Executive Summary of the case study report on water resources management in the Basque Autonomous Community

An input for the 3rd edition of the UN World Water Development Report: 'Water in a Changing World'

Water has become one of the most important issues on the international agenda, and for good reasons. A good example of this is the recently inaugurated international EXPO in Zaragoza with the slogan 'Water and Sustainable development' and the celebration next year of the 5th World Water Forum to be held in Istanbul.

The Basque Autonomous Community is not unaffected by this issue and therefore accepts as one of its main challenges to achieve proper water governance. Apart from the strong institutional commitment, the Basque Autonomous Community has incorporated into the Basque Water Act 1/2006, of 23rd June, the mechanisms necessary in order to execute the European Water Policy as expressed in the Water Framework Directive which establishes an EU action framework in the area of water policies (2000/60/EC). URA, the Basque Water Agency, has been set up through Act 1/2006 as a central instrument for carrying out the water policy in the Basque Autonomous Community. URA was set up in January 2008 and is committed amongst other things to strongly increasing the human and technical resources which are so necessary for a correct water management.

Proof of the Basque Country's commitment to water is our close relationship since 2005 with the United Nations World Water Assessment Programme (WWAP), fruit of which the Basque Country participated with a case study on the water resources in the Basque Autonomous Community into the 2nd United Nations World Water Development Report. As well as financing the publication of the executive summary of that report in Euskera (Basque language) and Spanish for worldwide Distribution. We renew this commitment with even more enthusiasm by participating in the Third Report, to be published in March 2009 during the 5th World Water Forum in Istanbul.

In the Basque Country we do not ignore the water problem in the most needy countries. By the Basque Government joining the Millennium Declaration in 2004 we commit ourselves to the universal eradication of poverty and this guides us in our policies. Hence the international mandate of URA is focused on the need to work towards fulfilling the water and sanitation-related Millennium Development Goals in collaboration with the on-going world initiatives.

Lastly, we must not forget the serious challenge which is the fight against climate change which is the focal point of the next United Nations World Water Assesment Report, and which in the Basque Country has taken the form of the Basque Plan Against Climate Change, which contains various water-related measures amongst its numerous actions.

I hope that this document, which is a timid advance of what will be presented in Istanbul, can be used to share concerns and to paraphrase the slogan of the 5th World Water Forum build bridges between the water communities.

Esther Larrañaga Galdós
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Water resources have always played a major part in the rise of great civilizations. However, as mythology depicts, water-related natural disasters have also had a large, sometimes devastating, impact for many. Given the destructive power of water, no wonder almost every culture has a myth of a flood, the earliest of which dates back to the Sumerians in the 17th century BC. Arguably through interaction of the civilizations, similar legends have followed one another. Perhaps the most well known ones being the Sumerian tale of Gilgamesh and the Noah's Ark of the book of Genesis.

The World Water Development Report (WWDR), rooted as it is in science and hard facts, is far from being a storyteller like these ancient texts. However, it does have one thing in common with the more mythical writings: it warns people of the changing face of our World.

All societies, regardless of wealth or level of development, are prone to water-related hazards. A recent example is the floods in the Basque region of Spain that took place in early June 2008, resulting in the evacuation of some residents from their homes by boat. However, in this case, the existence of proper infrastructure prevented the kind of catastrophe flooding can cause, and life went back to normal in a matter of days. Unfortunately, this is not the case in all regions of the World where urban infrastructure, including water and sanitation services, is far from being satisfactory.

The case study development component of the World Water Development Report aims to highlight various vulnerabilities to which societies are prone, as well as to share good management practices that allow sustainable utilization of water resources.

I have the pleasure to write the Foreword of the Executive Summary for this case study on the state of water resources in the Basque Autonomous Community. The detailed report, which will be released parallel to the launching of the 3rd edition of the World Water Development Report in March 2009, will provide a detailed account of the water sector in the region and explain the management and policy aspects which make the real difference in availability and provision of services for all, including the well-being of ecosystems. I would like to thank our counterparts, namely the Basque Water Agency and UNESCO Etxea, for the commendable job they have done in drafting the executive summary and in preparation of the full case study report. In the WWAP Secretariat, we are proud to be partners with authorities who are dedicated to make a difference by treating water resources as a heritage to be safeguarded for future generations.

I hope to see you all on March 16th, 2009 in Istanbul for the launching ceremony of the 3rd edition of the World Water Development Report.

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01 INTRODUCTION

Background

The Autonomous Community of the Basque Country (hereafter, ACBC) is one of Spain's seventeen autonomous communities. It is a densely populated area where 5% of Spain's total population lives on 1.4% of its land. As will be described in the sections which follow, it is characterized by great heterogeneity with regard to its topography, climate, population distribution, the distribution of its economic activities, and so on, which has had, and still has, a marked effect on the management of its water resources.

The area faces particular difficulties: occupation of the flood plains of the rivers draining into the Cantabrian Sea; periods of drought followed by floods; heavy industry in the river basins of the north juxtaposed with the farming activity of the southern river basins; and a broad-based and heterogeneous institutional and administrative framework, and so on. All this makes managing water resources a matter of overcoming successive hurdles, coupled with the uncertainty of what climate change has in store and the challenge of responding to it effectively.

Nevertheless, Basque institutions have risen to the challenge and are now actively engaging with the issues involved. The first step was involvement in the implementation of the European Parliament and Council Directive 2000/60/EC of 23 October 2000, establishing a framework for Community action in the field of water policy. The second was the passing in July 2006 of the Waters of the Basque Country Act, No. 1/2006 of 23 June, the purpose of which is to establish «the mechanisms necessary for implementing European policy», and the subsequent creation of the Basque Water Agency as the central instrument for carrying out water policy in the ACBC. Thirdly, the autonomous administration's wholehearted involvement in combating climate change is embodied in the Basque Plan to Combat Climate Change. These steps have laid the foundations for the achievement of one underlying goal, bringing about the effective stewardship of water.

Finally, the Basque administrations' support for the least privileged members of society should not go unmentioned. On 17 November 2004, the Basque Government agreed with the United Nations to commit to the Millennium Declaration through the signing of an agreement between the World Coordinator of the United Nations Millennium Campaign, Eveline Herfkens, and the Lehendakari (President) of the Basque Government, Juan José Ibarretxe. The Basque Government is following through on this agreement by seeking, thorough the Basque Water Agency, funding mechanisms to support Target 10 of Goal 7: to halve by 2015 the proportion of people without sustainable access to safe drinking water.

Location

The Autonomous Community of the Basque Country (ACBC) is situated in the north of the Iberian Peninsula, and has a Cantabrian Sea coastline of 209 km. It covers 7,234 km^2 and has a population of 2,140,904 (2005), giving a population density of 296 inhabitants/km^2 (Figure 1).

The ACBC is made up of three historical territories: Bizkaia and Gipuzkoa, in the north, and Araba, in the south (Figure 2).

Topography

The ACBC is an eminently mountainous territory, straddling the western end of the Pyrenees and the

Figure 1. Location of the ACBC Source: EUSTAT

Figure 2. Historical Territories in the ACBC Source: Basque Government

eastern end of the Cantabrian Mountains. The Cantabrian-Mediterranean watershed, formed by a succession of medium-altitude mountain chains, divides the territory and determines the area's geomorphology.

On the north-facing slope, this morphology gives way to a series of river basins that continue in the direction of the Cantabrian Sea, crossing an area whose height varies appreciably within a short distance. The basins form valleys that, generally speaking, lie markedly in a north-south direction. Only the River Ibaizabal differs, due to the predominantly east-west direction of its course.

On the slope flanking the Ebro, the relief is gentler with a lessening of the marked difference in altitude between the mountains of the watershed relative to the Cantabrian valleys. This is because of the higher base level of the Mediterranean rivers (around 600 m). The Alavese Plain constitutes a large central plateau, crossed by the River Zadorra and flanked by different mountainous areas, which separate it from the Ebro Depression (Figure 3).

