komi (1977) were largely responsible for the identification of the Evinos as a candidate reservoir, whilst the CEAs of Koutsoyannis *et al.* (1990) and YHEHODE (1990) confirmed to the Government that the Evinos was the most appropriate solution in the context of their limited assessment criteria. Given the Government has largely followed the recommendations set out in these assessments, it is fair to say that they have had considerable influence.

In contrast, the EIAs of both Panagopoulos *et al.* (1992) and Heurteaux & Soulios (1993) would appear to have little impact on the choice of Evinos or the nature of the project, but have smoothed the political passage of the project and facilitated access to European funding. Thus, they too have been relatively influential overall.

c) River Ythan NVZ

Due to the informal and iterative nature of the assessment process leading to designation, along with the lack of transparency at the different stages of the assessment, it is difficult to identify the extent to which specific assessment phases influenced policy outcomes. From an examination of the timing of the designation decision it is apparent that it was the intervention of the EC in the assessment process, rather than the results of any scientific assessment, that precipitated the change in policy on the part of the UK Government.

For each policy decision, both for and against designation, it could be argued that the results of the scientific assessment did not influence the Government in what were essentially political decisions, but that the Government used the inconclusive nature of the results as a basis for defending their position and the assessment model to further its own political ends. This argument is supported by the very high standard of scientific proof initially required by the Government and the very sudden shift towards a more "precautionary" approach when pressurised by the EU.

d) The Grensmaas

The assessment is an integral part of the planning and implementation phases of the Dutch case study and therefore is wholly influential in determining the preferred project approach.

e) Ebro River Transfer

Focusing on the last stage of the process, the 2000 PHN *Technical Reports* and 2002 *Strategic Environmental Assessment* (SEA) are clearly transfer driven. The 2000 *Technical Reports* are not formal assessment documents, but technical annexes of the PHN Draft justifying the decision already taken. On the other hand, as already mentioned, the SEA was submitted eight months after the project approval. This could suggest that the assessment and the decision making were independent processes. In fact, the analysis procedure followed in this case was highly based on strong assumption ("the implementation of the planned infrastructures is both necessary and appropriate and as such it has to be carried out"), rather than following a deductive logic.

However, taking into account the overall process (at least 1993-2002), including the numerous official documents, not formally assessment studies, and the wider social debate throughout this period, another and more subtle conclusion can be obtained. The project finally passed maintained the basic concepts of the first proposal, but also contained some important novelties, that try to soften some of the most harshly denounced

weaknesses of the previous proposal, i.e. a substantial reduction in the planned inter-basin water transfer volumes, enforcement of hypothetical users economic responsibility (at least as a legal requirement), and stabilisation of the growth of irrigation in recipient river basin. Nevertheless, due to the largely informal and iterative nature of the assessment process, along with the lack of transparency at its different stages, it is difficult to identify the extent to which the assessment inputs influenced policy outcome. Conversely, it is more probable that the evolution of assessment techniques and specific assessment items follow the changes in contextual factors and social pressures. Moreover, it is very likely that in spite of the official finalisation of the decision making process the project will be subject to new re-evaluations in the near future. In fact, just when this paper is being drawn up a new document, that starts the formal evaluation process has just been presented to the public.

4.6. Responsibility

a) Alqueva

Three Environmental Impact Studies conducted were all initiated by government legislation and conducted by consultants. All the assessment studies followed some kind of EIA decrees. The first EIS (1985) was prepared by DRENA/EGF, the global assessment (1991-1992) promoted by the EC Regional Development Office. There was extensive stakeholder participation in the assessment exercise. The integrated study of the Alqueva project apparently involved stakeholder participation from the inception of the project through the assessment process and after the approval of the project. The local stakeholders and the major political forces (national, regional and local) were involved at the different stages of the assessment exercise. The SEIA also involved external consulting experts in different areas of expertise.

b) Evinos River Reservoir

Under the Management of Water Resources legislation, the ministry of Industry, Energy and Technology have overall responsibility for management and planning of freshwater resources, with regional responsibility delegated to fourteen Water Departments. However, it was the Ministry of Environment, Physical Planning and Public Works that was responsible for instigating the 1988 assessment undertaken by the Department of Water Resources, Hydraulic and Marine Works of the National technical University of Athens (Koutsoyannis *et al.*, 1990) to evaluate alternative water supply options in the Evinos and Mornos.

The Ministry of the Environment were also directly responsible for assigning the two YPEHODE studies (1990 and 1991). These were assigned to various technical offices of the Water Departments. The 1990 study was finally approved by a bi-ministerial committee of the Ministry of Development and the Ministry of Environment. The Panagopoulos *et al.* (1992) EIA was initiated by the Greek Government under the European Directive 85/337/EEC. The Commission of the European Communities (DGXI) was directly responsible for the Heurteaux & Soulios (1993) EIA, as well as indirectly for a number of additional Greek impact studies (see p19). The implementation of the Evinos project was largely driven by the availability of Community Support Framework Cohesion Funding.

