The Ebro Hydrographic Confederation

An organisation serving water management and the water environment

MINISTERIO DE MEDIO AMBIENTE

CONFEDERACIÓN HIDROGRÁFICA DEL EBRO

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WATER

A NATURAL VITAL ELEMENT

The presence of water in its three states – solid, liquid and gaseous – is one of the characteristics of the planet Earth that makes it unique. Life originated in water and continues to depend on it. Without water, life is impossible since it forms a substantial part of all living beings (between 60% and 95%) and is the basis of their metabolism. Water is therefore indispensable and irreplaceable.

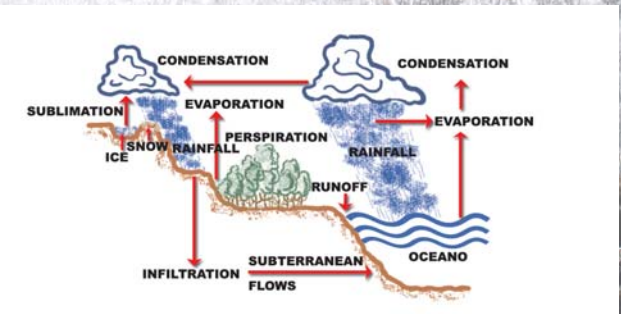
THE WATER CYCLE

Water on the planet is not static but circulates in a process known as the water cycle. In general terms, its function is as follows:

Heat from the sun acts like an engine and generates evaporation. The water held in this state of vapour is transported by the movement of the atmosphere. In certain conditions, clouds form and precipitation takes place. This marks the end of the ascendant stage of the cycle and the beginning of the descendent stage.

If this precipitation falls on land masses, part of it will circulate over the surface, forming streams and rivers as it seeks the oceans once more. Another part will filter down and circulate underground, usually more slowly, to reappear as springs and mountain streams, which also feed the rivers. Some of the water flowing on the surface will evaporate, increasing the humidity of the atmosphere, and the rest will reach the ocean, where the cycle will begin again.

The role of the water cycle in nature is extremely important as it supplies water to the continents and distributes it over all the planet. It is continually in a natural process of recycling, which makes natural purification and the circulation of nutrients possible. The function of the cycle is therefore rather like that of a purifier on a global scale.

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WATER IN A HYDROGRAPHIC BASIN

From the moment precipitation falls from the clouds to the land surface water tends to organise both its surface and underground circulation. This organisation gives rise to the formation of small streams fed by surface run-off or springs. These join up to form rivers, which also join to form bigger rivers, until all the water is received by one single river that takes it to the sea.

All the area of land where water circulates in the way described, eventually flowing into one single river, is known as the hydrographic basin of that river. The total number of streams and tributaries, together with the main river, is called the river basin system.

The river basin therefore forms the natural territorial unit for surface water on land, so it should also be the territorial unit with respect to its management. This provision is incorporated in the 1985 Water Act (Art.14)

GAUGING STATIONS

The river system extends over all the territory of the basin, taking water on its journey to the sea. The total amount of water comprises the flow, which is variable, being small in streams and brooks and much greater in big rivers. It also varies considerably depending on the different seasons. It is usually less in summer and more in winter and spring. Gauging stations are built on rivers to show the total amount and distribution over the year.

Gauging station of the Iregua river in Islallana (La Rioja)

LAKES AND WETLANDS

At times, water on its way to the sea accumulates in enclosed basins or depressions of varying depth, giving rise to the formation of lakes of different sizes and wetlands. These may be permanent or seasonal, but they always have one or more points of entry for either surface or underground water, and normally an exit that connects to the rest of the river system. The water in these remains stagnant over a varying period of time, giving it characteristics that differ from those of rivers. This leads to the creation of specific ecosystems with a particular dynamic that depends on the conditions pertaining to each lake or wetland, i.e. if it is permanent or seasonal, deep or shallow, freshwater or salt water, etc.

When there is no surface connection with the river system this is known as an endorheic lake.

Year	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	year
1997/98	69.3	181.2	526.1	293.1	183.1	171.9	214.6	164.9	99.7	50.9	38.9	60.2	171.4
1998/99	157.4	118.6	210.5	234.8	331.3	229.8	121.8	180.9	49.0	50.5	48.6	77.5	150.1
1999/00	76.3	179.7	288.9	154.4	166.3	77.7	332.2	190.0	74.6	49.2	52.1	39.4	139.7
2000/01	160.1	295.3	280.6	515.9	485.7	578.6	191.8	132.4	34.3	42.8	42.8	47.2	232.9
2001/02	54.5	93.9	51.6	81.1	147.6	102.6	83.4	97.5	49.5	20.5	30.5	37.5	70.3
2002/03	52.5	136.1	540.4	376.0	1046.3	580.8	190.7	273.5	55.6	27.7	35.8	91.5	279.5
2003/04	92.8	213.4	301.7	596.5	256.8	508.8	437.1	336.8	60.0	54.7	45.3	142.9	254.3
Average[1]	118.4	222.0	364.2	389.3	417.9	395.2	341.5	254.3	155.5	64.0	42.0	57.1	233.5

[1] Average from 1912 to 2004

Average monthly flow (m3/sec) at the gauging station on the Ebro at Zaragoza

THE CONFEDERATION

AS AN ORGANISATION RESPONSIBLE FOR THE COORDINATION OF DIFFERENT USES OF WATER

The multiple uses of water by man and the need to conserve the natural values of the water environment require certain coordination. To facilitate this, organisations known as Hydrographic Confederations were created, each with responsibility for the hydrographic basins of the different rivers.

A hydrographic basin is the area of land on which all the water converges by means of a network of tributaries on a single main river, which is responsible for carrying it to the sea. It is therefore a natural territorial unit which does not coincide with political or administrative boundaries.

The redrafted text 1/2001 of the Water Act (art.16) considers hydrographic basins to be indivisible units with regard to water management. It entrusts the management of water in one or more complete natural basins to the Confederations, with the exception of a few cases that are regulated by international agreements. These organisations therefore carry out their function in the territorial context of natural river basins.

The European Water Charter and the E.U. also make provisions for basins to be considered as a whole.

The hydrographic basin of the Ebro

HIDROGRAPHIC

The following are the main functions of the Hydrographic Confederations (R.D 1/2001 redrafted text of the Water Act):

The drawing up of the Basin Hydrologic Plan.

The administration and control of the Hydraulic Public Domain.

The administration of exploitation that is in the general interest, or affects more than one Autonomous Community.

The projection, construction and exploitation of any work they may undertake, either commissioned by the state or agreed upon by public and private entities.

Those functions derived from agreements with Autonomous Communities, local councils and other public or private entities, or those reached with private individuals.

Its duties and responsibilities are:

The granting of authorisations and concessions for interventions affecting the water environment.

The inspection of works derived from these authorisations.

The carrying out of hydrologic studies and measurements, and the provision of information on flooding.

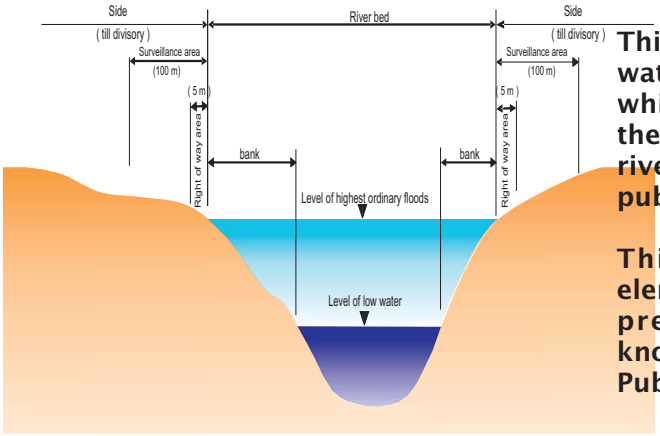
The control of water quality and definition of quality objectives

The undertaking of studies and projects, and execution of the work commissioned

The provision of technical and advisory services for any public or private entities requiring them.

