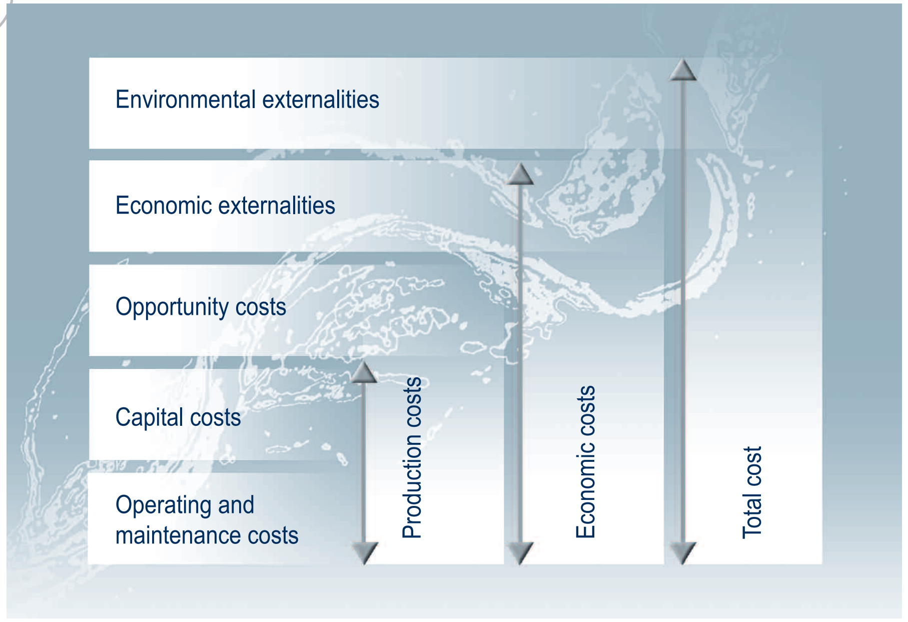
Assessment of costs

Which costs must be assessed?

The first step in assessing the costs of a project or programme is to precisely list all the costs that must be taken into account and quantified. Frequently, it is also necessary to determine the unit costs and the extent of the planned measures in order to calculate the total implementation cost of the project or programme. This type of cost assessment is often used in more elaborate economic analyses such as cost-effectiveness, cost-benefit and cost-recovery analyses.

The overall cost comprises a number of components listed in Figure 17.

Figure 17



The various components of the total cost.

Production costs

Production costs consist of the capital costs and the operating and maintenance costs.

- Operating and maintenance costs comprise all the expenses incurred by the operation of an infrastructure or a company. The main operating costs include payroll expenses, the purchase of raw materials, other external procurement (energy, transport, etc.), taxes, fees and depreciation of tangible assets.
- Capital costs include consumption of fixed capital, the cost of new investment and the opportunity cost of capital.

Consumption of fixed capital is defined as the theoretical value of the investment required each year to replace infrastructure. It is calculated taking into account:

- fixed capital expressed in physical quantities (capacity of reservoirs, lengths of networks, number of connections, number of treatment plants);
- the unit cost assigned to each type of installation or each characteristic entity;
- the assumed service life of each type of asset.

The cost of new investments includes not only the work to produce the new facilities, but also the cost of all preliminary studies. These costs are generally borne over a number of years.

The opportunity cost of capital corresponds to the estimated financial return that would have been gained had other investments been made, i.e. it is the profit that would have been produced if the capital had been spent on a different use. The opportunity cost is the economic expression of the consequences of a choice made, of a selection between competing solutions.

Economic costs

Economic costs consist of the production costs, opportunity costs and economic externalities.

In general terms, the opportunity cost corresponds to the value of the opportunity lost because one use of available resources was preferred over another, in cases where the resource is limited. In situations where a number of choices are possible, the opportunity cost represents the loss incurred when a decision is made to devote resources to one use and not to another. In the water field, the cost of the resource represents an opportunity value.