Overall, the Greek Government were largely responsible for the process of assessment and its many deficiencies. There was some intervention from NGOs, such as the Hellenic Ornithological Society, which partly prompted the EU to initiate an assessment directly. The EU also played an indirect role in assessment through the EIA Directive.

c) River Ythan NVZ

In the UK, the government look to an independent government agency, in this case the NERP (later SEPA), to initiate and conduct the scientific assessment. However, ultimately, the responsibility for implementing the Nitrate Directive lies with the UK Government and it is the Government that makes the decisions for designation. However, the inconclusive nature of the scientific evidence made the assessment process highly political drawing both pro- and anti-designation interest groups into the process along with those interested from an academic perspective.

d) The Grensmas

Under European Law the Dutch government have responsibility for initiating the EIA. The "Maaswerken" organisation was assigned responsibility for the planning and execution of the project, including the EIA. The

Province of Limburg is the project co-ordinator whilst the final responsibility of the project lies with Ministry of Transport, Public Works and Water Management. The project management is undertaken in consultation with the Ministry of Agriculture, Nature Management and Fisheries and a wide range of local and provincial authorities and NGOs, whilst a team of private companies were appointed to undertake gravel extraction.

e) Ebro River Transfer

In Spain, hydrological planning affecting several hydrological basins is a responsibility of the Central Government. Therefore, the design, evaluation, and implementation of the Ebro transfer, within the PHN, is ultimately the responsibility of this tier of Government. All the documents, starting with the River Basin Basic Documentation of 1988 up to the *Strategic Environmental Assessment* (SEA) of 2002 are documents signed by the corresponding Ministry, first the Ministry of Public Works and Urbanism, transformed into Ministry for the Environment after 1996. This general characterisation conceals a more complex reality. Some river basins are exclusively the competence of autonomous regions and therefore it is the Regional Governments that define the diagnosis. In any case, even in the case of river basins that are competence of the Central Government, Regional Governments make their own evaluations through their agriculture, tourism, and urban-spatial planning competencies. Those evaluations may be presented in the National Water Board (a merely consultative Board) and in Parliament, where the PHN is passed as a law.

A great social debate, often supported by a technical discourse, has taken place on a more diffuse level, from the presentation of the first draft (1993) up to the SEA (2002). This debate has produced an important number of documents of assessment nature throughout the whole process.

The EC has become a source of evaluation, due to its environment and agricultural policy competencies but mainly due to the Spanish Government's request for partial funding of the project. The Strategic Environmental Assessment (SEA, January 2002) is a document produced with the sole purpose of obtaining the EC's support and funding for the project. The EC has undertaken recently (August 2002) an independent evaluation report of the project, a report from which there is no public information yet.

One of the characteristics of the official documentation is that the specific authors (technical responsibility) are not habitually identified. This fact is particularly relevant since the Ministry often commissions the documents to consulting companies, which remain officially anonymous. An extreme case of this practice is the justification adduced by the Ministry for not publishing the reports on the PHN that the Ministry had requested from independent experts in October 2000, alleging the obligation to respect the 'right to privacy' of those experts. Those experts, most of them scholars, had been paid with Government's money and in general wished their report to be published.

5. Conclusions

1. Four of the case studies (Alqueva reservoir-Portugal, Evinos reservoir-Greece, Ythan NVZ-UK and Ebro River Transfer-Spain) have been formally and definitively approved by the responsible administrations (national governments in all cases) and are in a more or less advanced implementation phase. In most of these cases, this fact does not exclude the existence of some important uncertainties as regards the real feasibility of the projects or likelihood of their complete implementation.

The fifth case considered (The Grensmaas-The Netherlands) has reached a stalemate situation due to disputes concerning some important aspects of the project (quantity of gravel that should be dredged), lack of support by the inhabitants and legal allegations. The intended planning timing has changed and the project is so far in a "preparation phase" that have had to be fulfilled between 1997 and 1999. Furthermore, the direction of the project, i.e. organisation Maaswerken, had to resign from their tasks in January 2002. This situation could be considered similar to some stagnation stages experienced by other projects, e.g. Alqueva reservoir between 1978 and 1980 or Ebro transfer between 1995 and 2000. Nevertheless, the stalemate situation currently affecting the Grensmaas project, together with other distinctive features which will be commented further below, could be eloquent of some substantial differences in the governance issues encompassed by The Netherlands case.