WHAT IS THE HYDRAULIC PUBLIC DOMAIN?

According to the Water Act, both surface water flowing through rivers or streams and underground water is in the public domain, in other words, it belongs to everybody.



This does not only apply to water; the channels along which it flows, as well as the banks and margins of rivers and lakes, are also public.

This group of public elements related to the presence of water is known as the Hydraulic Public Domain.

For this reason, permission must be sought from the authorised public body the Hydrograph Confederation – to carry out any modifications in the channels or their margins, take water from them, or dispose of any waste.

WHAT IS THE BASIN HYDROLOGICAL PLAN?

If water is an indispensable asset for all activities, its use must be planned in order to satisfy the greatest general good. Because it is a public resource, this planning should be carried out by the State. The body designated by the State to do this is the Hydrographic Confederation.

This planning for different uses is known as the Hydrological Plan. There is one for each hydrographic basin (or in some cases the union of several small basins) and they are coordinated in the National Hydrographic Plan, which sets out the water policy of the State.
Its main objectives are:

-To rationalise the uses of water at the same time as caring for the environment.

-To increase availability in order to satisfy demand.

-To protect water quality.

A BRIEF HISTORY OF THE EBRO HYDROGRAPHIC FEDERATION (C.H.E.)

The Ebro Hydrographic Confederation was created in 1926 when it was known as the Syndical Hydrographic Confederation of the Ebro. It was the first such organisation, not only in Spain but in the world.

At the time of its creation the need to develop a water policy had already been promoted in Spain. In 1902 the first National Hydraulic Works Plan had been passed, and following this National Irrigation Congresses were held to discuss the advisability of creating local associations of irrigation syndicates.

As soon as its creation became effective, on March 5th 1926, the organising commission, directed by Don Manuel Lorenzo Pardo, began an intense campaign to raise awareness throughout the basin, on some occasions supported by the presence of the President of the Government and the Minister of Public Works. After this, plans and projects were begun for work to be carried out.

It was a long process in which we should not forget the ideas of Don Joaquín Costa, who was the great instigator of harnessing water from our rivers, and the decisions of the Count of Guadalhorce, who provided great support to the Ministry of Public Works. Neither should we forget Don Manuel Lorenzo Pardo, who championed and undertook the comprehensive exploitation of the basins and became the first technical director of what was then the Syndical Hydrographic Confederation of the Ebro.

THE EBRO BASIN

The Ebro Basin is situated in the NE quadrant of the Iberian Peninsula, covering a total surface of 85,000 km2, of which around 450 km2 are in Andorra, some 500 km2 are in France and the rest are in Spain, where they are divided between 9 autonomous communities: Cantabria, Castilla and León, the Basque Country, La Rioja, Navarra, Aragón, Castilla-La Mancha, Catalonia, and the Community of Valencia. Its natural limits are the Cantabrian mountains and the Pyrenees to the north, the Costero-Catalana chain to the east, and the Iberian System to the south-east.

It is drained by the Ebro, which has a total length of 910 km and flows in a north-west/south-east direction from the Cantabrian Mountains to the Mediterranean, where it flows into the sea forming a magnificent delta. Along its way, it receives water flowing from the Pyrenees and Cantabrian Mountains from important tributaries on its left that include the Aragón, Gállego and Cinca-Segre. On its right, it is fed by tributaries flowing from the Iberian System, which normally carry less water, such as the Oja, Iregua, Jalón and Guadalope. The total length of its river system is about 12,000 km.

Within the basin there are numerous lakes, mainly in mountainous areas. In the Pyrenees, where they are known as ibones **or** estanys, **these are small but of great scenic beauty. Examples of lakes found in other areas include those of Sariñena in Huesca, Montecornés in Lleida or the saltwater lake in Chiprana, Zaragoza. The Gallocanta lake deserves special mention, as do the Sástago-Bujaraloz salt lakes, which are situated in endorheic basins (with no outlet) but lie within the area covered by the Ebro Basin.**

This vast and varied territory covers approximately 20% of the surface of Spain. It has a population of about 2,800,000, with a density of 33 inhabitants per square kilometre, which is much lower than the Spanish average of 78 inhabitants per square kilometre. Almost half the population is concentrated in the cities of Zaragoza, Vitoria, Logroño, Pamplona, Huesca and Lleida.

There is a marked contrast between the centre of the valley, where population is concentrated, and large areas of the Iberian System and the Pyrenees, which are sparsely populated.

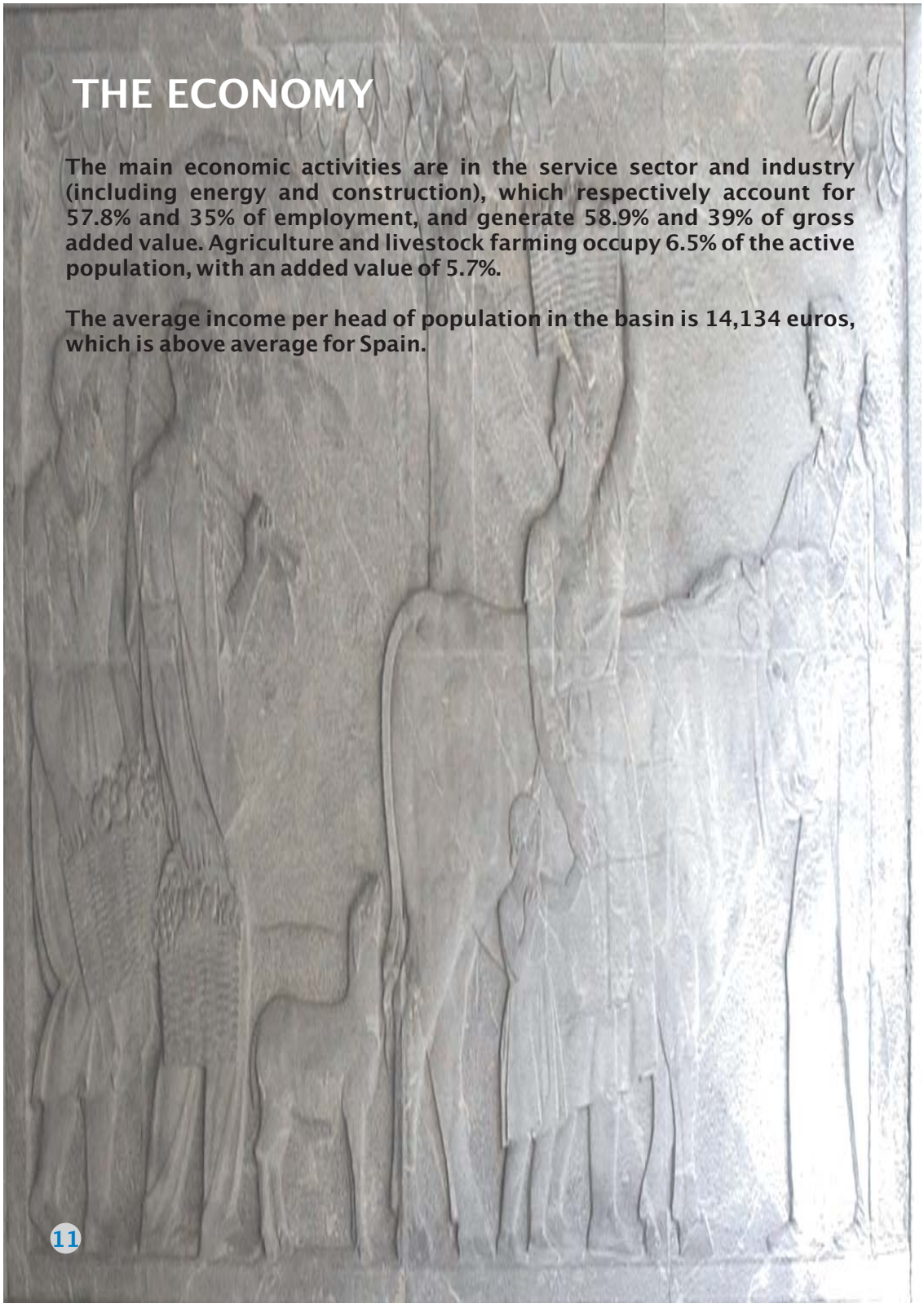
Autonomous Communities and rivers in the Ebro Basin