Irrigation and hydroelectricity as an example of resource opportunity cost

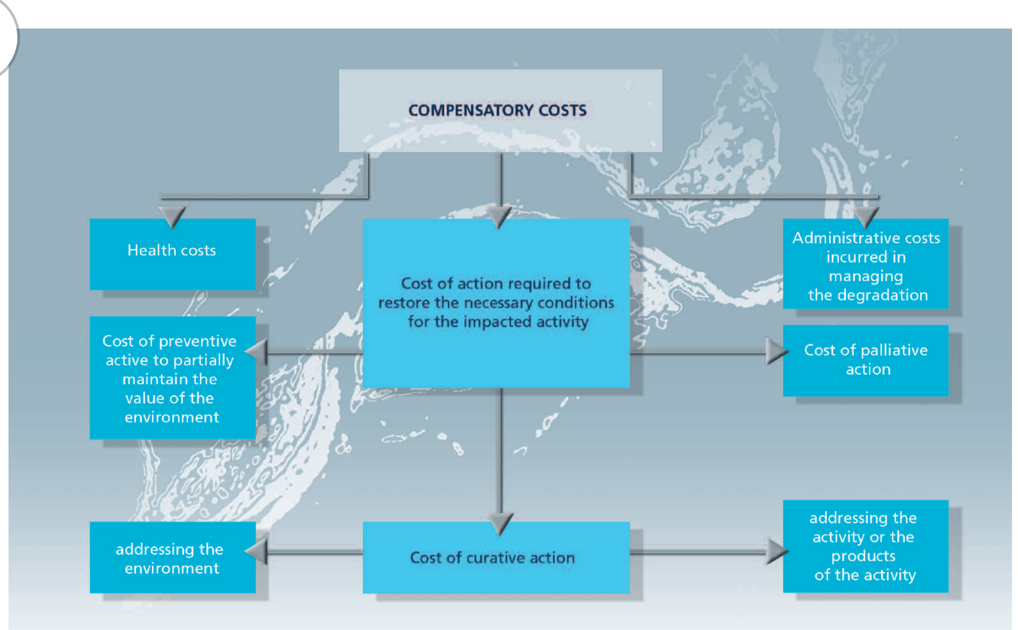
In Provence, vast quantities of water are drawn from the Verdon and Durance Rivers to irrigate fruit and vegetable crops. The water not used for irrigation serves to generate electricity in hydroelectric plants. There is therefore competition between tomatoes and kilowatts. If farmers are allowed to pay a lower price, they are encouraged to consume additional quantities of water that produce less value than if used for electrical generation, with as a result a waste of resources.
It is by making farmers pay a price equal to the value of the electricity not produced that the best distribution between the two competing uses can be ensured. The last cubic metre of water used will then produce as much value in terms of tomatoes as kilowatts.

Economic externalities correspond to the costs incurred by one activity to the detriment of another and not compensated or assumed by the entity generating those costs. Some compensatory costs represent negative economic externalities. For example, the “polluter pays” principle is a means to have the external costs of pollution paid by the entities causing the pollution.

Compensatory costs as an example of economic externalities

Compensatory costs are "observed excess costs imposed on a water user following degradation of an aquatic environment and/or water resources by another water user. Compensatory costs correspond to an outlay in response to a degradation (or a clear threat) to return to and theoretically maintain the initial status or an equivalent resource activity" (Analysis of compensatory costs in France and Europe for the WFD by Onema-Actéon-Ecodécision).

Figure 18



Analysis of compensatory costs in France and Europe for the WFD by Onema-Actéon-Ecodécision.

Total cost

The economic cost and the environmental externalities together represent the total cost.

The environmental externalities correspond to all the impacts, both positive and negative, caused by human activities on the environment and ecosystems. Concerning the impacts on resources that do not have a market price, as is often the case with environmental resources, it is necessary to assess and quantify the impacts in order to ensure that the cost is borne by the responsible entity. The concept of negative environmental externalities (environmental damage or costs) will be developed in the next chapter.

Assessing the costs of a project or measure

In the various economic analyses that are carried out in preparing an SBMP (sub-basin management plan) or for the WFD, the costs that must be assessed may vary.

For example, for an SBMP, the costs listed below are worth studying:
- the cost of new investments;
- consumption of fixed capital;
- operating and maintenance costs related to new investments.

On the other hand, there is no point in calculating the opportunity costs.

Finally, the economic and environmental externalities may be assessed as needed. For example, it may be worthwhile to list the compensatory costs in order to study the budgetary impact of a project on the local stakeholders.

