Water demand management in the Mediterranean, progress and policies

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Monitoring progress and promotion of water demand management policies

National report of Spain

Mediterranean Commission on Sustainable Development

Mediterranean Strategy for Sustainable Development

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Spanish National Report

PNUE
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Environnement et développement en Méditerranée

Index

ABREVIATIONS AND ACRONYMS

A.G.U.A.	Performances for the Management and Use of Water
AAI	Integrated Environmental Authorisation
AGE	Spanish Geography Association
BATs	Best Available Techniques
BREF	BAT Reference
CEDEX	Public Works Experiment and Study Centre (Spain)
DCE	Dichloroethane
DPH	Public Hydraulic Domain
EAGGF	European Agricultural Guidance and Guarantee Fund
EEC	European Economic Community
EFLUS	Fluvial Spaces project
EPER	Polluting Sources State Organisation
ERDF	European Regional Development Fund
ESF	European Social Fund
EUWI	European Union Water Initiative
FAO	Food and Agriculture Organisation of the United Nations
FIFG	Financial Instrument for Fisheries Guidance
GDP	Gross Domestic Product
GVA	Valencian Autonomous Government
GWPO	Global Water Partnership Organization
HNP	Hydrological National Plan (Spain)
INBO	International Network of Basin Organisations
INE	National Statistics Institute (Spain)
IUCN	International Union for Nature Conservation
IWRM	Integrated Water Resource Management
MAPA	Ministry of Agriculture, Fishing and Food
MDGs	Millennium Development Goals
MENBO	Mediterranean Network of Basin Organisations
MMA	Spanish Ministry of Environment
MVC	Monomer Vinyl Chloride
OECD	Organisation for Economic Cooperation and Development
OIEAU	International Water Office
PATRICOVA	Territorial Action Plan for the Prevention of Flood Risk
RD	Royal Decree (Legislation)
RDPH	Public Hydraulic Domain Regulation
SEIASAS	State Societies for Agrarian Infrastructures
STREP	Specific Targeted Research Projects

UNEP	United Nations Environment Programme
VPC	Vinyl Polychloride
WDM	Water Demand Management
WFD	Water Framework Directive
WSSD	World Summit on Sustainable Development
WWF	Worldwide Fund for Nature

1. Introduction

The objective of this report is to inform about the water situation, evolution and the consequences in Spain, as well as to demonstrate that progress is possible and essential in terms of efficiency and to contribute to the reflection on the problem of water demand management related to territorial specificities.

The Spanish Ministry of Environment is in charge of proposing and developing the Government's policy in nature conservation, sustainable development, environmental impact and flora assessment, fauna, habitats and natural systems, as well as collaborating with the regional governments for the development of actions related to the management and protection of marine and inland public areas. The policy development on water and coasts, environment and direct management of the public water domain corresponds to this Ministry.

Spain has actively participated, as a EU member, in numerous initiatives and environmental international Fora, to defend and promote environmentally friendly and sustainable water management practices. It has participated through different means in the EU Water Initiative to contribute to the achievement of Millennium Development Goals (MDGs) and WSSD targets for drinking water and sanitation.

Within the Iberian Peninsula, Spain has a strategic geographic position since, while being in South-western Europe has a great proximity to Northern Africa and is surrounded by the Mediterranean Sea and the Atlantic Ocean. This geographical unique location has made of the country a crossing path and establishment point for numerous cultures and peoples. With a variety of climates and landscapes, the Spanish Mediterranean area benefits from mild winters and hot summers, making the land profitable for a variety of crops.

With around 110 Km^3 of water resources in Spain, only around 45 are available resources. There are more than 1000 large dams with 56 Km^3 of regulation capacity and 35 Km^3 of demand, from which 24 is for agricultural use, 4,5 for urban supply, 1,5 for industrial uses and 5,0 for cooling energy plants. The average precipitation is 690mm, reaching almost 2200 mm in Northwestern areas, and only 120mm in Southeastern areas. These figures, which reflect the average of the last 50 years, have been reduced as for precipitation and available resources in the last 10 years, due to the long period of drought registered in Spain.

Spanish rivers present a great irregularity as well, and its population tends to concentrate in coastal areas, and urban ones as Madrid and areas bordering the Ebro and Guadalquivir Rivers.

There are eleven demarcations (eight of them shared with other countries), which depend on the Ministry of Environment, and seven intra-community (within one Autonomous Community) basins depending on the Regional government in which they lie.

Reform of the River Basin Organisations

The structure and functioning of river basin organisations will be updated in brief, while regional governments (Autonomous Communities) are already being incorporated into the decision making process and the public control of water, and the participation of all citizens in water management is jointly promoted. The hydrological planning departments will be prioritised (to cope with the Water Framework Directive objectives), and will be in charge of developing and supervising river basin management plans with follow ups and controls, promoting public participation in their elaboration. Personnel and technicians backgrounds will be diversified in order to obtain a plural and holistic view of water management problems.

Water Act Reform Process

The Spanish Water Law is currently undergoing a full reform. The Spanish Ministry of Environment identified deficiencies in the water management process in different sectors (groundwater, planning process, dam security, and sewage and wastewater treatment among others) and consequent negative effects in the national water practices that needed to be addressed through legal tools. Through the National Water Council special Working Groups were created to assess water management practices, consult the largest possible amount of stakeholders in order to propose measures that will allow improving water management taking into account the will, opinion and studies of all groups involved: users, water professionals and technicians, environmental associations, administrations etc., and so to achieve a policy proposal with a broad social base.