ARAGON
CANTABRIA
CASTILLA-LA MANCHA
CASTILLA Y LEON
CATALUÑA
COMUNIDAD VALENCIANA
LA RIOJA
NAVARRA
PAIS VASCO

THE ECONOMY

The main economic activities are in the service sector and industry (including energy and construction), which respectively account for 57.8% and 35% of employment, and generate 58.9% and 39% of gross added value. Agriculture and livestock farming occupy 6.5% of the active population, with an added value of 5.7%.

The average income per head of population in the basin is 14,134 euros, which is above average for Spain.



COMPLEXITY AND RICHNESS OF THE WATER ENVIRONMENT

The water environment is of great complexity. It not only consists of water flowing in rivers but also that in lakes and wetlands, or in aquifers connected with rivers and riverine forests. All these elements are interrelated in a such a way as to make them interdependent.

At the same time, the way such an environment functions is influenced by multiple factors. The most important are the climate of the basin, its topography and the vegetation cover.

THE WATER ENVIRONMENT AS A SUPPORT OF HIGHLY VALUABLE ECOSYSTEMS

The rivers themselves are home to important animal populations:

-Macroinvertebrates: These constitute the basic food of other animals and are an indicator of water quality. The most familiar is the crayfish but there are many more of smaller size.

-Fish: In Spain 68 species are catalogued, some of which are endemic, that is, exclusive to our rivers. The rivers of Cantabria are noted for trout, barbels, eels and salmon. In the Ebro valley 46 of these 68 species are present.

Numerous species of animals inhabit the riverine forests, with their survival depending on both the woodland and the river itself :

- Birds: The greatest diversity of birds in all the European ecosystems is found here. These include herons, wild ducks, kingfishers, wagtails, dippers and nightingales.

- Mammals: These include the otter, the shrew and the muskrat. Besides these, many others, such as the wolf, the wild boar and the roe deer, use the woodland as ecological corridors.

-Reptiles and amphibians: These include frogs, toads, snakes and newts.

Protection of these riverine forests is essential as they are unique environments with great biodiversity, usually greater than the surrounding area. Furthermore, they fulfil functions that are very important for the river ecosystem :

-They contribute to the natural purification of water (the “green filter” effect) and moderate its temperature.

-They fertilise the riverbanks and protect them from erosion.

- They protect the riverside.

IN THE EBRO BASIN

Because of its large area, the length of its river system and its geographical diversity, numerous stretches of the riverside have great environmental richness.

The wooded areas have been depleted through occupation of the riverside, but good examples still remain, both on the main river and some of the tributaries. Examples on the Ebro that stand out are the stretch between Zaragoza and La Zaida, and the stretch between the rivers Huecha and Aragón. Some notable examples on its tributaries are the lower courses of the Arga, the Aragón and the Cinca.

Ancient meanders that have been abandoned by the river are known as galachos. **They still contain water and are normally bordered by well-developed woodland (the** galachos **of Juslibol, La Alfranca, Cantalobos, etc.). These enclaves are of great geomorphological and biological interest and are a reminder of the dynamism of the river.**

In some mountain areas the rivers of the basin have carved out deep canyons of great scenic beauty, with water flowing between huge walls of rock. There are many examples in the Pyrenees, including the Arbayún and Lumbier gorges in Navarra, and the Añisclo canyon and the Ventamillo gorge in Aragón. In the pre-Pyrenees the group of canyons of the Sierra de Guara stand out, and in the Iberian System those of the rivers Piedra, Mesa and Guadalope (Aragón). They are places of great scenic and environmental value, and are generally in a good state of conservation. In them are found species of fauna and flora that are characteristic of water environments, together with others that are typical of crags and cliffs.

Some of the woodlands, meanders and canyons are protected. Therefore, their conservation as riverine areas of great ecological value for people to visit and enjoy is made easier. Examples in Aragón include the nature reserve known as Galachos de la Alfranca de Pastriz, La Cartuja y El Burgo de Ebro, and in Navarra the areas of Lobera y Sotillo, La Remonta, El Ramalete, El Quebrado and La Mejana.

BASIC DATA ON THE BASIN

Area and inhabitants within the basin by Autonomous Communities

	Area Km²	%	inhabitants 2004	%	Density Inhab/km²	Municipa-lities
Cantabria	775,4	0,91	19.061	0,64	24,58	9
Castilla y León	8.124,9	9,50	93.624	3,17	11,52	186
La Rioja	5.050,7	5,90	293.553	9,93	58,12	174
País Vasco	2.680,7	3,13	262.516	8,88	97,93	57
Navarra	9.227,4	10,79	557.254	18,86	60,39	246
Aragón	42.076,3	49,19	1.198.526	40,56	28,48	663
Castilla-La Mancha	1.117,9	1,31	1.892	0,06	1,69	27
Cataluña	15.634,4	18,28	523.752	17,72	33,50	339
Comunidad Valenciana	846,5	0,99	5.060	0,17	5,98	16
TOTAL...	*85.534,2*	*100,00*	*2.955.238*	*100,00*	*34,55*	*1.717*

Hydrology

- Surface waters: 13.000 km of main rivers
- Groundwaters: 105 grounwater bodies
  6980 srpings

Main irrigater areas:

	Irrigated area (ha)
Canal Lodosa	32.818
Canal Imperial de Aragón	26.508
Canal de Tauste	9.022
Canal margen dcha. del Ebro	15.170
Canal margen izda. del Ebro	12.690
Canal margen dcha. del Najerilla	2.785
Canal margen izda. del Najerilla	5.015
Canal Urgell (Principal + Auxiliar)	77.516
Canal Piñana	13.495
Canal Aragón y Cataluña	98.202
Riegos del Alto Aragón	110.562
Sistema Bardenas (I+II)	73.489
Riegos de Jalón–Jiloca	43.574
Riegos del Guadalope	12.998
TOTAL..... 533.844	

Energy. Electricity production in the Ebro basin:

	N	Potencia Mw	Produc. Gwh/año
Hydropower	322	3.874	7.800
Carbón	3	1.290	7.600
Gas	2	800	
Nuclear power	2	2.421	18.400