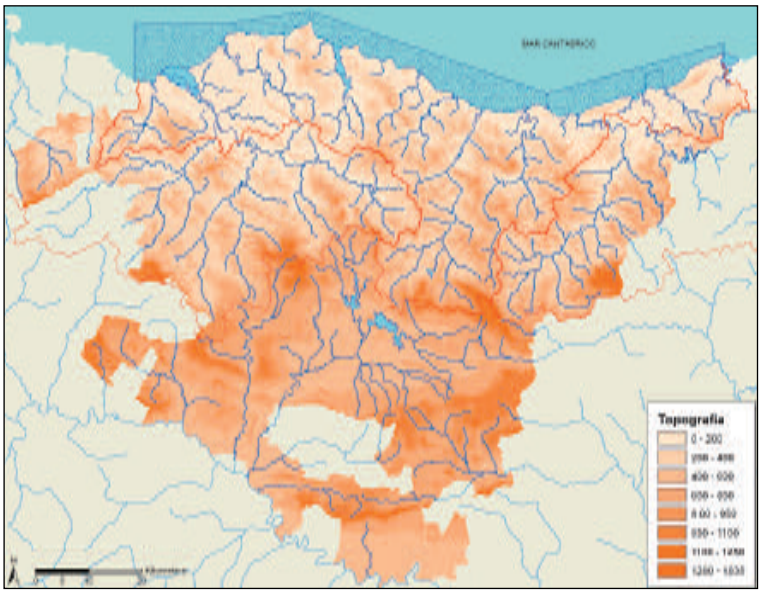


Figure 3. Topography Source: Basque Government

Socio-economic features

The majority of the Basque population is concentrated in the three capitals, in the surrounding areas, and along the coast.

The Eastern Slope of the Cantabrian Mountains, which largely corresponds to the historical territory of Gipuzkoa, has a population density of some 360 inhabitants/km^2, and is home to 33% of the population of the ACBC. The Western Slope of this range largely corresponds to the historical territory of Bizkaia, has some 456 inhabitants per km^2, and shelters 54% of the population of the ACBC. In the Mediterranean part, which mostly corresponds to the province of Araba, this figure drops to 105 inhabitants per km^2, representing 13% of the population.

These differences in population density, together with an orography that varies from snug valleys with well-developed industrial activity, to expansive plateaux devoted essentially to agriculture, convey an initial idea of the nature of both the territory's socio-economic make-up and the nature of the problems, or pressures, affecting water in its different categories and the aquatic environment generated around it.

The ACBC's economic structure closely matches that of the main European Union countries, although it has a greater industrial component and its primary sector has relatively little economic weight.

The steady economic growth of the past few years, which has been running at over 3% per annum, has enabled the Basque Country to achieve a per capita GDP of 26,515€/inhabitant (2005), which is 125.6% of the EU average, and is exceeded only by Luxembourg and Ireland. Similarly, the percentage of people in work has remained at 65.4% of the population aged 16 to 64, which is 1.5 points above the average for the EU-25, whilst the rate of unemployment has dropped to 5.7%.

Migratory balances, which were negative until 1999, became positive from 2000 onwards: the Basque population increased by 6,237 inhabitants during 2002 thanks to immigration. Of the 25,967 persons who immigrated into the ACBC in 2002, 47% were foreigners while the remainder came from other autonomous communities in Spain.

The ACBC enjoys a high level of self-government in important matters such as health, education, security, housing and taxation. This autonomy to decide how to organize itself emanates from the

Statute of Gernika, ratified by referendum on 25 October 1979. This Statute recognizes the existence of a Government with executive powers and of a Parliament with general legislative capacity. Furthermore, Euskadi has two territorial bodies inherited from the Basque foral tradition: the General Assemblies, with a regulatory and functional capacity similar to parliaments, and the Diputaciones Forales or Regional Governments, their executive institutions. Their existence lends the Autonomous Community a decentralized character, similar to that of a confederation.

The method of harmonizing the ordinary administrative bodies' areas of competence with those of the foral ones is regulated both by the Statute of Autonomy itself and by the Historical Territories Act, the code which reconciles the existence of a general organization with the need to respect the historical legal systems of its three territories (Araba, Bizkaia and Gipuzkoa).

Land uses

The factors governing vegetation confer on the territory a propensity for the growth of woods. Only land in situations with very specific conditions -such as high salinity, rocky outcrops, predominant hydromorphy, and so on- is permanently suited to supporting lesser plant communities alone. The high rainfall throughout the area and the predominance of acid soils over neutral or alkaline result in the prevalence of acid-loving vegetation. Other aspects of the climatic system, such as frequent mists in the mountains, are responsible for characteristic features of ACBC vegetation such as the presence of mountain plants at low altitudes. Most of the current landscape has been considerably transformed and, with just a few exceptions, the spontaneous woody masses that exist are small and somewhat altered. The dominant landscape of the north-facing slope is composed of meadows with cultivated parcels and areas reforested with conifer trees, amongst which Pinus radiata is by far the most widespread and abundant. The river and stream-bank vegetation is formed of mixed woodland dominated by alders, willows and ash trees. The Mediterranean-facing slope is characterized by a greater presence of natural woods -although sometimes comprising bushy species- and by the presence of cultivated fields and, in amongst them, irrigation networks.


Joseba del Villar

02STATE OF THE RESOURCE


Josu Sanz

Climatology

On the north-facing slope the climate is of the mesothermal variety, with moderate temperatures and significant rain. It belongs to the 'Atlantic climate' category, which is characterized by humidity without a dry season. Air masses, whose temperatures have become mild through contact with temperate ocean waters, reach the coast and tend to even out the temperature variations between night-time and daytime, or between summer and winter. The orographical factor (the presence of mountains) explains the high rainfall across the entire Atlantic-facing slope of the Basque Country, between 1,200 mm and more than 2,000 mm of average annual precipitation.

The average volume of precipitation across the ACBC area is about 9,222 hm^3/year, of which 6,747 falls on the Cantabrian slope and 2,475 on the Mediterranean (Basque Government, 2003). The watershed of the Cantabrian and Mediterranean slopes, through its altitude and proximity to the coast, constitutes one of the principle determining factors for climate. This orographical (mountain) factor, which defines the territory's oceanic-continentality, is one of the fundamental factors in precipitation and climate. The other factors are latitude, which determines the slant of the sun's rays, and the orientation of the valleys with reference to coastal winds (Figure 4).

Out of the total volume of rain that falls, 4,634 hm^3/year (49%) returns to the atmosphere through evapotranspiration and 4,575 hm^3/year (51%) is converted into water resources. From these figures it can be calculated that on the Cantabrian slope the run-off coefficient is a very high 53% while on the Mediterranean slope it drops to 45%, although this is a still a very high figure. The average specific runoff is 632 mm.

The middle area, which occupies a large part of Araba, is a transition zone between the oceanic climate and the Mediterranean one, with Atlantic features predominating as a truly dry summer does not exist. In the south of the ACBC, in the area of the Ebro depression occupied by the Alavese Rioja, the climate is characterized by hot, dry summers of the Mediterranean type. Normally, due to its rather cold

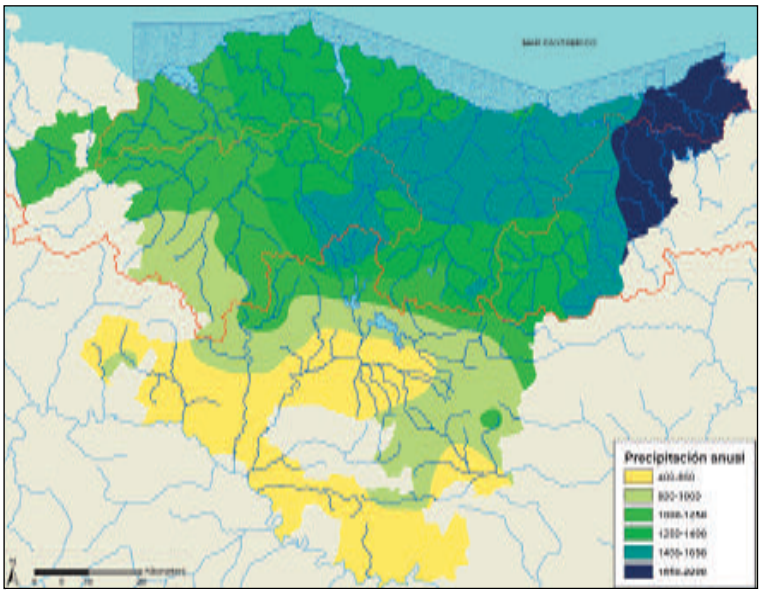


Figure 4. Average annual precipitation Source: Basque Government


Joseba del Villar

winters with scanty precipitation, this climate is referred to as 'inland Mediterranean' or 'Mediterranean continental'.