WFD article 9 requires cost-recovery analysis taking into account "the costs of water services, including environmental and resource costs". That means it is necessary to study the total cost of water services and not only the production costs or the economic costs of the services.

Once the SBMP scenarios or the WFD programmes of measures have been turned into actual projects, the assessment of their cost begins. In general, the goal is to solve the following equation:

$$C = Q * P$$

where

C = the total cost of the project or measure.

Q = the number of units involved, e.g. the number of population equivalents concerned by a project to reduce carbon pollution.

P = the unit cost of implementing the project or measure, e.g. the cost per population equivalent of treating the carbon pollution.

Consequently, there are two studies that must be carried out and that may be totally distinct:
- the first consists of determining the number of units (Q);
- the second attempts to set the unit cost (P) best suited to the characteristics of the study perimeter.

The study on Q may consist simply of listing the units concerned by the given project within the perimeter set for the assessment, e.g. the number of population equivalents. These data are available in more or less detail depending on the situation, e.g. per administrative sector, per area served by a collection system, etc.). In some cases, this may not be possible because the information on the desired units is not available, e.g. for confidentiality reasons. In this case, calculation of Q is no longer an inventory, but becomes an estimate on a case-by-case basis taking into account the data collected and using corrective coefficients.

The study on P consists of obtaining, from other studies or from experts, a value for the unit cost in situations as close as possible to that studied. In any case, P is determined using more or less rough estimates that must be refined and that should be clearly explained in the report on the assessment results.

In addition, the interaction between the two factors must be adapted to the operational conditions. The type of data (degree of detail, dates, etc.) for one of the factors in the equation (P or Q) is an important aspect in determining the other factor. For example, processing of the data selected to calculate Q may depend on the value of P, and vice versa. This means that the two studies must be carried out on an iterative basis, always taking into account the situation for the other factor.

Project sizing is often a source of data-aggregation difficulties. For example, it is very common to estimate the unit cost of a project, e.g. the cost of renaturalising a kilometre of river or the cost of water-treatment capacity for 100 population equivalents. However, it is much more difficult to determine the number of kilometres of river that must be renaturalised or the number of population equivalents that must be treated to reach the good-status objective. In other words, there is real difficulty in sizing measures due to the remaining uncertainty concerning their impacts (dose-response analysis) and the effects of data aggregation on their effectiveness.

To make progress, it is indispensable to:
- accept the uncertainty, discuss it and propose sizing solutions indicating the selected assumptions;
- continue with efforts to determine unit costs by developing more detailed typologies than those currently available in order to produce more realistic total costs. That is the purpose of the cost observatories that the Water agencies are in charge of setting up.

Managing uncertainty in WFD economic assessments and presenting uncertainty to political decision-makers

The WFD set environmental objectives for all water bodies that must be reached by 2015. If it is unlikely that a water body will reach the set objectives by 2015, the WFD requires that measures be implemented. An economic assessment serves to describe, formulate and select the necessary measures.

Uncertainty is an unavoidable factor when running the economic assessments required by the WFD. There may be uncertainty about:
- the amount of quality that a water body must gain in order to achieve the good-status objectives;
- the effectiveness of a measure or combination of measures;
- the cost of a measure or combination of measures;
- the benefits of a measure or combination of measures;
- the relative importance of the factors contributing to a pressure;
- the time required for a measure or combination of measures to produce the expected improvement in quality.

It is therefore indispensable for an economist to:
- correctly manage uncertainty during economic assessments;
- take uncertainty into account when presenting the results of an economic assessment to decision-makers.

The goal is not to reduce uncertainty, but to correctly manage it and to provide decision-makers with concise and actionable information on its implications. It is important to remember that any attempt to reduce uncertainty must be proportionate to the importance of the decision to be taken and the consequences of an incorrect decision.

Using an example of a cost-benefit analysis (CBA), this section discusses how to take uncertainty into account and how to present the uncertainty inherent in a CBA. In this case study (see the Tables on the following pages), economists use CBA to assess three measures:
- measure 1 = management of development work;
- measure 2 = creation of wetlands;
- measure 3 = depollution of an old mine site.