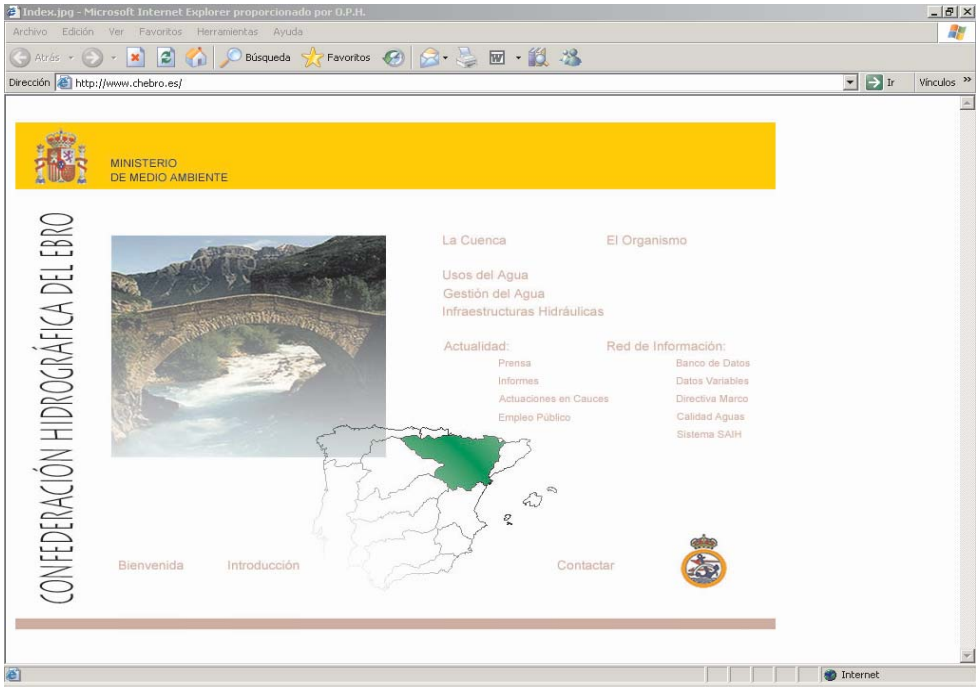
www.chebro.es

General information on the Ebro Basin (geophysical characteristics, population, economy etc.) and on the Organisation (its history, legal framework, functions and structure) can be found on the official website. This includes a large amount of data on water use and management, water quality, hydraulic infrastructure and gauging, as well as application of the Water Framework Directive to the Basin.

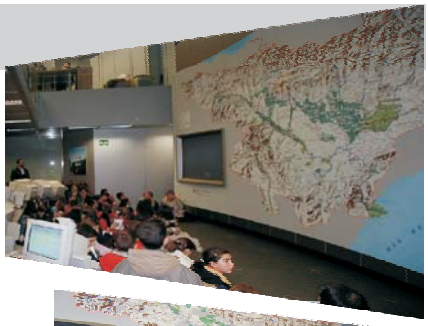
It is therefore possible to access and download documents, studies and maps done by the Organisation.

From this site it is also possible to access the Automatic Hydrological Information System (Sistema Automático de Información Hidrológica **or S.A.I.H.)**

The Organisation can be contacted through this site by electronic mail.



www.saihebro.com



The Automatic Hydrological Information System (S.A.I.H.) sends out information every fifteen minutes on the many hydrological variables in the basin, using a network of 215 rain gauges, 130 gauging stations on rivers, 179 gauging stations on channels, 73 thermometers, 101 radio transmitters and 12 so-called concentration points. These transmit the information to the Basin Control Centre (CPC) located at the headquarters of the Ebro Hydrographic Confederation.

Its main objectives are the optimisation of water resource management, flood prevention and flood response to reduce risks and damage as much as possible, and the overall management of the resource.

Data is updated hourly on the website (http://www.saihebro.com) . This way it is possible to have access almost in real time to data on irrigation, rainfall in the Basin, the amount of water flowing in rivers and irrigation channels, and the height and volume of water stored in reservoirs

It is also possible to consult and download information corresponding to the previous 7 days, as well as historic data included in the database.

Data available on the website is of great use to those who use the reservoirs and rivers, and for carrying out monitoring in particular situations.

In the Forecasting section, information is given on developments expected over the following two days. This information is drawn up using the Decision Support System (SAD - Sistema de Ayuda a la Decisión).

PERMANENT EXHIBITION OF GLACIERS IN THE SPANISH PYRENEES

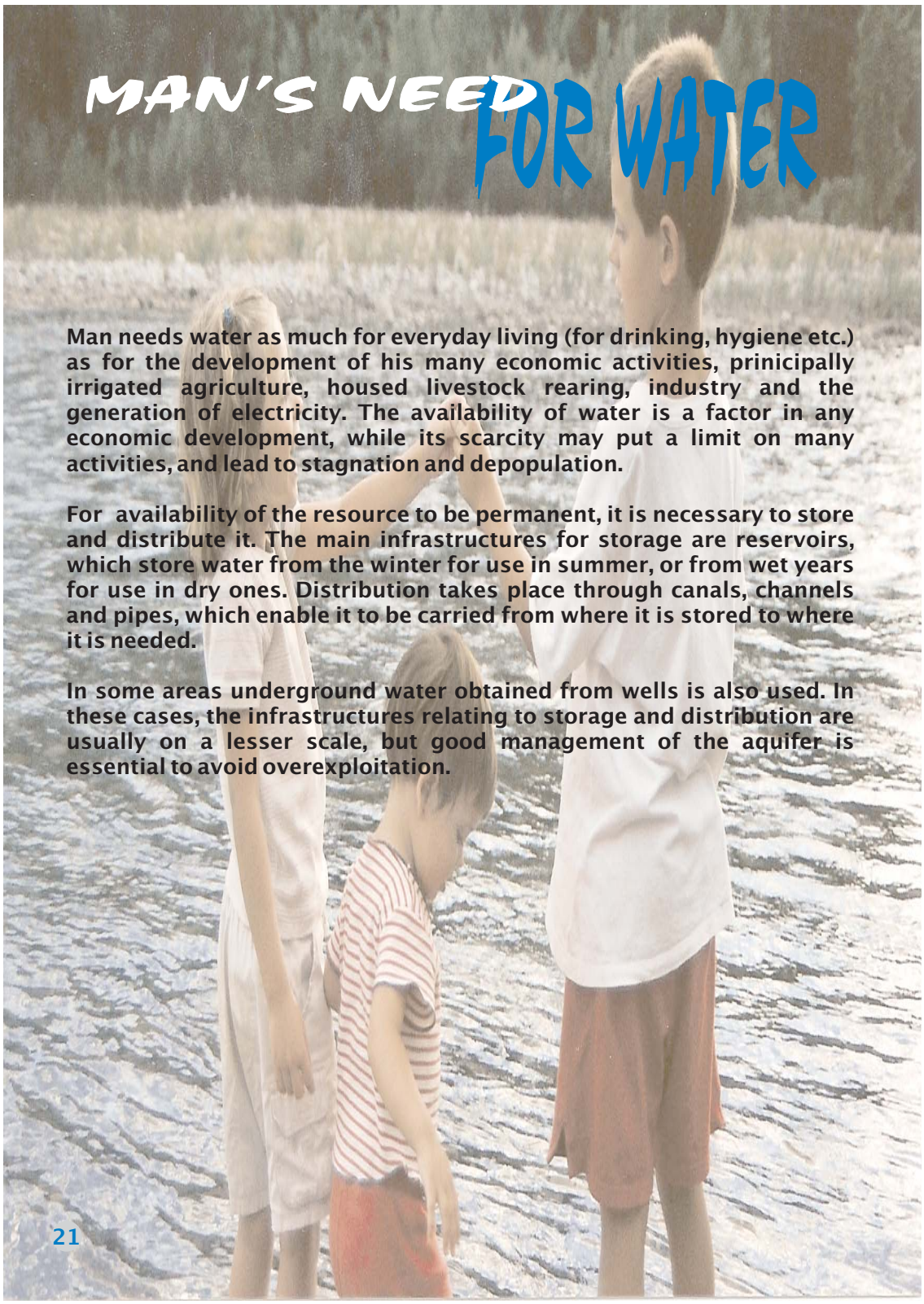
The only glaciers still existing in Spain are found in the highest mountain masses of the Aragonese Pyrenees. They are small in size, and bear witness to the great glacial systems that formerly covered most of Spain's mountain ranges. Nevertheless, they are of great environmental value (they have been designated as a Natural Monument by the Aragon government) and exert a certain influence on the regulation of flow in some Pyrenean rivers that rise in them.