Water resources balance

There are twenty-four significant hydrographic basins or hydrological units, of which fourteen empty into the Cantabrian Sea and the rest into the Mediterranean. These are described as Hydrological Units (Basque Government, 2001), using the concept of Hydrographic Demarcations (areas), but without assigning the corresponding coastal waters (Figure 5). The water resources of each Hydrological Unit are described in Table 1.

The groundwater masses that exist in the ACBC are shown in Figure 6 and 7. Figure 8 displays the total water resources (hm^3/year) in the groundwater masses.

Figure 5. Hydrological units. Source: Basque Government

Risk analysis

Article 5 of the Water Framework Directive (hereafter referred to as WFD) makes compulsory the carrying out of a «study of the repercussions of human activity on the state of waters». The purpose of this study is to identify whether a particular mass of water is at risk of falling below the environmental standard set out in Article 4 of the WFD. In order to identify this risk, it is necessary to analyse the pressures to which each mass or water is subjected and to assess their impact.

The most widespread pressure on the rivers of the Cantabrian basins of the Basque Country is currently of a hydromorphological nature. This is because the accented topographical relief of the Cantabrian basin area together with recent major industrial and urban developments have given rise to progressive occupation of the river meadows and

Figure 6. Boundary jurisdiction. Source: Basque Government

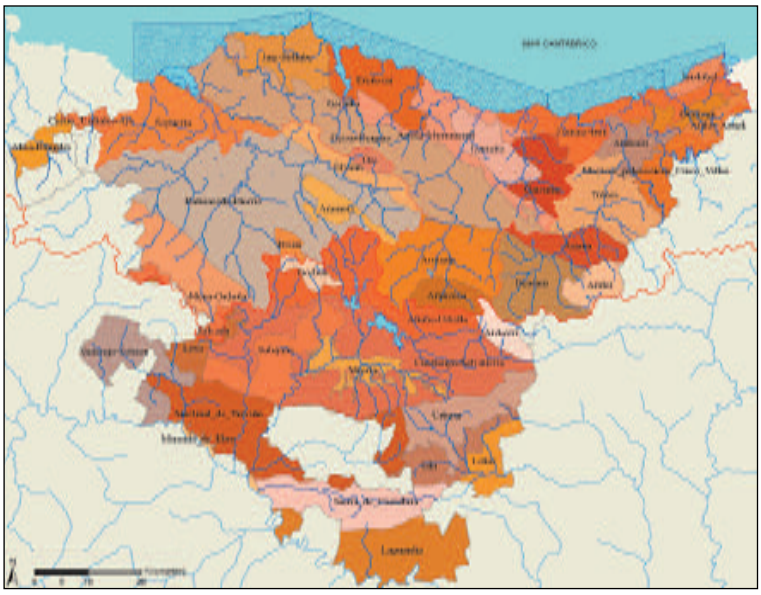


Figure 7. Ground water resources. Source Basque Government.

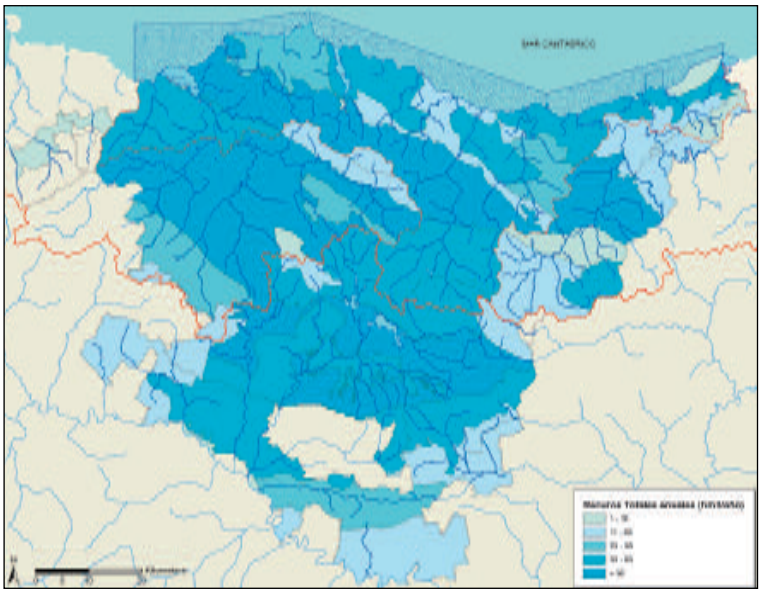


Figure 8. Total annual groundwater mass water resources (Hm3/year). Source: Basque Government

growing pressure on areas around rivers, all of which is clearly reflected by current indicators. Pressure in the Mediterranean basin is less and stems fundamentally from agricultural activities.

The loss of river, and stream-bank woodland associated both with the aspects mentioned above and arable farming and forestry activities, is also very acute in the ACBC.

Another, less widespread form of pressure, that is, one of a slightly lesser order of magnitude, is the discharge of effluent into the river system. Although plans to clean up rivers have led to a notable improvement in river water quality in the respective Demarcation (area), in Demarcations where plans are incomplete, the indicators being used still give high values for pollution, such that the discharging of effluent still affects 40% of the river system to a greater or lesser extent.

Another widespread pressure, which affects 45% of surface water masses, stems from livestock farming.

Of less general importance are pressures from water abstraction, either for consumption or other uses. These are classed as significant for 20% and 25% of water masses respectively, although local impact may be more acute.

Over half the area of the ACBC is wooded. A large part of it, especially on the Atlantic-facing slope, is used for producing timber and wood pulp for papermaking by planting fast-growing species in privately-owned plantations. Because of the rising cost of woodland management labour, recent decades have seen a growth in mechanization of the jobs involved. In some cases, this has resulted in high rates of erosion.

Finally, it is worth pointing out the importance of pressure from farming in the Mediterranean area of the Basque Country, which significantly affects 55% of the defined surface water masses in the river category. In contrast to this, farming activity has a lesser impact on the rest of the Basque Country; in principle, it does not exert the same pressure, and its effect on water masses is not classed as 'significant'.

The Basque Country's transitional and coastal water masses give rise to a significant number of pressures, due to the presence of major drivers, such as demography (population density), the large-scale presence of industry, and port development.

One of the biggest pressures for transitional water masses has been the loss of seashore area, as compared with its original extent in the post-Flandrian age. Both the introduction of nutrients and the formation of channels are pressures that continue to exert themselves on transitional (and, to a lesser extent, coastal) water masses. There is also considerable pollution of both waters and silts (moorings for watercraft may be added as a source of pollutants). Overall there are two main pressures: the discharge of pollutants, both urban and industrial, and morphological alteration (formation of channels and loss of shore area between the terrestrial vegetation line and the low tide line).

Analysing pressures on water masses in the lakes and wetlands category is a qualitative process; it calls for expert opinion and cannot be based on numerical data in the strict sense.