Three values are provided for the costs of each measure (high, medium, low) to indicate the uncertainty of the assessments (see Table 7, page 47). A few costs not related to water and concerning implementation of the measures are also listed and quantified (see Table 8, page 47). In this example, the first measure would result in the elimination of a public road, which would in turn reduce recreational activities and the number of visitors. This reduction was calculated under the heading of costs not related to water. A few benefits, both related and not related to water, concerning implementation of the measures are also listed (see Table 6, page 46). Some are quantified with cost data, but others can only be evaluated qualitatively given the uncertainty.

This chapter is drawn from a presentation made by Maria Salvetti during the conference on integrated water management held in Basel in September 2007.

In this example, all costs are identified and quantified, but only some of the benefits could be quantified. It is often difficult to cost all the identified benefits given the uncertainty inherent in this type of assessment. That is why the cost-benefit ratio only partially reflects the overall effects of measures (see Table 9, page 47).

Tableau 6 *Assessment of benefits.*

Measures	Main category	Secondary category	Type	Description	Present value (best estimate)
Water-related benefits	Production		Commercial fishing		
			Recreational fishing		
			Water-related products		
			Energy production		
			Abstraction		
	Visitors		Informal recreational activities on the banks		
			Bathing	More frequent visits by current visitors and perhaps new visitors	57 148 £
			Fishing	Major uncertainty concerning the effects of a reduction in metals and other pressures on fishing	863 202 £
			Other visitors with specific activities	Low potential advantage to be drawn from an increase in the numbers of these visitors	19 596 £
			Education and research		
			Health		
	Other advantages		Navigation		
			Amenities		
	Ecosystem services	Physical	Flood/storm protection	Limited advantage from flood protection for neighbouring properties	217 518 £
			Water regulation		
			Preservation of wetlands	Major advantage from increase in size of wetlands and salt marches	Not calculated
		Chemical	Wastewater treatment		
			Nutrient recycling		
		Biological	Nursery/feeding zones for fish	Limited advantage, already partially taken into account in recreational fishing	Not calculated
			Biodiversity/habitat reserve	Major advantage from the improvement of a listed SPZ	Not calculated
	Non-use		Non-use	Major advantage in that the improvement will affect a nationally and internationally important site	5 150 082 £
Benefits not related to water	Soil quality			Cleaning of the mining sites would improve water and soil quality	Not calculated
	Ecosystem services	Chemical	Carbon sequestration	Limited advantage	104 084 £
TOTAL					6 411 630 £

Tableau 7 *Cost of measures.*

Measures	Adjusted (non recurrent) financial costs (present value)		
	Low	Medium	High
Natural techniques to develop Whitton Ness	5.0 M£	6.5 M£	8.0 M£
Creation of wetlands	2.1 M£	2.8 M£	3.0 M£
Depollution of an old mine site	1.2 M£	2.3 M£	3.1 M£
Total	**8.3 M£**	**11.6 M£**	**14.1 M£**

M£ = millions of pound sterling

Tableau 8 *Costs not related to water.*

Costs not related to water	
Reduction in recreational activities due to loss of public road following development project with no replacement	276 557 £

Tableau 9 *Summary of CBA (cost-benefit analysis) results.*

Cost (present value)	11 876 557 £	Other costs not quantified	Cost of amenities and landscape not quantified
Benefit (present value)	6 411 630 £	Other benefits not quantified	This includes non-use (Ramsar). Some benefits were not quantified.
Net present value	5 464 927 £	Cost-benefit ratio	0.54

How can economists present the uncertainty affecting CBA results in a completely transparent manner? Is it possible to provide decision-makers with useful results without masking the difficulties created by the uncertainty?

It is necessary to achieve a common understanding on uncertainty with the local stakeholders and experts in order to present it correctly. The use of graphs indicating "tipping points" (see below) can also help in providing better information on uncertainty.

Qualitative assessments to the rescue?

During a cost-benefit analysis, it is often more difficult to analyse the benefits than the costs. To avoid neglecting or underestimating benefits that may be difficult to cost or even to quantify, qualitative assessment is often proposed. It can indicate whether the value of the expected benefit is high, medium or low, positive or negative, known or negligible. The level of confidence in the assessment is also indicated qualitatively (high, medium, low).