2. Three projects (Alqueva, Evinos and Ebro) are characterised by a strategy of 'productivist' management of water resources, not exempt of strong tensions and substantial changes throughout the formulation and decision process. In any case, the projects have as central objective, and as main driver behind the whole decision making process, the generation of water resources to supply urban, industrial and/or agricultural demands. This, together with other factors from the geographical context, gives them remarkable similarities. As the report on Evinos points out: "It seems that the supply management approach, seeking to satisfy ever growing demands, prevailed

against a demand management approach, the main weighing factors being the pressure of time, the urgency of the matter, the anticipated EU subsidies and perhaps the knowledge and safety inherent in the implementation of tested technologies (dam constructions), instead of new innovative ones."

The Scottish case study (Ythan) can be regarded as a representative case of a 'post-productivist' approach to water environment management, as far as it aims to protect or recover the quality of this environment, reducing the intensity of economic activities (agriculture) that are supposed to have a negative incidence over them. This fact introduces substantial differences in the nature of the contents that feature this project's decision making process, i.e. legitimacy and hegemony (Bourdieu 1977, 190-197) of values and interests at stake, position of actors' networks, coherence with the general trend to 'naturalisation' dominant in the surrounding cultural context, even though the four projects already approved (Alqueva, Evinos, Ebro y Ythan) have other highly significant common characteristics.

The fifth case study (The Grensmaas) begins as a 'multifunctional project'. However, one of its initial objectives (gravel recovery, although in a less aggressive manner than traditionally carried out) is increasingly contested by social demands of protection and recovery of water environment and landscape quality, which constitutes the other basic initial objective. Furthermore, the increasing weight of environment and landscape conservation contradicts the objective of financial balance, through gravel exploitation, explicitly included in the formulation of the project. In this same case, over the decision making process (mainly since 1994-1995 floods) an already ongoing revision of the general strategy to deal with flooding has got strength. The new *schemas* (from controlling river flows to living with them, i.e. "Space for the River") become superposed and should be compatible with the project's initial objectives.

3. Regardless of the specific objectives behind them, the four projects formally approved (Alqueva, Evinos, Ythan and Ebro) coincide in a key feature that is firmly established in the formulation of the project and appears clearly stated in the respective case study reports: the assumption that the benefits are greater than the costs.

In some cases (Alqueva, Evinos, Ebro) this assumption is based on widely accepted and hegemonic social values and in long held traditions of hydraulic policy in the history of each country. In Portugal, a strategic water reserve and the regional development of Alentejo ("The hypothetical social benefits (e.g. regional development) of the Project were the main arguments to proceed with it despite the fact that economic benefits (irrigation, energy and water supply) aren't clearly demonstrated and the environmental impacts of the Project are very significant due to the submersion of a very large area". In Greece, overcoming a water deficit that prevents the development of the main national metropolis by implementing a project foreseen decades ago, an unquestionable objective reinforced by the situation created by a specific drought spell. In the Spanish case the solution to hydrological imbalances which constitutes the country's main geographical problem. This does not mean that these strategies are immune to internal tensions within the water policy arena and to changes in the wider cultural, political and economic contexts that frame the decisions adopted at national level. Actually, these assumptions are deeply rooted in the kind of socially hegemonic 'schemas', 'shared strategies' and 'myths' about water environment, well described for other contexts by Social Theory (Anderson 1980, Thompson, Ellis et al. 1990, Burke 1992, 101-103).

In a similar way, the legal framework (EU Nitrate Directive) of the Scottish case (Ythan) implicitly implies that benefits of reducing nitrate pollution in an area designated as a Nitrate Vulnerable Zone (NVZ) will justify any costs that may be incurred in achieving these reductions. As opposed to the before-mentioned cases, given the 'postproductivist' nature of the project's objective, social legitimisation of this assumption demands changes in the configuration of power balances and of power relations between the different networks of stakeholders, i.e. a transition from the hegemony of the alliance between Ministry of Agriculture and Fisheries (MAFF) and the National Farmers Union (NFU), in the context of a nation state, to the emergence of a more pluralistic process of policy development where wider interests are no longer marginal and subservient to the MAFF-NFU alliance, with Scottish Wildlife Countryside Link (SWCL) establishing connections in Brussels, in a sub-state/ supra-state context. Changes in actors and in decision-making scales, inevitably interconnected among them, which express and accompany transformations in social objectives and values.

On the other hand, the Grensmaas project is based in the assumption that "no changes will occur in the markets for sand and gravel". This leads to a lack of interest on prospects about the impact of extra gravel and sand on prices of these resources, thus conditioning the cost-benefit analysis. Nevertheless, it seems that the Grensmaas case does not present a clearly hegemonic, in a social and/or legal way, assumption that could be compared with those present in the other cases, in terms of basic and strong driving-force of the project.