In general, the main pressures on wetlands are as follows:

- Pressure from intermittent sources with organic matter repercussions, those that discharge nitrogen and/or phosphorus, and those that potentially discharge specific pollutants.
- Pressure from diffuse sources of arable agricultural origin due to the use of fertilizers and plant

Hydrological unit	Area (km²)	Water quantity (hm³)	Precipitation (hm³/year)	Real evapotranspiration (hm³/year)	Potential evapotranspiration (hm³/year)
Bidasoa	76.47	82.5	134.6	52.1	64.6
Oiartzun	93.32	106.0	175.3	69.1	78.4
Urumea	138.10	174.0	263.5	89.1	105.3
Oria	780.04	690.2	1271.6	584.9	639.5
Urola	348.98	297.1	546.7	249.3	276.4
Deba	554.29	470.7	893.4	422.5	471.5
Artibai	109.67	83.3	165.6	82.0	88.3
Lea	127.76	93.6	176.3	83.0	92.6
Oka	219.16	159.2	305.6	146.3	166.5
Butroe	236.00	142.8	308.9	166.5	208.9
Ibaizabal	1533.93	980.0	2091.6	1111.0	1396.3
Barbadun	134.21	86.7	164.6	78.1	104.0
Aguera	49.29	32.9	63.5	30.8	38.9
Karrantza	140.34	90.5	186.1	95.5	110.5
Jerea	10.36	2.1	7.9	5.8	9.3
Puron	24.67	5.0	18.9	13.8	22.2
Omecillo	241.37	33.9	177.8	143.6	231.9
Baia	307.84	159.2	327.8	168.4	228.5
Zadorra	1100.19	569.0	1171.3	598.5	1024.5
Inglares	97.95	10.8	72.1	56.9	100.2
Linares	0.52	0.2	0.5	0.3	0.3
Ega	407.00	162.3	365.7	197.9	268.7
Arakil	115.35	70.0	131.6	61.2	87.2
Ebro	387.79	73.4	201.8	127.7	390.7
Total	7234.60	4575.4	9222.4	4634.4	6205.5

Table 1. Total Water Resources within the hydrological units .Source: Basque Government, 2003

health products. Other factors are livestock origin, the presence of polluting sites, and leisure activities with diffuse pollution potential.

- Pressures of the hydromorphological type, such as the deterioration of natural river-edges or stream-bank vegetation due to the land being adapted for cultivation; the drying out and cropping of wetlands; the abstraction of water for consumption uses; and the filling in of wetlands through human activities, and their consequent silting up as a result of solids being dragged into them.
- Pressure of the biological type: the repopulation of fish farms and the introduction of species from other areas.

Pressures on the chemical state of groundwater have been labelled 'significant' in two masses, as a result of a 'high' pressure, which can be traced to arable farming activities. Similarly 'significant' pressures, but in this case moderate ones, have been assessed in other masses, due to (amongst other things) livestock activities and/or potentially polluting sites, and as a consequence of arable farming activities.

The whole of the groundwater masses are in a good quantitative state, hence there is no quantitative impact on them.

Monitoring networks

According to Article 8 of the Water Framework Directive, Member States must have programmes for monitoring the state of water masses in operation from 22 December 2006. These programmes must be in keeping with the information generated in the reports produced under Articles 5 and 6 of the WFD and must be consistent with the requirements of Annex V.

One novel feature of the WFD is that it incorporates biological indicators as a central element in its analysis of whether environmental aims are met, and it regards physical-chemical and hydromorphological indicators as elements which influence the biological ones. However, in the case of the ACBC, operational monitoring networks that use biological indicators as basic elements in assessing water quality have been in existence since 1992.

Monitoring programmes have been in operation since 2007, in accordance with the dates and requirements established by the WFD. There are also specific programmes for monitoring protected areas.

It is the job of the Basque Water Agency to test and monitor the water quality of the Basque

Country's internal basins, as necessary, for planning and managing water resources and their use. It likewise proposes and follows-up water quality targets and schemes, in coordination with the other departments concerned. The Basque Water Agency aims to ensure that the density of points -the parameters which indicate quality criteria and testing frequency- is sufficient to gain a consistent and comprehensive overview of the state of the ACBC's water masses, with special emphasis on the internal basins.

The control networks that the Basque Water Agency manages or coordinates, either directly or indirectly, are described below:

- The network that monitors the state of the ACBC's groundwater masses.
- The Basque Country Internal Basin Reservoir Quality Assurance Network.
- River hydrometeorological and quality assurance network.
- Network for monitoring the state of the ACBC's groundwater masses.
- Network for monitoring water for human consumption (intakes >100 m^3).
- Quality Network for Water used for Mollusc and Shellfish Farming in the Basque Country.
- Quality Assurance Network in Bathing Areas
- Vulnerable Area Monitoring Network (Directive 91/676/EEC).
- Sensitive Area Monitoring Network (Directive 91/271/EEC) in the Basque Country's Internal Basins.

In the ACBC, it has become customary for multiple networks to coexist to monitor water quality and quantity, with different management bodies involved and relatively different aims and approaches. Thus, noteworthy activities have been carried out by the Basque Government, the Regional Governments, the Hydrographic Confederations of the North and of the Ebro, state organisms, which play a role in the management of water, and Consortiums and Associations, amongst other bodies.

In response to the monitoring requirements of Article 8 of the WFD, the Hydrographic Confederation of the North and the Hydrographic Confederation of the Ebro (operating in their sphere of competence within the ACBC) have designed networks for monitoring water masses and protected areas. Their designs are derived from the new obligations of the WFD and previous networks such as the Integrated Water Quality Network (Red Integrada de Calidad de las Aguas – Red ICA), the Environmental Variables Monitoring Network, the Network for Monitoring Surface Water for the Production of Drinking Water (Red de Control de Aguas Superficiales destinadas a la producción de agua potable – Red ABASTA), and the Automatic Hydrological Information System (Sistema Automático de Información Hidrológica-SAIH), amongst others.

The Regional Government of Gipuzkoa manages the Gipuzkoa Water Quality Monitoring Network and the Gipuzkoa Estuaries Water Quality Monitoring Network, which are responsible for periodic physical-chemical and biological testing at different sampling points. The water quality monitoring net-

works managed by Management Bodies undertake testing in reservoirs and their principal tributaries. This enables the monitoring of main intake points of water for human consumption, sensitive continental areas and certain water masses in the river category.

Flooding and droughts

Flooding

Flooding produced by rivers, transitional waters and coastal waters is a natural process that plays an important role in modelling the lie of the land. The damage done to people and property is a consequence of the location and characteristics of human settlements and land uses.

There are frequent flood alerts in the ACBC and records of floods date back to the year 1403. In Bilbao, there are thirty-nine recorded incidents classed as disasters. Flood records also cover a widespread geographical area, with similar phenomena having occurred at other points of Basque geography.

Nearer in time to the present day and better known are the floods of October 1953, June 1975, June 1977, July 1988, February 2003 and, most notably, August 1983, which left thirty-four people dead, five missing and material losses estimated at 1,200 million euros.

The factors that combined to cause these latter torrential rains were threefold: cold polar air reaching the high ground; the high surface temperatures of the Basque coastal waters, which produced a very unstable, hot and moist surface mass; and light winds from the north which, when stopped by the mountains profiles, triggered ascending air currents and instability. Rain gauges recorded precipitation of over 500 mm in twenty-four hours.

The Basque Water Agency has produced a map illustrating flooding liability, which differentiates between areas affected by the advent of return periods of 10, 100 and 500 years' (completion of the flooding cycle). This will serve as a geographical reference for applying land-use criteria according to the extent to which the land is liable to flooding. Accordingly, the Basque Water Agency has drawn up the Criteria for Land Use according to degree of Liability to Flooding. In late 2007, the European Union passed Directive 2007/60/EC of the European Parliament and Council of 23 October 2007 concerning the evaluation and management of flooding risks. Furthermore, early 2008 saw the passing of Royal Decree 9/2008, modifying the Public Domain of Water Regulations to introduce the element of risk management.

The structural measures carried out in the ACBC have comprised essentially: the creation of an infrastructure of drainage channels in heavily built-up areas for flood defence; the demolition of structures covering river beds to recover them for drainage; the removal of obstacles to the flow of water (obsolete bridges, disused hydraulic structures such as water wheels and dams, etc.) to regenerate river beds and improve drainage capacity; the diversion of covered-over streams within built-up areas, and so on.