Of course, this type of assessment is easier to carry out than a quantitative assessment, however it may incur other difficulties. For example, if the results of the benefit assessment are expressed in both monetary and qualitative terms, it may be more difficult to draw conclusions shared by an entire group. It is also difficult to calculate together benefits that have been assessed quantitatively and qualitatively. Finally, attempts to compare benefits assessed quantitatively and/or qualitatively with monetary costs are very difficult and sometimes impossible. That is why efforts to manage uncertainty by mixing qualitative and quantitative assessments do not always produce a clear set of conclusions and do not necessarily simplify discussions with stakeholders.

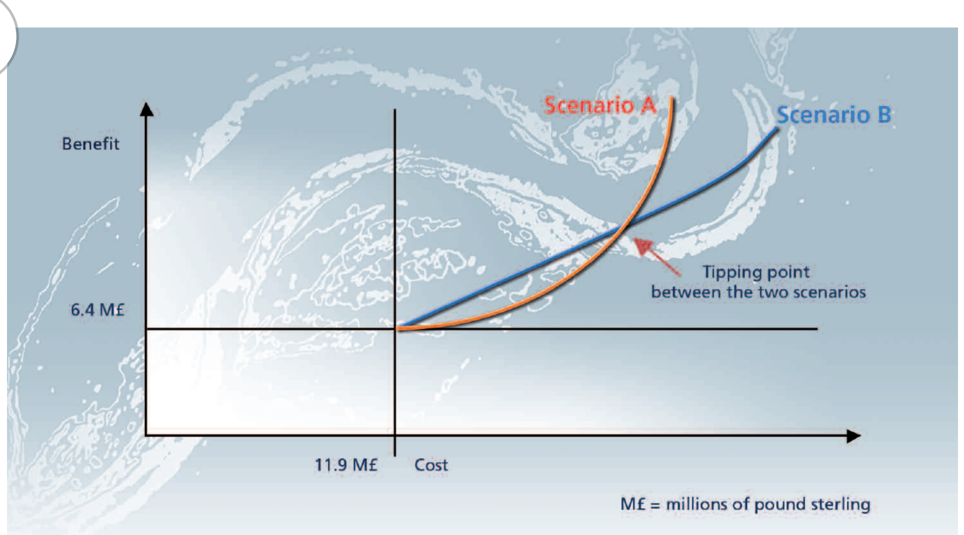
Graphs indicating "tipping points" to help in providing better information on uncertainty

One technique used to manage uncertainty consists of identifying "tipping points". They correspond to the values at which one scenario (measure, policy, etc.) becomes more favourable than another scenario. Even though this technique does not provide any information on the statistical confidence level, tipping points can help decision-makers in ascertaining the robustness of the analysis.

This technique can be very useful in presenting the uncertainty concerning cost and benefit assessments to a group of people having varying degrees of scientific and technical knowledge. Simple and clear graphs can highlight the key values and the ranges of assessment data, thus facilitating discussions. Using this technique, an economic assessment makes a substantial contribution to launching the discussion and arriving at a decision, thus fulfilling its mission.

The graph in Figure 19 shows an example of this technique with data drawn from the CBA presented above. In addition to the costs and benefits already assessed in the CBA, two scenarios are also compared.

Figure 19



The tipping point is where the lines representing the scenarios cross.

Discussions with stakeholders and joint analysis to manage uncertainty

In the example above, the use of ranges for the assessments (high and low values) can be of use in presenting the cost and benefit data. They indicate the areas where costs and benefits reach similar values, i.e. where there must be discussion and negotiation with and between the local stakeholders.

The CBA results are one factor among many in the process of making a decision and should not be the sole factor in determining whether a project is approved or not.

Experts and local stakeholders should be brought into the assessment process as early as possible because their participation is a pragmatic means to manage uncertainty while creating a common understanding of the issues. They can further contribute by providing very precise knowledge concerning the costs and benefits of measures for projects specific to a given site. The sharing of information on uncertainty is also a means to limit risks. Making different groups of people aware of uncertainties is in fact a collective means of managing uncertainty. It is a necessary step in the plan to manage uncertainty over the long term, which should also include a monitoring system and the creation of a database.

Summary of the principles and techniques proposed to manage uncertainty

During WFD implementation, economists must confront uncertainty when carrying out economic assessments and when presenting the results to decision-makers. Among other aspects, uncertainty stands out in that it entails difficulties in terms of both the methods employed and communicating the results. The purpose of an economic assessment is to inform the decision-making process.