This exhibition is housed at the headquarters of the Ebro Hydrographic Confederation and is in two main parts:

* An audiovisual presentation with images of glaciers and ice sheets, together with old photographs of some of them, showing the extent to which they have receded during the twentieth century. Also shown are the results of some of the research work carried out on them.

* The second part of the exhibition consists of a series of panels with general information on the phenomenon of glaciers on a global scale (related to climate, morphology and glacier dynamics, etc.), and, more specifically, on glaciers in the Pyrenean mountains, including their range, associated types of relief, mapping techniques, etc.

MAN'S NEED FOR WATER

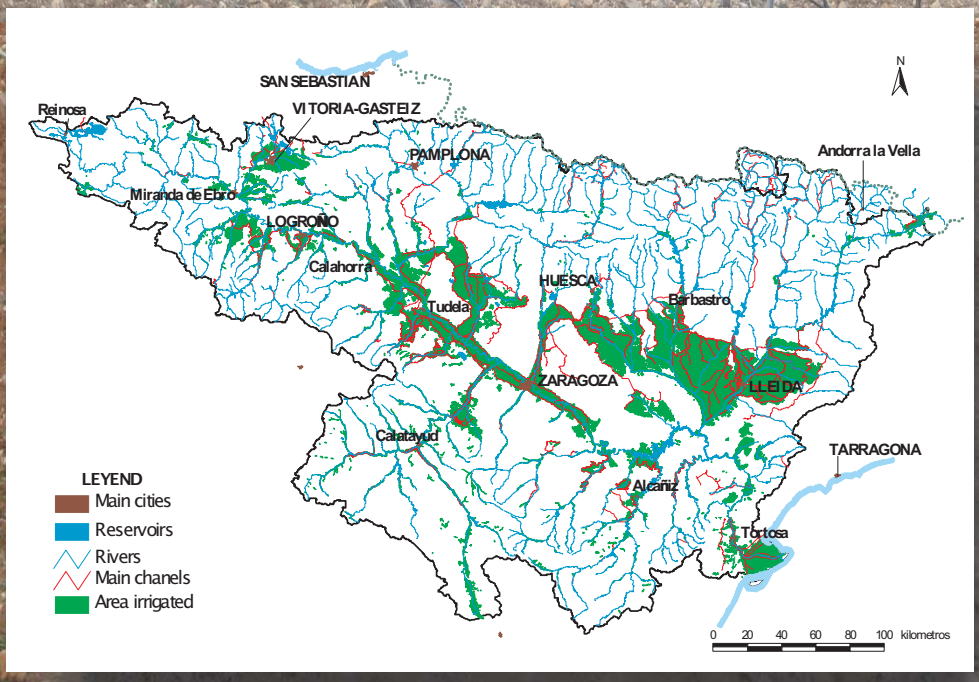


Man needs water as much for everyday living (for drinking, hygiene etc.) as for the development of his many economic activities, prinicipally irrigated agriculture, housed livestock rearing, industry and the generation of electricity. The availability of water is a factor in any economic development, while its scarcity may put a limit on many activities, and lead to stagnation and depopulation.

For availability of the resource to be permanent, it is necessary to store and distribute it. The main infrastructures for storage are reservoirs, which store water from the winter for use in summer, or from wet years for use in dry ones. Distribution takes place through canals, channels and pipes, which enable it to be carried from where it is stored to where it is needed.

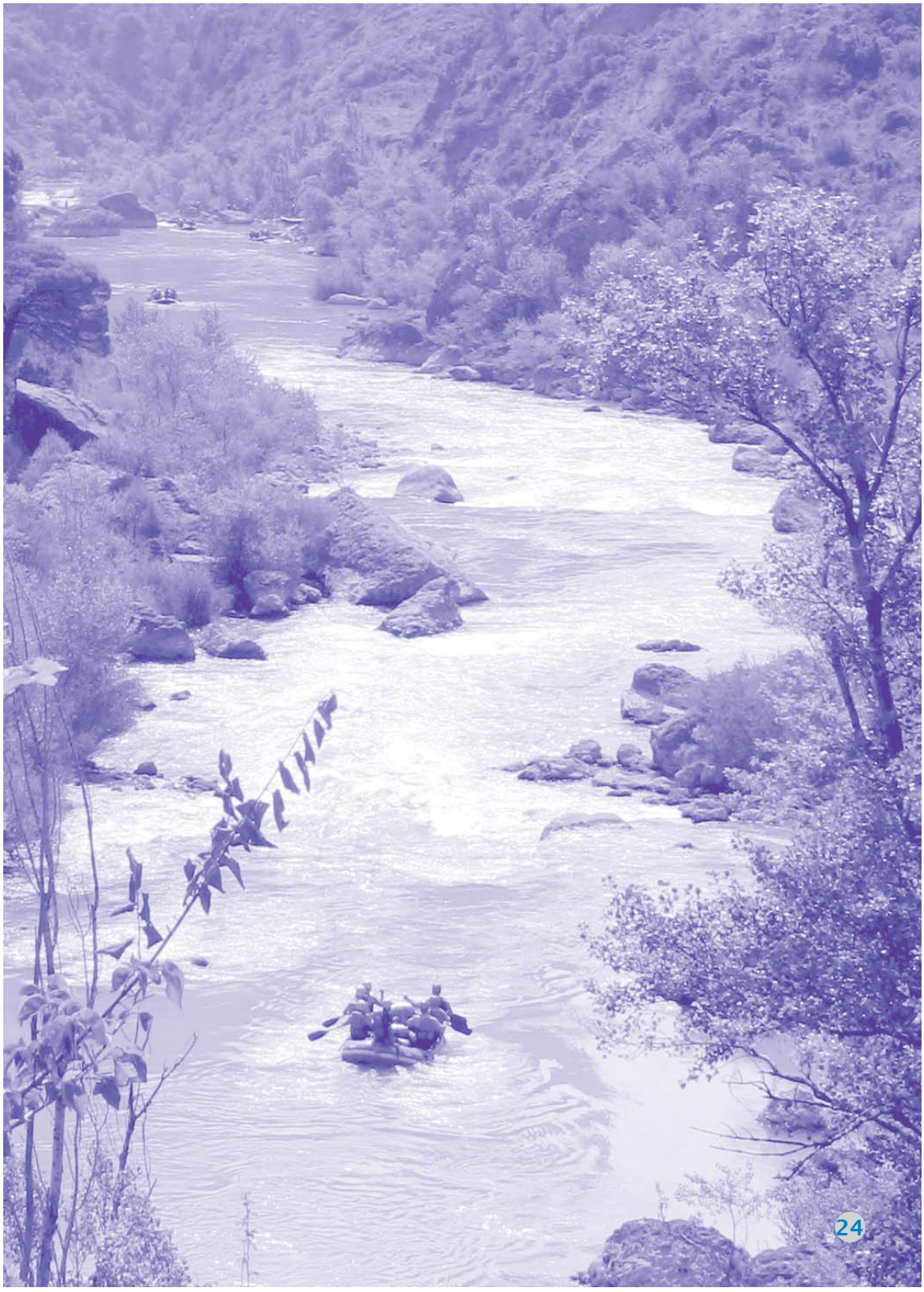
In some areas underground water obtained from wells is also used. In these cases, the infrastructures relating to storage and distribution are usually on a lesser scale, but good management of the aquifer is essential to avoid overexploitation.

Principal types of infrastructure for storing and transporting water.