Droughts

Drought is a normal and recurring feature of the climate and, although we tend to regard it as an unexpected and exceptional event, it may be looked upon as a seasonal anomaly within the natural range of climatic variations.

As has been described in previous sections, the two historically most prominent drought periods were the 1940s–1950s and the two-year period 1989–90.

Since the drought phenomenon takes place over a period of time, rather than being a single event, droughts are classified according to the point in time when they begin. Hence, the creation of the Ebro Hydrological Plan and the recently-approved Special Action Plan in Situations of Alert and Possible Drought (Plan Especial de actuación en situaciones de alerta y eventual Sequía – PES) of the Ebro Basin and the Northern Basin (Ministerial Order 698/2007, effected 21 March). The general aim is to minimize the environmental, economic and social effects of whatever drought situations might occur. Accordingly, an agronomic dry period is considered to start: «When, in two consecutive

months of the series, the recorded rainfall is less than 60% of the average for that month of the year; this period ends when the precipitation recorded in one month is equal to or greater than the average of the series used, that is, until behaviour that is considered normal resumes».

Applying this criterion to the fifty-year average precipitation series in the Hydrological Units of the ACBC, we observe that there are agronomic droughts every 1.8 years on average and, in the best cases, every 2 years. Droughts are prolonged between 10% and 15% of the time. A spatial pattern is noticeable whereby the frequency and duration of droughts increases as the annual precipitation drops, but this type of analysis doesn't provide information regarding the intensity of the drought.

Various lines of working have been developed by the different administrative bodies and adopted with the aim, on the one hand, of achieving better management of demand and resources for daily supply under normal conditions and, on the other, of resolving extreme episodes of drought with as little disruption as possible. These measures will be adapted, as necessary, to the possible effects of climate change in the ACBC, especially on its Mediterranean-facing slope. To this end the public administration of the ACBC has implemented a number of different studies and research projects.

All these projects look into measures for rationalizing use and harnessing additional resources, both under normal conditions and in exceptional situations. Examples of such measures include interconnecting different regulating systems (in some cases between intra-Community (internal) and inter-Community basins) or modifying the use of reservoirs and the abstraction groundwater for each of the different situations and ranges of seriousness, determined according to the available resources and forecasts at each particular time.

In order to design preventive and palliative water-use measures capable of overcoming the worst-known conditions, historical records of drought situations are being taken into account, by simulating their coincidence with one another in the light of the available data series and infrastructure in operation today in each of the systems.

The most representative sample of this research work in the ACBC is the series of studies for improving the supply to the metropolitan areas of Bilbao and Vitoria-Gasteiz.

03USE OF THE RESOURCE

As has already been mentioned, the differences in population density, and varied orography give an initial idea of the nature of this territory's socio-economic make-up and the problems, or pressures, that affect water, in its different categories and in the aquatic environment which it generates. The following section sets out the main features of the sectors of economic activity that exert a decisive influence on the aquatic environment within the Autonomous Community of the Basque Country.

Supply of water and removal of wastewater

The water services concerned with the supply of water and the removal and treatment of wastewater come under the Local Authorities, by virtue of Act 7/1985: Regulating the Bases of the Local System.

The most widespread structural formula for managing services is partnerships between municipalities, in the form of Associations or Consortia, to which the municipalities concerned assign all or part of their water management functions and powers.

The Basque Water Agency, together with the Regional Governments, has entered into several collaborative agreements for financing infrastructures for the supply of water and the removal of wastewater.

As at the date of this report, the ACBC has 16 supra-municipal management bodies, while 35 municipalities and 212 administrative agencies manage water directly, as shown in Figure 9.

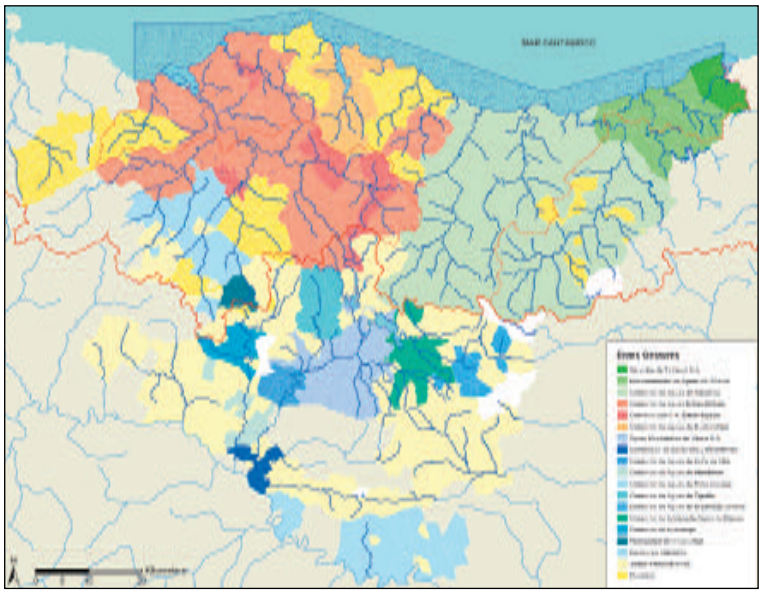


Figure 9. Supra-municipal management bodies in the ACBC. Source: Basque Government

Supply of water

Infrastructures associated with the capture and distribution of groundwater are capable of abstracting some 48 hm^3/year, while surface water intakes contained within supply systems move approximately 313 hm^3/year.

Several significant water transfers also take place between basins in addition to the compartmentalization or division described here. The Cerneja-Ordunte inter-basin water transfer system transports resources from the Ebro Demarcation to the Northern Demarcation, then to Ordunte reservoir, and from there to the Internal Basins. It supplies several municipalities in the Encartaciones Region and, finally, Bilbao. The inter-basin transfer system of the reservoirs of the Zadorra, Ullibarri and Urrunaga in the Ebro Demarcation, links up with the Undurraga reservoir in the Northern Demarcation, as well as with the supply infrastructure of the Bilbao-Bizkaia Water Consortium, part of whose geographical range lies in the Internal Basins. This latter transfer system is also used to generate hydroelectric power.

One of the significant determining factors in the current volume of consumption is the concept of 'unchecked' cubic meterage. This translates as the sum total of losses from the mains through leakage, under-readings by faulty metering equipment, unaccounted-for consumption, fraudulent taking of water from the mains, and so on. The current average level of efficiency of supply mains has been estimated at 60.30%.

Removal of wastewater

The process of installing specially designed purification systems shows that the established quality aims have not always been achieved. According to the results obtained via networks for monitoring the state of water masses, some sites where purification systems have been installed are still showing a shortfall in water quality. However, it is obvious that there are a significant number of other problems contributing to this circumstance.

As of 2003, the ACBC's inventory of wastewater treatment stations identifies the systems, which are summarized in Table 2.

Water and industry

The ACBC represents one of the biggest concentrations of industry in the State. In 2005, its industrial sector represented 10.45% of the State's corresponding GDP, playing a particularly significant role in the sectors of special steels (90%), machine tools (80%), stamp forging (75%), capital goods (50%), casting (50%), steel production (40%), domestic appliances (40%), professional electronics (40%), automation (33%) and automotive (30%) and aeronautical industry (22%).

Industry plays a preponderant role in the Basque economy, although this has waned recently, albeit only slightly. During 2004, the sector produced 29.4% of Euskadi's GDP, a much higher percentage than the 15.2% it produced within the state or the 20.4% within the European Union.

Basque industry uses approximately 91 hm^3/year of which 58 hm^3 is captured by the industrial establishments' own intakes, while the urban mains supply the remaining 33 hm^3/year. If we apply to the mains supply the average proportion of 'unchecked' cubic metres that would relate to these infrastructures -that is, if we consider the volume of water captured at the catchments instead of the amount which the water works pumps into the distribution main- the sector's annual demand rises to 106 hm^3/year.

Generally speaking, those industries with the greatest demand for water have secured their supply by setting up their own intakes, whereas others for whom water represents a less significant input to their processes have tended to connect to the mains. Mixed schemes are also common, in which water for production processes is derived from the producer's own sources and the supply for other uses is drawn from the mains.