There are no generic or "ready-made" solutions when dealing with uncertainty. However, there are a number of principles and techniques that, when used correctly and depending on the circumstances, can help in managing uncertainty.

- Encourage discussions and the participation of local experts and stakeholders to ensure that local knowledge is taken into account in the assessment in order to reduce uncertainty.
- Work on the water-body scale to reduce the economic and scientific uncertainty.
- Assess advantages qualitatively when quantification is too difficult, that will stimulate discussion.
- Provide assessment results in the form of value ranges to express the uncertainty concerning advantages, costs and the effectiveness of measures. Point out situations where the estimated values are equal in order to stimulate discussion.
- Use graphs showing the tipping points between various scenarios to draw the attention of decision-makers to zones of uncertainty that require further discussion.

Special cost-calculation techniques – cost-effectiveness, cost-benefit and cost-recovery analyses

When the costs of measures and consequently of the various scenarios and programmes have been determined, the data is generally used in different types of analyses. These analysis techniques are fairly well known, however expert knowledge is required to implement them correctly.

The three main analysis techniques used in the water and aquatic-environment fields are presented here. They are part of the WFD-implementation process and may be of use in preparing an SBMP.

Cost-effectiveness analysis

Cost-effectiveness analysis (CEA) is used to select the various options or measures required to attain a goal at the least possible cost. This type of analysis serves to rank the available projects or measures according to their effectiveness in reaching the set environmental objective.

The purpose of CEA is to ensure that the limited financial resources of the stakeholders and funding parties are put to the best possible use. Consequently, it is a means to reduce the cost required to achieve the set objective. Contrary to cost-benefit analysis (CBA), the point is not to determine the monetary value of the benefits produced by reaching the objective. Cost-effectiveness analysis cannot inform on the relevance or the utility of a project, nor can it serve to select the best project on the basis of the expected benefits. CEA can, however, assist in selecting the least expensive set of projects or measures capable of attaining the set goal.

WFD Annex III states:
"The economic analysis shall contain enough information in sufficient detail [...] in order to [...] make judgements about the most cost-effective combination of measures in respect of water uses to be included in the programme of measures under Article 11 based on estimates of the potential costs of such measures."

For example, concerning the reduction of priority substances (Art. 16), the WFD recommends using cost-effectiveness criteria to determine the best combination of measures to reduce and progressively eliminate this type of pollution.

Cost-effectiveness analysis is also a valuable tool in preparing an SBMP. In this context, the difficulty lies in jointly selecting the technical means, i.e. the measures capable of reaching the environmental objectives, and setting the economic parameters, via the economic assessment of the measures which are not always precisely defined by the experts, either because their scope is too vast to the point that they represent a general direction or an overall objective to be reached, or because it is very difficult to size them (number of hectares, of population equivalents, of tons, etc.).

Example of a cost-effectiveness analysis

The water resources of the towns of Patay and Coinces, in the Beauce region, did not meet drinking-water standards due to high levels of nitrates and pesticides. The pollution was caused by intensive farming activities within the water-table perimeter.

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The situation could be improved by preventive measures (which have a cost) or by technical corrective measures. Three different solutions were proposed to the two towns.

- Project A proposed drawing water from a new resource via a connection to an abstraction created in the town of Coinces.
- Project B proposed drawing water from a new resource via a connection to an abstraction created in the neighbouring town of Villeneuve-sur-Cosnie.
- Project C consisted of a physical-chemical treatment of the available resource to reduce the level of nitrates and pesticides.

The planned duration of projects A and B, i.e. drawing on a new resource, was 30 years. Project C, which involved treating the polluted water, was designed to last 15 years. However, its total cost over 30 years will be calculated.

For each project, the investment costs and annual operating costs were determined.

	Projet A	Projet B	Projet C
Investment	730 000 €	370 600 €	890 000 €
Operations	18 000 €	12 000 €	17 000 €

For project C, the investment costs were doubled in order to compare the three projects over the 30-year period.

The projects were ranked according to their net present value (NPV). The NPV is equal to the total revenues (unit price x volume sold) minus the initial investment and minus the expenses (operation), all discounted at an annual rate of 8% over the life of the project (30 years).

$$\text{NPVn} = \frac{\textbf{Revenue - Investment - Operating costs}}{(1+8\%)^n}$$

The selected project is the one having the highest NPV.