THE USE OF WATER FOR LEISURE ACTIVITIES

The presence of both flowing and still water enriches and enhances the landscape, and rivers, lakes and reservoirs have traditionally played an important role in leisure pursuits. Activities such as fishing, bathing, sailing or simply visiting such places are forms of relaxation and enjoyment for many people. This makes it necessary for the water to be of a satisfactory quality, and for the banks to be in a suitable condition. The link between the use of water for leisure activities and conservation of the natural and scenic values of the water environment is of great importance.



DEMAND IN THE BASIN

Annual demand is around 7038 hm3/year, with 245.7 hm3/year transferred to other basins.

Agriculture is the activity that consumes most of the total (86%), followed by industry, general supply and water transfers. The high consumption by agriculture, including livestock, is mainly due to the large areas under irrigation, which account for 537,000 ha in all the basin. These are divided into nine irrigation systems: Najerilla - Iregua, the Ebro Axis, Bardenas, Cinca-Monegros, Aragón - Cataluña, Urgel - Piñana, Guadalope, Bajo Jalón and the Ebro Delta. When other irrigated land is added, the area under irrigation in all the basin rises to 780,000 ha, almost 28% of the total land under cultivation (2,800,000 ha).

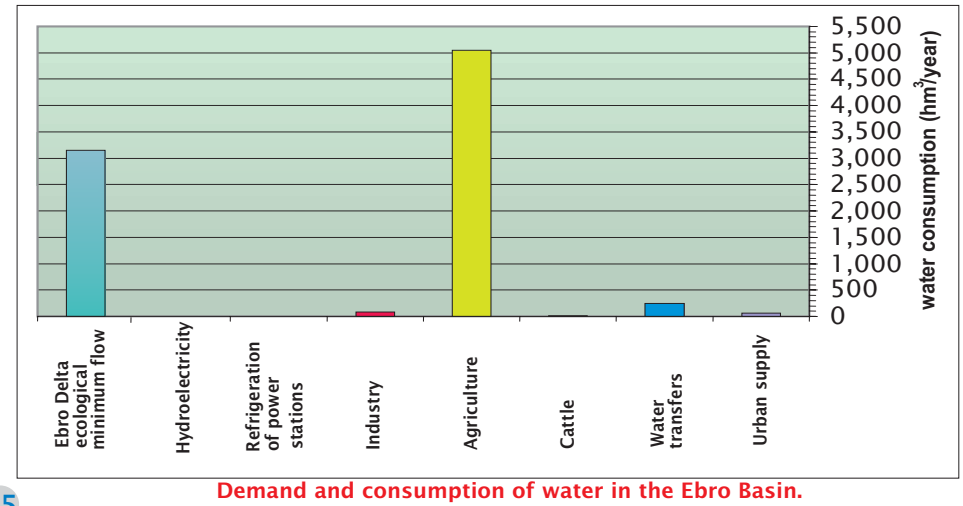
Large volumes of water are required for other purposes, apart from consumption. Electricity generation uses some 38,000 hm3 per year, the refrigeration of power stations some 3,500 hm3, and aquaculture about 1,000 hm3.

To satisfy these needs the C.H.E. has at its disposal a network of 53 main reservoirs with a total reserve capacity of 7455 hm3, and a network of 27 main canals which feed a multitude of irrigation canals and smaller channels.

In order to adequately cover future needs, the Basin Hydrological Plan has been put in place. This consists of the study of the water resources presently at its disposal, an estimate of future needs and the planning of any necessary work and infrastructures to satisfy these.

As can be seen in the graph, the two greatest demands on water are its use for irrigation, and the maintenance of minimum flows. The greatest demand in the basin is for maintenance of minimum flow on the Ebro delta, which requires more than 3,000 hm3/year.

	Water demand hm^3/year	Water comsumption hm^3/year
Urban supply	313	63
Water transfers	246	246
Cattle	66	13
Agriculture	6,310	5,048
Industry	414	83
Refrigeration of power stations	3,354	0
Hydroelectricity	60,000	0
Ebro Delta ecological minimum flow	3,154	3,154
TOTAL		8,607



Demand and consumption of water in the Ebro Basin.

IRRIGATION: A SOURCE OF WEALTH

At present, the total area under irrigation is just over 780,000 ha (28% of the total cultivated area), of which around 537,000 ha have the benefit of sufficient water flow, and can therefore count on high production. This flow is guaranteed by water supplied from reservoirs, and, to a lesser extent, from aquifers.

In the areas of the basin under irrigation, the levels of productivity attained are perfectly competitive with those of the European Union. For this reason, and with an eye to the future, all Autonomous Communities are strongly committed to the application of technology in irrigation, in order to compete with their European partners.

A significant agro-industrial sector has developed in irrigated areas, which generates considerable added value by transforming agricultural production. In the Ebro Valley more than 27,000 people are employed in in the agro-alimentary sector.

Land under irrigation and the agro-alimentary industries associated with it have contributed greatly to population stability in these areas, which are without doubt the most demographically and economically dynamic in the basin.

WATER QUALITY

There is a dual aspect to the quality of water in the Ebro Basin. The periphery of the basin, formed by the Pyrenees and Iberian System, has water of excellent quality. In general, pollution levels are very low, largely as a result of low demographic pressure.

In the centre of the Ebro Valley water quality is low, in some stretches of the Ebro itself and where it is joined by its tributaries. It does not always fulfil the minimum requirements for use in the public water supply. The causes of this substandard quality can be found in the saline character of the Valley, and in pollution resulting from human and economic activity.

Controlling and combating pollution is the biggest unresolved issue facing those who live along the Ebro. Much of the work of the Ebro Hydrographic Confederation is dedicated to taking action on this.

MAKING GOOD USE OF WATER

Conservation and protection of water resources, and the water environment in general, is a task that concerns everybody, from public institutions, mainly Hydrographic Confederations, to private individuals, who play a fundamental role. It is therefore necessary to be familiar with a series of guidelines that can be applied to make more rational use of the resource:

In the urban environment:

- Saving water during domestic use, when watering gardens, etc.
- Reducing the use of toxic products and their disposal.
- Improving and maintaining infrastructures for storage and distribution in order to minimise losses.
- Treating water before it is released back into the river system.

In agricultural activity:

- Modernising transport and distribution infrastructures with the object of reducing losses.
- Extending the use of irrigation techniques that consume less, and applying the most suitable to the particular conditions found in each area.
- Limiting the use of fertilisers and herbicides in order to reduce their presence in the return flow from irrigation, with consequent negative effects on the river system.

In industrial activity:

- Promoting the recycling of water wherever possible.
- Introducing technologies with low consumption.
- Treating water before it is returned to the river system.

For all the public:

- Understanding the water environment and approaching it with curiosity and an attitude of respect.
- Avoiding damage to plants and animals in lakes and rivers and their surroundings.
- Avoiding degrading the quality of the water or that of its banks by depositing rubbish and toxic products or tipping rubble.
- Putting into practice measures to save water in everyday activities in order to optimise use of the resource.
- Researching clean technologies that consume little water for future implementation in agriculture and industry, etc.

THE C.H.E an organisation at the service of society

The Ebro Hydrographic Confederation is an autonomous body attached to the Ministry of the Environment.

Its administration and management correspond to the Governing Board and its President, in conjunction with other official bodies, such as the Users' Group, the Reservoir Withdrawal Commission, Water Exploitation Boards, Boards of Works and the Water Council.
The Confederation is a participatory and democratic body, with representation by both consumers and the nine Autonomous Communities included in the basin.

The challenge of the Ebro Hydrographic Confederation for the future is to find a way of meeting an increasing demand for water that is in harmony with the preservation and regeneration of aquatic ecosystems.