Demand for water for industrial uses in the ACBC represents about 28% of total demand, a very high percentage when compared with recorded use in other autonomous communities. However, this figure drops to 17% if we consider industry's share of mains water.

According to available information, the 91 hm^3/year used generates in the order of 59 hm^3/year of wastewater, placing average consumption at close to 35%.

From current consumption of water for industrial use it is possible to forecast an increase in demand to 105 hm^3 per annum by 2015. If the demand related to the high-level network (between the catchment and the water works) is expressed, the figure increases to 130 hm^3 per annum, assuming a constant percentage of 'unchecked' cubic meterage (i.e. losses from the high-level network through various causes).

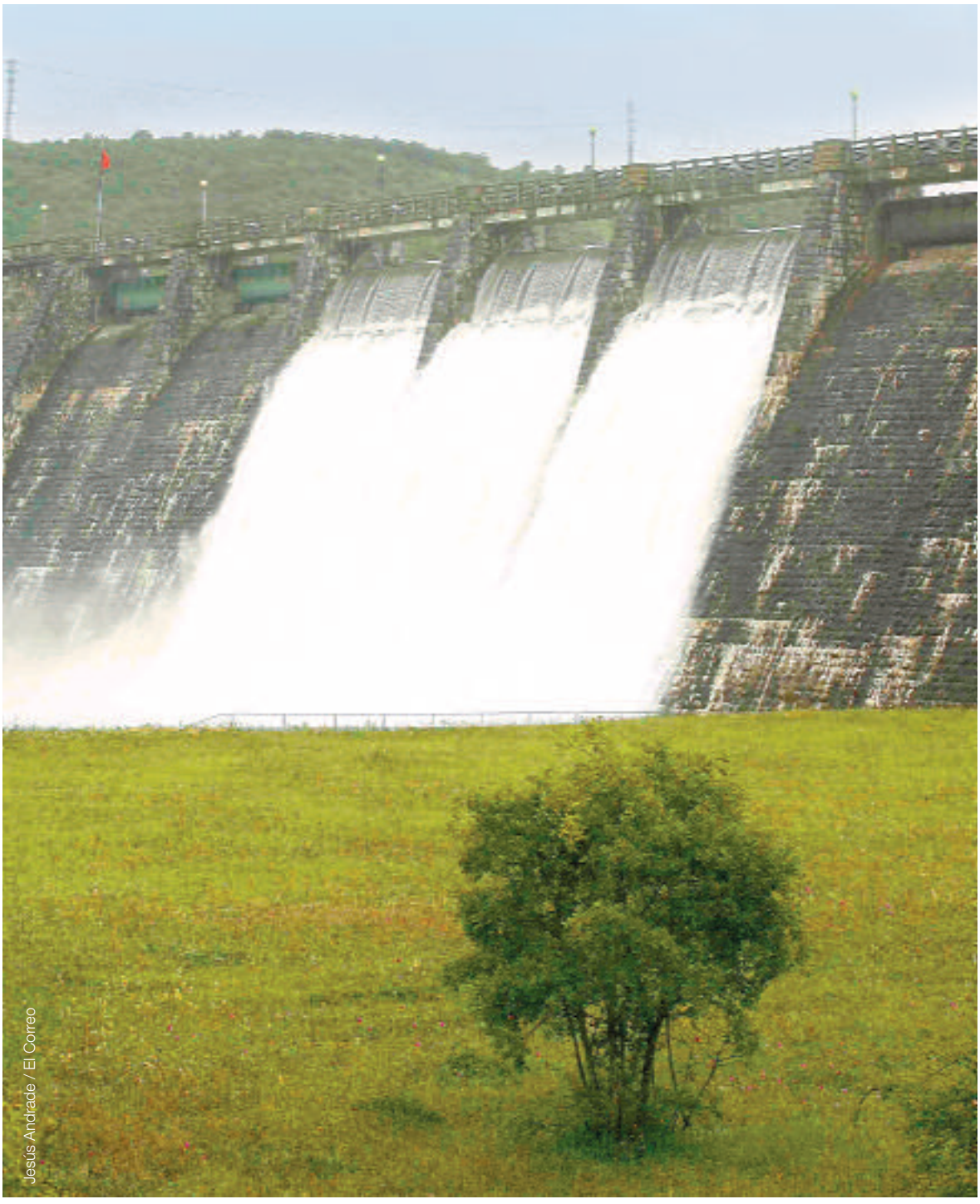
This result implies major growth in industrial demand from the mains, that is, from 17% to 22%. However, industry's share of the overall demand for water consumption is steady at 28%, due to parallel growth in other types of demand, specifically crop irrigation.

As for discharge of effluents, it is estimated that volume will increase to 66.5 hm^3/year as a consequence of stepped-up industrial activity, representing an increase of 13%.

It is hoped that the implementation of initiatives begun under the Basque Sustainable Development Environmental Strategy (2002–2020), by the Basque Government's Department of the Environment and Territorial Management, may serve to correct the high loading of contaminated effluent in water being recorded at the present time.

<table>
<tr><td rowspan="2">88 wastewater treatment stations inventoried</td><td>56 stations in service</td><td>Treatment provided for 1,712,584 inhabitants</td></tr>
<tr><td>3 stations under construction + 29 stations planned</td><td>There are plans to incorporate 300,767 inhabitants</td></tr>
<tr><td colspan="2">Autonomous solution</td><td>69,236 inhabitants</td></tr>
</table>

Table 2. Solutions for wastewater removal, and population served


Jesús Andrade / El Correo

The role of water in arable and livestock farming

The Basque agrarian sector does not possess significant economic weight within the State as a whole; it represents 2% of state Final Agrarian Production, although this percentage increases to 2.6% if taken in terms of the Gross Value Added at market prices, and up to 2.3% in terms of Agrarian Income, by virtue of the lower subsidies received by Basque producers.

Farming or forestry businesses take up 85% of the territory of the Basque Country. Of this area, some 600,000 hectares -about half- comprises wooded areas with timber production; about 30% is meadows and pastureland; and barely 14% (85,200 hectares) is cultivated fields. Of the latter, 90% is located in the historical territory of Araba and the remaining 10% is split between Gipuzkoa and Bizkaia.

Current water demand for agriculture amounts to 43.8 hm^3 per year, which corresponds to 11.5% of total water use in the ACBC.

Irrigation is responsible for 80% of the sector's

water consumption. Average annual estimates show that some 13,600 hectares are watered out of a total of 30,475 potentially irrigable hectares, all of which are located in the Ebro Demarcation. These fields grow cereals, potatoes and beets in rotation, as well as market garden produce, while vineyard irrigation forms a large and increasing presence.

These irrigation operations are managed by over a hundred irrigating growers' groups, who possess sprinkling systems (78% of the area) and trickle systems (the remaining 22%). Mainly surface water is used for irrigation, although 19% of the water used now is recycled wastewater (which is employed on 1,750 hectares in the Vitoria-Gasteiz district).

Most livestock farms have rearing sheds and keep dairy and beef cattle, pigs and fowl. They mainly run intensive production systems and obtain their water supply from the mains. These farms consume 15% of all water used for agriculture.

One of the most significant and direct impacts of farming activity on the ACBC's aquatic environment is the increase in concentrations of nutrients, especially nitrates, in both surface water and groundwater. This is a consequence of the washing off of fertilizers applied to the surface of the land.

Since the early part of the current decade, tests for pesticides have been carried out at specific points on rivers that cross the ACBC's agricultural areas. These tests have been undertaken essentially by the Basque Government's Departments of Health and the Environment, and by the Hydrographic Confederation of the Ebro.

The tests reveal the periodic appearance of herbicides of the atrazine family (atrazine, terbutrine, terbutilazine, metribuzine, simazine, etc.) as well as phenoxyacid herbicides (2-4 D, mecoprop, MCPA) in the waters of the high Zadorra basin and the Alegria, occasionally exceeding the limits established by existing quality standards for some of these substances.