In the water field, the "impact on the water price" criterion (project cost / distributed volume) is often a useful data point. It translates the impact of a project into the cost per cubic metre of water. Presented in this manner, the results are easier to present and to understand for public decision-makers and water users.

The total cost of the projects (investment + operation) was compared with the revenue derived from the sale of 150 000 cubic metres per year, i.e. the costs of each project were divided by the 150 000 cubic metres distributed to consumers.

For a discount rate of 8%, project B is more cost effective than projects A and C.

Discount rate	Projet A	Projet B	Projet C
8%	0.66 €/m^3	0.35 €/m^3	0.94 €/m^3

Study by the Loire-Bretagne water agency.

Cost-benefit analysis

Cost-benefit analysis (CBA) compares all the benefits to all the costs of a given project and its options, taking notably into account the impacts that are not calculated in monetary terms (which is often the case for the environment).

It is a very useful decision-aid tool that can compare the different versions of a project and assess their relevance. Depending on the cost-benefit ratio, it is possible to determine whether the project is profitable or not. For example, it is possible to calculate the costs of restoring the ecological quality of the Alsatian water table and to assess the corresponding benefits.

Practically speaking, CBA results differ depending on whether the assessed benefits are marketable or not, e.g. environmental improvements such as reducing water pollution, etc. In the latter case, the analysis will require the use of appropriate techniques to monetise the expected non-market benefits.

Consequently, this type of analysis requires:
- precise definition of the required measures;
- an estimate of the costs and benefits of the measures;
- the distribution of costs and benefits over time (for discounting purposes);
- an assessment of the measures taking into account the present value of the cost-benefit ratios and a sensitivity analysis.

CBA is not a means to calculate the financial profitability of a measure, but an assessment of its overall value and economic relevance for the local government. In other words, the results are not intended solely for the project promoter, but for all stakeholders.

In determining the costs and benefits, CBA goes beyond a calculation of the financial aspects. The objective is to take into account all social and environmental costs and benefits, including non-economic effects, goods and services, which by definition do not have a price. To express their value in monetary terms, it is therefore necessary to produce fictive prices calculated using hypothetical methods. The results are only as good as the underlying assumptions, which sets certain limits to this type of assessment.

The main weak point of CBA is that the assessment of costs is based on measures whereas that of benefits looks at human uses that are directly linked to the status of a hydrosystem. The problem is that hydrosystems provide services on very large scales. It is sometimes difficult to see these services as being of direct use, even though they are, of course, of value for water management in a river basin (protection of groundwater, supply during low-flow periods, flood control), but also for protection of biodiversity on smaller scales, e.g. a network of natural zones, etc. Because CBA has difficulties in determining the best scale for its application, it has certain limits as a decision-aid tool in formulating policy.

Cost-benefit analysis also has limits in terms of the method. Because it attempts to express all the consequences and impacts of a project in monetary terms, it must call on fictive economic situations, either by inventing a market where none exists or by simulating a change in the environment. Both the persons running the assessment and those using the results must be aware of these limitations. In almost all cases, they are accompanied by practical difficulties pertaining to the availability of data. This has to do with the fact that the data required for the CBA cannot always be obtained in the suitable format. For this reason, the analysis consists, to a large extent, in manipulating data that are incomplete, fragmented, lacking in detail or lacking in scope. Extrapolations, interpolations, simplifications and working assumptions are the inevitable ingredients of economic assessments in the environmental field in general and the water-management field in particular, even if sensitivity analysis of these parameters can be used to limit the uncertainty to a certain degree.

Consequently, even though the basic principle behind cost-benefit analysis is fairly simple (compare discounted costs over time to discounted benefits over the same time span), the actual analysis implies a large amount of work to simplify the parameters and correctly define the hypotheses. In the end result, the quality of an assessment depends on its capacity to inform and facilitate discussions. That requires a high level of transparency concerning the method and understandable terminology.

That also means that the calculations and results should not be seen as a decision in and of themselves, but as a basis for discussion, further reflection and negotiations.