Among the specific objectives are:
- Supplyng quality water to the inhabitants of the centre of the Valley, whose water is presently of inferior quality.
- Preserving and regenerating the aquatic ecosystem through education, and insisting upon laws being enforced.
- Improving water management in the basin by raising levels of efficiency regarding water usage and increasing minimum environmental flow in rivers.
- Encouraging the generation of wealth, employment and clean energy through water regulation and the improvement and transformation of irrigated land.
- Improving aquatic ecosystems, both from an environmental and scenic point of view, and minimising the negative effects of reservoirs with plans for land restitution.

In order to achieve these objectives, and others required by the Water Act, the Ebro Hydrographic Confederation can count on a team of people with the most advanced scientific and technical knowledge on environmental matters. It has introduced the most sophisticated control and analysis techniques, such as the Automatic Hydrological Information System (S.A.I.H.), described in the annexe, and is committed to a policy of flexibility and efficiency in all its activities.

The recently-created company, Aguas de la Cuenca del Ebro, will be of great support to the Confederation in its endeavour to provide more and better services to society.

The European water charter

1. There is no life without water. It is an indispensable and precious asset for all human activity.

2. Freshwater resources are not inexhaustible. It is necessary to conserve them, control them and, wherever possible, increase them.

3. To pollute water is to do harm to man and other living creatures that depend on water.

4. The quality of water must be maintained at an appropriate level, depending on its different uses; in particular, it should be of the required standard for public health.

5. When waste water is returned to the river, it must be in such a way as to not prevent future use.

6. The maintenance of a sufficient vegetation cover, preferably forest, is imperative for the conservation of water resources.

7. Water resources should be inventoried.

8. The economics of water resources should be planned by competent authorities.

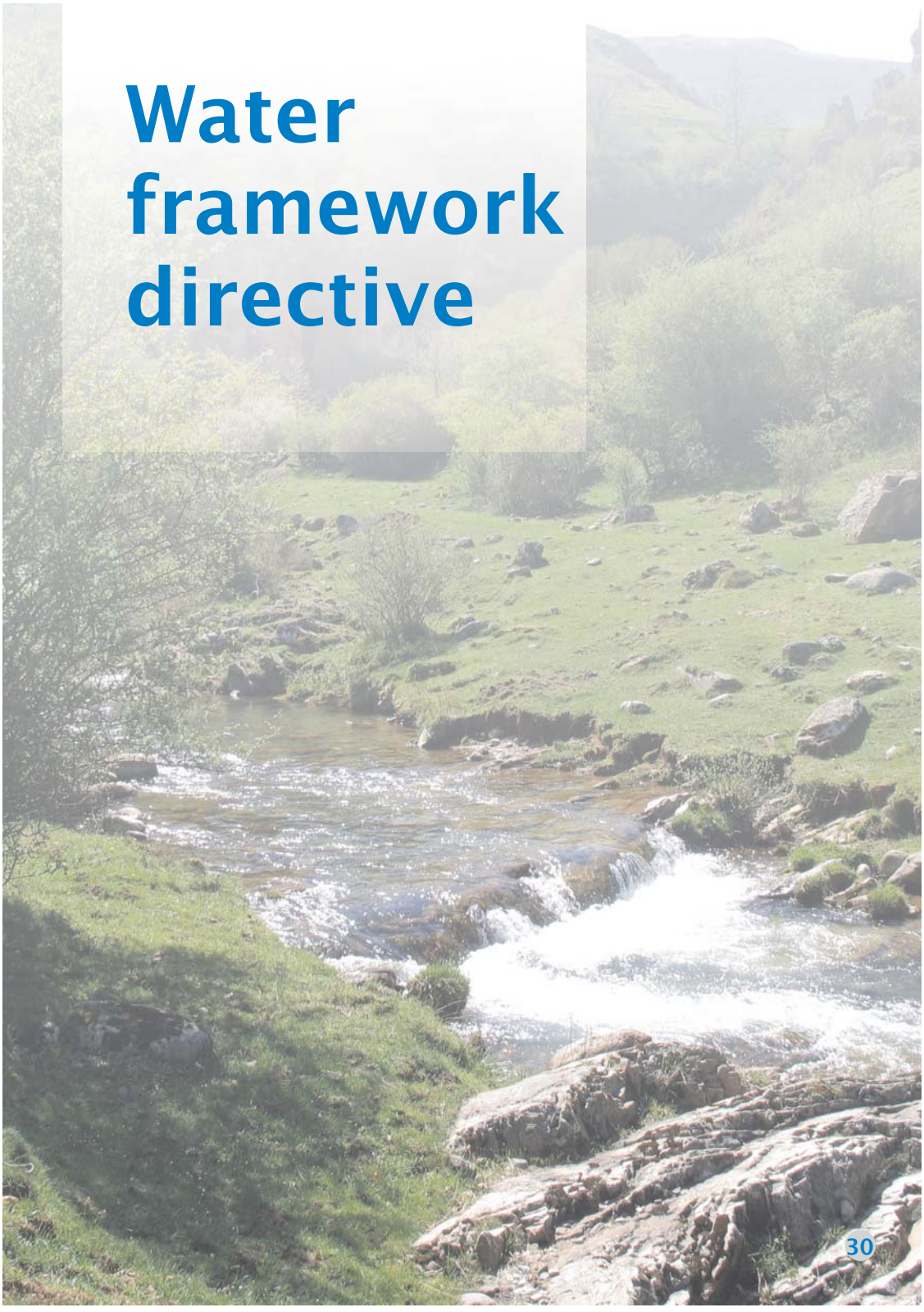
9. The conservation of water should be promoted through intensive scientific research, specialist training and public information services.

10. Water is a common inheritance with a value that should be recognised by all. It is the duty of everyone to be careful and economical when using water.

11. The administration of water resources should be based on natural basins rather than on political or administrative structures.

12. Water does not recognise borders; as a common source it requires international cooperation.

Water framework directive



Water framework directive

The Directive sets basic standards regarding water management that are common throughout Europe. Its purpose is to establish a protective framework for all continental surface water, water in transition, in coastal areas and underground, in order to prevent its deterioration and promote its sustainable use through long-term protection. This objective should be achieved by the year 2015, when all water in the European Union ought to be of good quality. The reason for these activities is that due to pollution and increasing demand, human pressure compromises its long-term sustainable availability. It is necessary to reverse today's negative tendencies, and be aware that protecting water means protecting the ecosystems from which it is inseparable.

Measures taken to protect water and prevent its degradation, and those aimed at regenerating water in bad condition, should be based on a comprehensive understanding of hydrographic basins, the causes of deterioration in aquatic ecosystems, and the importance of monitoring water quality.

The units for management and planning are the hydrographic basins themselves. These can be grouped together to form hydrographic units. In each hydrographic unit action is needed:

- To study the repercussions of human activity on the state of the water.
- To define plans for measures that help meet both environmental objectives and the demand for a water supply in good condition.
- To supervise the condition of water and protected areas.
- To raise awareness of cost recovery of services related to water under the principle "he who pollutes pays".
- To draw up a register of protected areas related to water.

· December 2004: Analysis of the characteristics of the units and a study of pressures and impacts affecting water should be completed, with an economic analysis of water usage included.
· December 2006: The supervision programmes should be in operation to serve as a basis for water management.
· December 2008: Management plans for the hydrographic basins should be made public.
· December 2009: The first management plans for the hydrographic basins should be published.
· December 2015: The quality of water should have reached a "good state".

To meet these objectives there should be a process of public participation in planning, based on transparency of information. It is also necessary to prevent pollution wherever it is generated, by dealing with its origins in a sustainable way. Each state should designate a "competent authority" which, in the case of the Ebro basin is the Ebro Hydrographic Confederation. This depends on the Ministry of the Environment, although the participation of ALL is of extreme importance in order to achieve the objectives.