Water and energy

The hydroelectric sector in the ACBC comprises little over 100 schemes with a total installed power of 150 MW and an annual production of some 360 GWh. Most of these schemes are mini-generating

stations with no significant regulation. Only two produce over 10 MW: Barazar (in the Zadorra Hydrological Unit) and Sobrón (in the Ebro Hydrological Unit), both of which have intakes situated in the Ebro Demarcation.

The average hydroelectric demand in the ACBC has been estimated at some 6,300 hm^3 per annum (Basque Government, 2004). Logically, this figure includes the passage of the same volumes of water through successive turbines in different power stations along the same river.

The outlook for the further development of hydroelectric production in the ACBC may be gleaned from Energy Plan 3E-2010, which outlines the strategy and aims leading up to the year 2010 in the Basque energy sector. These aims include introducing efficiency schemes that make it possible to make savings and improve energy intensity; diversifying energy-generating sources; raising levels of self-sufficiency in energy; and substantially reducing the environmental impacts of energy-producing processes.

The aquatic environment and ecosystems

Although this section has been included within the chapter on the Aquatic Environment and Ecosystems, it's appropriate to point out that, as stated in Article 7 of the consolidated text of the Waters Act, ecological volumes of water (in rivers, etc.) and environmental demands for water will not be classed as usage for the purposes of this article and those which follow. Rather, Article 7 must be regarded as a general restriction imposed on water abstraction systems. In any case, the rule on supremacy of use for the supply of populations, expressed in paragraph 3 of Article 60, also applies to environmental volumes of water. Environmental volumes of water shall be fixed in basin hydrological plans.

The ACBC's bio-geographical position, lying between the Euro-Siberian and Mediterranean regions; the climatic gradient from the coast to La Rioja; and the differences in altitude of over 1,000 m, all produce a great wealth of flora and fauna, with over 3,000 plant species and over 400 species of vertebrates.

Where fauna is concerned, there are numerous areas of interest. These are generally mountainous places with little human occupation and a significant presence of woodland masses. Rivers and streams are interesting places for fauna, mainly due to the presence of endangered species, such as certain fish and amphibians, the European mink, the Pyrenean desman (muskrat), and so on. Ecosystems associated with surface waters are home to wetlands, which are of great interest to migratory birds as over-wintering and breeding grounds. Outstanding examples of these include the Txingudi Salt Marshes (Gipuzkoa) and the Urdaibai Biosphere Reserve (Bizkaia) in the Cantabrian Sea area; and inland, the tail ends of the Zadorra Reservoir System (Araba), Salburua (Araba) and the pools of Laguardia (Araba).

One unusual aspect of the river ecosystems of the north-facing slope is that their character is largely determined by the relatively small area between their headwaters and their mouths, where they flow into the Cantabrian Sea. The result of this is a rapid succession of different ecosystems as the river makes its way to the sea. Within the space of a few kilometres one may go from a stretch with well-oxygenated waters low in nutrients, to areas with clear, open banks, and slow-moving waters rich in nutrients and silty beds. Indeed, the transition occurs within so short a distance that in some rivers there are almost non-existent ecosystems, especially in the middle-height and lower reaches. Mediterranean rivers have better-defined ecosystems, as in general they are characterized by longer courses and more gradual transitions. Furthermore, they present marked seasonal low water levels, which in slow-moving rivers or where the low water level is combined with the presence of karstic swallow holes may cause the riverbed to dry up completely.

Out of the entire ACBC area, 10.6% (76,695 hectares) lie within the Network of Protected Natural Spaces. Within this network there are many areas linked to the watery environment that have been declared Sites of Community Importance under Directive 92/43/EEC, also known as the Habitats Directive (Figure 10).

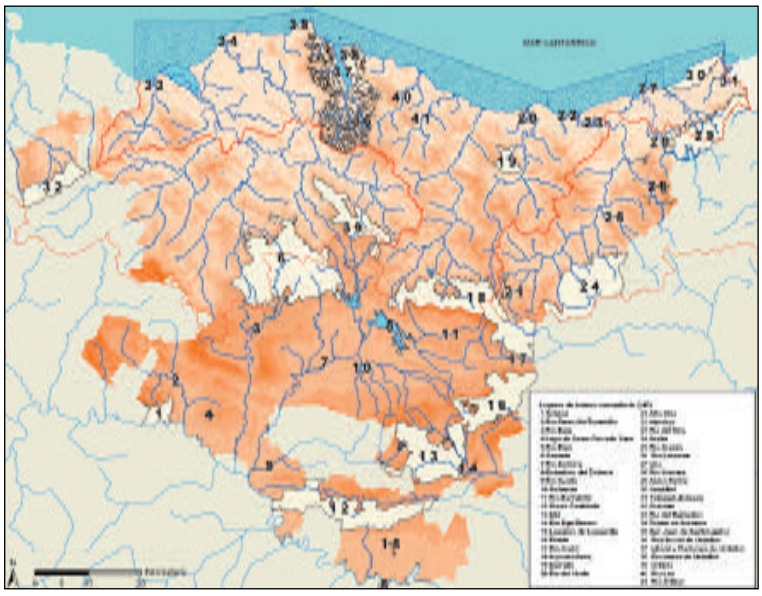


Figure 10. Sites of Community Importance related to the watery environment. Source: Directive 92/43/EEC

04STEWARDSHIP

Managing water resources

Water is a public asset, essential to all. Water management is therefore a function of the Public Authorities, who lay down the conditions under which they grant licences for water use, as well as performing inspection duties and implementing a system of fines. The distribution of responsibilities for managing continental waters in the ACBC is very complex, with numerous authorities involved.

Responsibility for functions and services relating to water resources and their use, as well as to permits and policing in the Public Water Domain -which, in Spain, is an asset owned by the state- falls primarily on the Basin Organs of the Spanish State (Hydrographic Confederations) for the Inter-Community Basins, and on the Basque Government for the Intra-Community (Internal) Basins. However, on the basis of a management order made by the State Agency in 1994, it is the ACBC that at present performs most of these functions throughout the Inter-Community Basin territory. However, the power to decide on the matters entrusted by the order still lies with the Hydrographic Confederations (the HC of the North and HC of the Ebro), which fall under the State.

Local authorities, meanwhile, are responsible for providing the municipal public services of water supply and sewerage. The regional governments have the power to arrange and coordinate municipal water supply and sewerage services, so as to ensure that provision is integrated and adequate to meet needs.

The Shoreline Public Domain belongs to the state and comprises areas of tidal influence, beaches, sands and dunes; territorial coastal waters, with their sea beds and subsurfaces; cliffs; islands; land reclaimed from the sea, and so on.

Responsibility for management of the coastline lies with the Basque Government, together with the granting of permits for land-sea discharge of effluent and land use in the coastal buffer zones where protective easements apply.

The legislative framework for State water matters is defined by Royal Legislative Decree 1/2001, which was enacted on 20 July. This approves the consolidated text of the Waters Act, which in turn modifies the 1985 Waters Act.

The EU has designed and promoted an integrated water resource policy. This is probably the most ambitious and innovative of all its environmental policies. Its key element is Directive 2000/60/EC of the European Parliament and Council dated 23 October 2000, also known as the Water Framework Directive, mentioned earlier. This lays down an EU-wide framework for protecting continental, transitional and coastal surface water and groundwater; preventing or reducing their contamination and promoting their sustainable use; protecting the environment; improving the state of watery ecosystems; and attenuating the effects of flooding and droughts. The Directive's main aim is the improvement of the state of watery ecosystems, in order to achieve a good ecological state for water masses by 2015.

On 19 July 2006, the Water Act, No. 1/2006 passed on 23 June, was ratified. Its purpose is to establish «the mechanisms necessary for implementing European policy and, at the same time, provide this subject with a suitable regulatory framework for the different public authorities involved to be able to put it into practice». This Act enables participation by the different historical territories of the ACBC. The ultimate aim is to create a single organization encompassing authorities and users, whilst respecting local powers and functions in the matter.

The Act gives the Basque Water Agency the status of a public body, establishing it as a central instrument for implementing water policy in the ACBC. This organism became operative in January 2008.