4. When they are present, the assumptions about the unquestionable value of the project are based on an **indisputable diagnosis** of the problem and its solution, and on the indisputable definition of the necessity and technical viability of the required infrastructures or programs: : 1. Regional underdevelopment open to change through hydraulic intervention, in the Alqueva dam project; 2. Stagnation due to water deficit of the country's main development area open to solution by implementing a historical project, in the case of Evinos River reservoir; 3. Surplus and deficits between regions that are necessary and possible to be balanced by means of inter-basin transfers, in the Spanish National Water Plan; 4. Eutrophication processes that can be solved through changes in agricultural methods, in the Ythan River.

In the Grensmaas project despite the importance of this above-mentioned assumptions about market stability, the initial goals of the project (gravel exploitation together with protection against floods by means of canalisation and dikes) were already weakening when the project was being launched, and generate even deeper doubts during the decision making process. Thus, diagnosis and definition of alternatives have been more controversial.

5. All these factors lead to the following characteristics of the assessment carried out over the decision making process. They are more or less clearly present in the different cases according with their specific features as were presented before.

- a) Underlying the overall process are the deeper issues of **values and beliefs** influencing both perceptions of nature of the problems to be tackled, as well as of optimal ways to manage them. In all the cases, the high importance of established patterns and beliefs can be confirmed, in the way that has already been stated in other contexts: "Assessment of risks and response options tends to follow, rather than lead, political target setting, and the range of options tends to contract over time" (Committee on Global Change Research 1999, 318). Formal institutional procedures are not neutral but embody beliefs and ideas (informal institutions) that provide an advantage to some actors over others, acting as independent or intervening variables between the preferences and power of actors on the one hand, and condition closely policy outcomes on the other (Jordan 2000).
- b) **Assessment** (be it strictly economic or multi-criteria oriented) is not really considered as an independent, less say previous, stage in the design of the projects. Evaluation, beyond the partial yet firm diagnosis of the problem and its solutions, is done after the formulation of the project or even after its approval and it is carried out, if at all, incompletely.
- c) The **implicit strategy**, strongly assumed in the formulation of the project, makes difficult if not impossible the discussion of global alternatives. In the two case studies can be confirmed that "policy is often strongly path dependent in that early decisions may constrain or determine later ones, thus making discussion of alternative policies extremely difficult at later stages" (Gooch et al. 2002).
- d) The **complexity** of ecological and social processes inherent to the projects tends to be simplified by the starting diagnosis, basically incomplete. As has been concluded in other cases (Nilsson and Langaas 2002), more effort appears to be put on collection of information on state and impacts than on driving forces, pressures and responses. The diagnosis is conceived as a sum of descontextualized representations and supposed to be objective and existing independently of human agents, following what Thsoukas recognises as an *information reductionism* (Thouskas, 1997: 832).
- e) The **uncertainty**, present in basic aspects of information about the relations among different components of natural and social systems, is masked by the certainty that accompanies the diagnosis of the problem and the definition of the strategic solutions adopted. Decision-making processes based on the grounds of scientific alone criteria fail to recognise the complexity and the high levels of local scientific uncertainty and lead to a highly subjective and 'political' outcome
- f) Evaluation, conditioned by this fundamental fact, constitutes a **basically informal and iterative process**, sometimes diffuse, throughout the entire project life, from conception to completion, even over the post-decisional stage. In this changing process, the modules or vertices concerning actors' participation, available and really used information together with the context that conditions the whole decision making process, are difficult to separate from evaluation. This does not exclude the formalisation of specific evaluation documents, in different forms and rhythms, sometimes late over the project formulation or even once it has been approved. This last fact is quite indicative of the real role that sometimes evaluation performs throughout the process, i.e. an instrument for the justification and defence of an already decided strategy.
- g) Nevertheless, in general some **evolution and development of assessment methodologies** and techniques can be found, closely depending on the time extension of the decision making process and the intensity of the social controversy. This, in certain cases, leads to significant changes influencing the dimension or complementary aspects of the project, although not affecting its core contents.

- h) Evaluation is closely dependent on the balance of power among actors (Mann 1986, 1, 518-521), habitually affected in the case studies by an **increasing polarisation**. To conclude from this that the decision making process in the cases outlined above were just 'subjective', 'arbitrary' and/or 'groundless' may be considered a simplification. The evaluation item plays, precisely, a key role in the way conflictive approaches are expressed and at times partially solved. . In reality, "achieving effective water governance based on sound decision making process (including water projects assessment), is inherently political in nature" (Hall, 2002). We can say that the integrated perspective and practice that comprehends complexity of water issues' evaluation is inseparable from explicit considerations of ethics and policy (Funtowicz, O'Connor and Ravetz, 1996).
- i) In the context of intertwined and partially overlapping tiers of authority that characterise the emerging system of multi-level governance, the **European Union scale**, for legal and/or financial reasons, performs a key role as a driving-force for the emergence of formalised evaluation inputs throughout the decision making process.

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