Water framework directive

THE UNIT OF THE EBRO

The Ebro Hydrographic Confederation is the organisation in charge of overseeing correct water management in the Ebro Basin, according to the criteria that have predominated in different periods of history.

At present, much effort is being put into modernisation, efficient administration, transparency of information, environmental sensitivity and public participation. The Framework Directive divides water into "water bodies", which form the management units. In the Ebro Basin almost 700 surface water bodies (rivers, lakes, etc.) have been defined, and 105 underground water bodies.

The situation regarding activities linked to the introduction of the Directive in the Ebro Basin is as follows:

a) Study of the repercussions of human activities.

Human activity exerts great pressure through the generation of urban and industrial waste, general pollution, morphological changes in rivers, lakes and wetlands, and modifications to the water regime by regulation and withdrawal from the flow. Aquatic systems have a considerable capacity for regeneration, but the negative effects of these activities gradually change and denaturalise them. In the Ebro Basin, preliminary studies indicate that 43% of the established surface bodies runs the quality objectives fixed in the Framework Directive ,4% duesn't run and 53% is in study. The main causes are specific and general pollution and water withdrawal from rivers, together with alterations to riverbanks.

b) Programmes of measures to adopt.

Once the state of the water is known, it is necessary to devise a programme of measures aimed at correcting unwanted effects and guaranteeing the sustainable use of water. These have to be determined by 2009, and include:

- Reduction of effluent by limiting and controlling contaminants.

- Improvement of environmental practices in agriculture.

- Expansion and improvement of the treatment of effluent and waste management.

c) Monitoring the state of the water.

At present, the Ebro Hydrographic Confederation has more than 1000 control points that measure such aspects as river flow, water levels in reservoirs, lakes and wetlands, the physio-chemical parameters of surface and underground water, biological communities present, and the level of underground water. These points are organised into different networks which are being extended and brought up to date in order to adapt to the requirements of the Directive.

d) Economic analysis of water use.

It is aimed to make those exploiting water for its different uses contribute to recovering the costs involved, both in making it available to the required standards and maintaining aquatic ecosystems. This should take into account the social, environmental and economic effects of recovery, and the geographical and climatic conditions. According to the principle "he who pollutes pays" the costs necessary for restoring aquatic ecosystems to an acceptable state have to be assumed to a large extent by those causing the damage.

At present, most of the costs generated in the Basin (infrastructure, management, etc.) are assumed by private concerns, and the rest taken up by local, autonomous and central administrations. The users of urban supply services also finance most of the total cost, but where cleaning up of the environment is concerned, the cost to users is still low

e) Register of protected areas related to water

The following should be included:

- Surface and underground water masses used for harnessing water destined for human consumption that provide more than 10 m3 a day or supply more than 50 people.

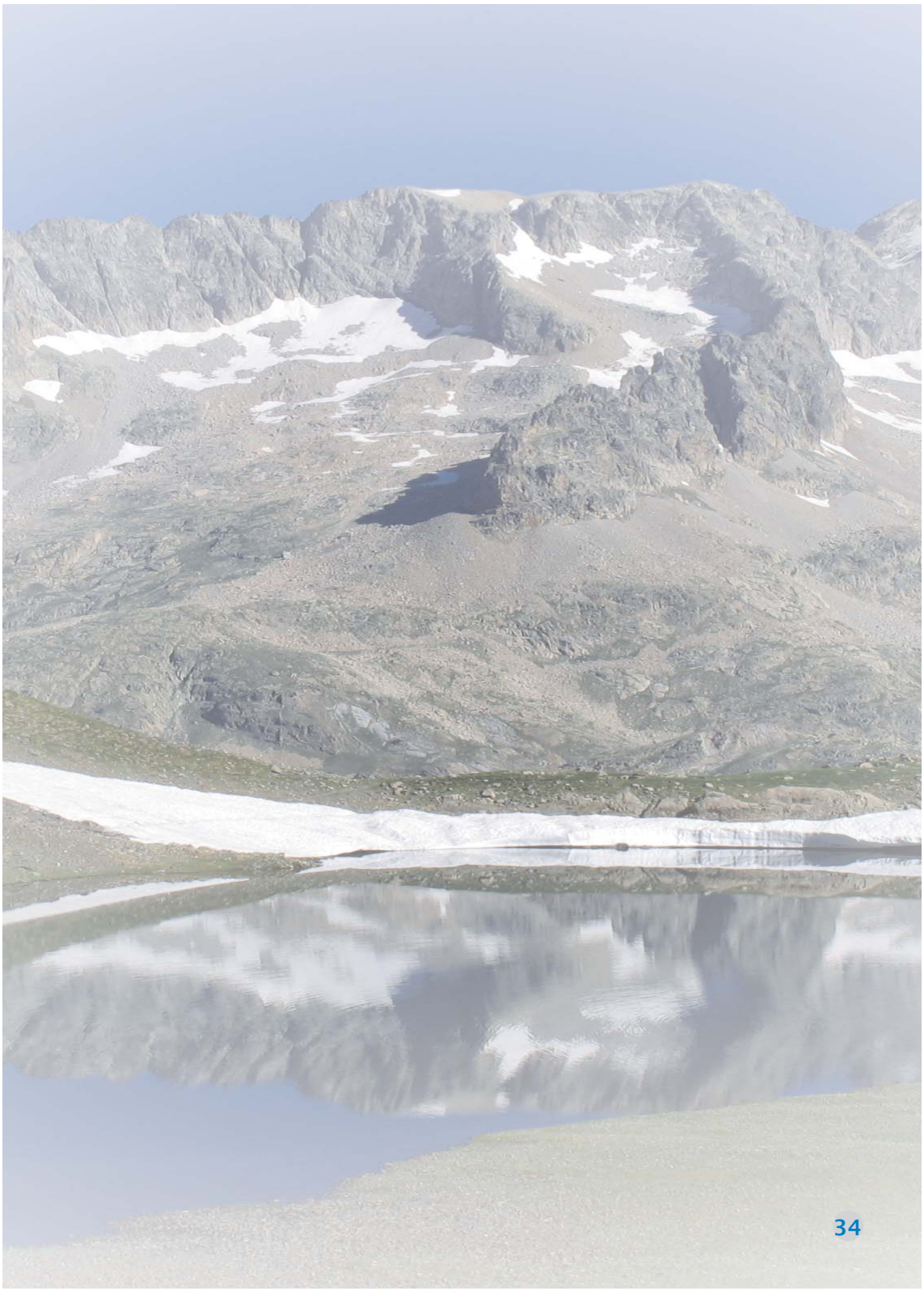
- Areas destined for the protection of aquatic species that are important from an economical point of view.

- Water masses declared as being for recreational use (including bathing).

- Areas that are sensitive and vulnerable with respect to nutrients.

- Areas designated for the protection of habitats (LICs) or species (ZEPAs) when maintenance or improvement of water quality is an important factor for their protection.

- At present, areas corresponding to the cases mentioned have already been identified. Advances have been made in the inventories of water harnessed for water supplies, and the rest of the databases have been brought up to date, thereby establishing the relation between areas involved and water masses affected by protection.



BIBLIOGRAPHY

- Barrera M. Las aguas del Ebro. Acesa. Zaragoza

- Benayas J. et al (1989). El agua. Guía para la educación ambiental. Departamento de Ordenación del Territorio y medio ambiente. Gobierno de Navarra. Pamplona.

- Del Valle J. Funciones y usos del agua en la cuenca del Ebro. Ed Prames, Zaragoza.

- De los Ríos Romero F. (1984). El agua en la cuenca del Ebro. Institución Fernando el Católico. Zaragoza.

- Marcuello J.A. (1986). El Ebro. Zaragoza.

- MMA (2004). Water in Spain. Ed. Centro de Publicaciones del Mº de Medio Ambiente.

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