■ Cost-benefit analysis in the WFD and SBMPs

CBA is one of the basic techniques used in preparing WFD programmes of measures, i.e. to estimate and compare the costs of measures with the corresponding environmental benefits, in order to justify possible exemptions concerning the deadline or the overall objective for a water body (see the chapter on disproportionate costs).

This type of analysis could also be used in preparing SBMPs, but they are expensive. Feedback on CBA use for SBMPs has shown that it can be implemented in a simplified form, for example by listing all the costs and benefits corresponding to different scenarios, without necessarily having to monetise all the data. In this case, CBA corresponds to a multi-criteria analysis.

CBA may be a means to mobilise stakeholders and to impulse the creation of scenarios for the SBMP. It can also show that the foreseen financial resources are not sufficient to meet the set objectives.

However, a negative cost-benefit value does not necessarily mean that the objectives are overly ambitious. It could simply be because the monetary value of some benefits is difficult to calculate. In addition, other criteria (environmental, sociological, etc.) may exist, even though it is difficult to assess them quantitatively.

The difficulties commonly observed and reported are the following:

- difficulty in identifying all the benefits. Some benefits are unknown or not easy to quantify (margin of error, no reference points);
- difficulty in fully distinguishing the link between water and the local area. In some cases, the link is too technical to enable easy identification;
- the scope of the analysis appears too vast and open-ended;
- difficulties arise for SBMPs in less populated and/or less touristic areas;
- some benefits depend on other measures that fall well outside the scope of the SBMP.

On the whole, CBA is not particularly well suited to the scale on which SBMPs are formulated, but it can be used in specific cases for certain subjects.

Consequently, it is not necessarily useful to carry out a complete cost-benefit analysis for an SBMP. On the other hand, it may be worthwhile to:

- implement CBA techniques, e.g. by collecting data on economic issues in the area (the study for the SBMP for the Gironde estuary to select the rivers in which fish-passability issues were the most pressing produced an estimate on the value of fishing activities in the estuary (45 million euros), which was of great use to the concerned stakeholders because their role in the local economy had never been mentioned previously;
- run precisely targeted cost-benefit analyses (specific topics in each area);
- run cost-effectiveness analyses because they can avoid the difficulties involved in assessing benefits and can serve to compare different versions of projects.

Cost-effectiveness analysis or cost-benefit analysis?

To reach the set objectives, a number of measures or projects are generally possible. These measures or projects may complement each other or they may be exclusive. They differ in terms of their costs (market and non-market), their benefits (market and non-market), their deadlines, geographic locations, contributions to reaching the set objectives and their redistributive effects.

Cost-effectiveness analysis implies comparing the costs of various measures or projects required to attain a given environmental objective, e.g. a reduction of a pollutant to a given level in a water resource. For an SBMP, this type of analysis is suitable when the goal is to compare the costs of several technical options or scenarios in view of a given objective. For WFD implementation, these analyses are carried out during the formulation of the programmes of measures in order to select the most cost-effective measures to achieve good status for a water body.

Cost-benefit analysis is a decision-aid tool designed to assess projects through comparison of their costs and benefits. If the project produces a net gain, it can be approved. Different projects can also be ranked according to the level of net gains that they produce. There are two possible cases. The purpose of CBA can be to compare:

- a base scenario, which extrapolates the current situation into the future, with an alternative scenario in order to judge the usefulness of implementing the latter;
- a number of scenarios in order to select the best one, without necessarily comparing them to a base scenario.

It is clear that CBA deals with general guidelines and, for an SBMP, serves in particular to analyse alternative measures having different effects on resource quality. For WFD implementation, CBA is used to justify exemptions in terms of deadlines or of the final status (see the chapter on the analysis of disproportionate costs).

Finally, CBA differs from CEA in that it requires that all costs and all project impacts (both positive and negative) be expressed in monetary terms in order to allow comparisons.

Cost-recovery analysis

Cost-recovery analysis, a concept explicitly mentioned in the WFD, must be carried out in the process of drafting the characterisation report for each river-basin district. The analysis must indicate the degree to which each category of water-service users in fact pays for the water it consumes and discharges. The WFD does not impose a specific level of cost recovery and leaves the Member States with a certain degree of leeway, notably by providing the possibility of taking into account the social, environmental and economic impacts of cost recovery.

This type of analysis is presented in detail in the chapter titled “Cost recovery or the water economic cycle”.