Getting the public to participate

Article 14.1 of the Water Framework Directive requires Member States to encourage active participation by all parties concerned in applying the WFD and, in particular, with drawing up, reviewing and updating hydrological plans. This implies that the relevant authorities in the Demarcation must cooperate with the administrative bodies involved in implementing the WFD -and with the public, and the agents concerned with the Hydrologi-

cal Plan- to ensure that the WFD's environmental targets, and other social and economic targets, are met. In this way, the WFD and the Consolidated Text of the Water Act establish mechanisms to ensure public participation in drafting the Outline of Important Topics and the Hydrological Plan.

As a consequence of these actions, the Basque Water Agency is in the midst of a public participation process, one that is laying the foundations for a water management policy that will enable the sectors involved and the area's residents to engage directly in water policy.

The process is structured as a series of working sessions, in which agents identified as representatives for water issues actively participate. The process begins with a general presentation session, followed by eight workshop sessions, three devoted to territorial participation by basin (Eastern Cantabrian basins, Western Cantabrian basins and Mediterranean slope) and five by sectorial subject (hydroelectric power, arable and livestock farming, water supply and removal of wastewater, water and industry, and aquatic environment and watery ecosystems). In both cases, in principle, there will be two working sessions: assessment workshops and general guidelines for action workshops. The process will end with a day for feedback and discussion of practical applications.

Similarly, the Basque Water Act provides for the existence of a Users' Assembly as a participative organ of the Basque Water Agency, and for the Basque Country Water Council as a deliberating and advisory organ.

Water costs

The Basque Country Water Act No. 1/2006 states that the cost of water shall be directly related to the quantities used, and to the environmental deterioration caused by its use. The cost will be progressive according to the quantity consumed, and a distinction will be made between uses, with a breakdown identifying separately industrial, domestic and agricultural use, among others.

Furthermore, the Act creates the Water Charge, an ecological tax earmarked for the protection, restoral and upgrading of the watery environment; to enhance collaboration between the competent authorities to achieve efficient supply and sewerage services; and to foster mutual aid between territories. It will be used to prevent pollution at source and to conserve, protect, upgrade and restore the environment and ecosystems connected to the aquatic environment. This includes maintaining ecological flows, and achieving a good ecological condition for water masses, as set out in Framework Directive 60/2000/EC; financing infrastructures listed as being of general benefit to water planning; allocating grants or financial resources to local corporations, to other bodies and to individuals for meeting the aims of water planning; and making investments intended to save water, with special emphasis on minimizing losses from distribution networks.

The ACBC's main management bodies, by which is meant principally the consortia and associations, operate an efficient management system that recovers a high percentage of the financial cost of the services they provide. For this purpose they review their tariff structure each year in order to establish prices that will enable them to recoup their budgeted costs in each financial year.

At present, a heterogeneous range of formulae enable the management bodies to govern their operation, with a variation in the scope of the functions

assumed by each body. Clearly, however, there is a collective trend towards a management model covering the complete water cycle, with a sufficiently comprehensive approach to ensure the sound development of the model.

The method for managing the income from the services they offer is homogeneous throughout the whole of their territory, regardless of whether the costs of providing these services are higher in some municipalities than in others. That is to say, these bodies follow principles of integrated management of their services, homogeneity in the quality of the services provided, and uniformity of tariffs within the territory under each body.

This means that the different user groups set up by each management body (municipalities, domestic users, and business or industrial users) support the same tariff ratio and, consequently, the same percentage of the cost is assigned to them, no matter what their location or the real associated cost may be.

The low-level network tariffs (distribution mains) set by the municipalities and administrative agencies, which are served by consortia and associations, often have little or nothing to do with the high-level network tariffs (between the catchments and the water works) set by the latter. This means that multiple tariffs coexist in each consortium or association's areas. In many cases, these tariffs don't follow any financial criterion.

The data sets provided by the main management bodies, with which the study was carried out, are both high in volume and, generally speaking, quality. Nevertheless, the heterogeneous nature of the management systems used by the consortia and associations makes comparison difficult.

There is a large information gap when it comes to income and expenditure in some organizations engaged in managing high-level network water, especially in self-sufficient local authorities. However, these serve only 8% of the ACBC's total population (5% of the internal basins, 14% of the Northern Hydrographic Demarcation and 10% of the Ebro Hydrographic Demarcation).

Where this information gap does matter, though, is in the low-level network where municipalities themselves are the managers. The management of water services there is often characterized by a lack of accountability, with the smaller municipalities presenting the biggest problems.

Tariffs are usually stratified in consumption bands. One tariff covers up to a certain number of cubic metres, with a higher tariff covering above this level of consumption. Domestic users pay least, followed by business users and then industrial ones.

It should be pointed out that in the case of water for irrigation, it is the Irrigating Growers' Groups who guard this authority. Likewise, there are a large number of industries who have their own intakes with which they supply all or part of their own needs.

As set out in Article 9 of the WFD, the allocation of costs to water-related services must take into account environmental costs and those related to water resources. For the purposes of this report it has been assumed that environmental costs may be likened to the costs of complying with existing environmental legislation. Amongst these are costs relating to the treatment and cleansing of wastewater, although later it will be necessary to take into account other costs, such as those relating to recovering used flows and restoring negatively-impacted ecosystems.

Financing millennium development goals

The holistic vision of nature and human beings as a whole has given rise to the concept of integrated water resource management (IWRM), whose purpose is to integrate management and human use of the resource with respect for the environment's needs. The application of this concept -adopted internationally as the only possible way towards attaining the necessary balance- ensures that access to drinking water for humans is compatible with safeguarding the environment. The water management work undertaken in the Basque Autonomous Community has focused on this, using IWRM, and applying the most recent and innovative pieces of legislation on the subject, such as the Basque Water Act, No. 1/2006, which transposes the European Directive into national law.

Within the ACBC there are numerous funding initiatives, which fall under Goal 10 of Target 7 of the Millennium Declaration. One of the most outstanding of these is the work being done by the Basque Government's Department of Housing and Social Affairs in relation with the Fund for Cooperation and Aid to Development (FOCAD), funds earmarked by the Regional Governments, and through projects supported both financially and technically by certain management bodies.

Similarly, Article 42 of the Basque Water Act provides for the creation of the Water Charge «earmarked for the protection, restoral and upgrading of the watery environment, and for collaboration with the competent authorities so as to achieve efficient supply and sewerage services, and to foster mutual aid between territories».

To this end, the Basque Water Agency aims to earmark a percentage of the funds raised by this charge to finance work towards attaining the Millennium Development Goals, in particular, Goal 10 of Target 7. Accordingly, it is currently studying financing mechanisms that will not only raise capital to

help achieve this international target, but also help raise user awareness in all strata of society of the key importance of good management of water resources. In this way, the attention of users will be drawn to the problems posed by the unavailability of water in developing countries, and the complications that the use of poor quality water generates in these types of communities.

Climate change and water resources

The ACBC's Department of the Environment and Territorial Management understands that combating climate change must be made an urgent and essential priority of any government action. The Department has therefore taken primary responsibility for this commitment, which has been built into the Basque Sustainable Development Environmental Strategy 2002–2020. It has also been crystallized through the setting up, in early 2006, of the Basque Climate Change Office and the drafting of the Basque Plan to Combat Climate Change.

As part of this initiative, the Basque Water Agency has initiated an ambitious study to determine the water resource measures that need to be taken in the event of climate transformation, looking ahead to the period 2011–2040.

A series of recommendations and suggestions have been set down in a preliminary report. Among these, attention should be drawn in particular to the need for the Basque Water Agency to receive regular technical advice, while working with the adaptation programmes arising out of the Plan to Combat Climate Change. Such advice will enable it to steadily and systematically incorporate and update its ever-growing leading-edge knowledge of impacts, in order to progressively align itself with the best international practices for adapting to climate change.

As a result, it is essential that the information-gathering and sharing and assessment work of the Basque Water Agency include the climate variable to the extent possible.


Urantza Aiva

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