The final deliverables of the Working groups have been formal decrees proposals obtained from a bottom-up strategy (from stakeholders to the central Administration) and are currently being approved, to incorporate several changes in the Water Law that have to go through the State's Parliament approval.

2. Major changes in the water situation in the country.

In some geographic areas in Spain, demand is greater than supply. Most of the Southeastern areas present water scarcity and droughts, which are more likely to increase due to climate change. This fact together with the necessity to maintain our life quality standards and to face a not at all optimistic future, in terms of climatic aspects, is promoting change in our global view of water management and related social scopes (political, social, technical and environmental).

The development and enforcement of the Hydrological National Plan of 2001 caused a series of severe confrontations, questioning its outcomes and resulting in a political and social division, which is still noticeable at present. The lack of direct public participation and social implication in the decision-making caused the strongest criticism. These problems and the enforcement of the WFD have underlined the importance of the hydrographical basin as a management unit, which considers all the implied parties and is translating into the reform of the Law previously mentioned.

Water unbalances and shortages derived from droughts are still causing social conflicts, which are trying to be faced through more water works in the most affected areas (Programme AGUA).

2.1 Resources, their mobilisation and non-conventional water production

According to FAO, water resources from 1978 until now and estimation until 2012 are as follows:

Spain	1978-1982	1983-1987	1988-1992	1993-1997	1998-2002	2003-2007	2008-2012	Mean	Std. Dev
Average precipitation in depth (mm/yr)	636	636	636	636	636	636	636	636	0
Groundwater: produced internally (10^9 m3/yr)	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	0
Surface water: produced internally (10^9 m3/yr)	109.5	109.5	109.5	109.5	109.5	109.5	109.5	109.5	0
Overlap: surface and groundwater (10^9 m3/yr)	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	0
Water resources: total internal renewable (10^9 m3/yr)	111.2	111.2	111.2	111.2	111.2	111.2	111.2	111.2	0
Water resources: total internal per capita (m3/inhab/yr)	2 926	2 865	2 811	2 762	2 714	2 700		2 796	88.33
Water resources: total external (actual) (10^9 m3/yr)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0
Water resources: total renewable (actual) (10^9 m3/yr)	111.5	111.5	111.5	111.5	111.5	111.5	111.5	111.5	0
Water resources: total renewable per capita (actual) (m3/inhab/yr)	2 934	2 873	2 819	2 769	2 721	2 707		2 804	88.57
Water resources: total exploitable (10^9 m3/yr)	46.3	46.3	46.3	46.3	46.3	46.3	46.3	46.3	0

Source: FAO

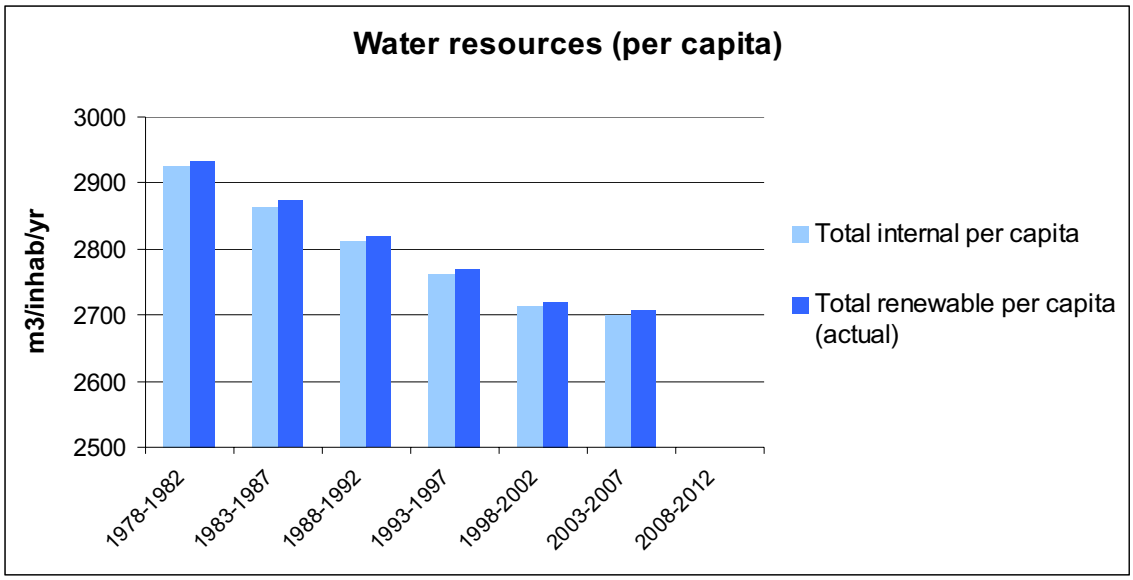
Spain	1978-1982	1983-1987	1988-1992	1993-1997	1998-2002	2003-2005	Mean
Average precipitation in depth (mm/yr)	583	631	664	703	655	625	643

Source: INE, HISPASAT

Some of the volumes presented on the table are constant throughout time since their calculation does not take into account the climatological variable. Rainfall in Spain is characterised for its space and time variability. As for space variability, if the average yearly is about 700mm/year,

1600mm fall in the North and less than 300mm in larger areas of the South East and the Canary Islands. This conditions different regional vulnerability degrees to droughts. As for time variability, there is an alternation of dry and wet periods between1978-1995 and 1998-2005.

As it can be observed in the following graph water resources decrease, both the total internal per capita and the total renewable per capita.



Spanish rivers gather about 106 000 hm^3 a year, of which only 9 000 could be used if there were no dams. It is obvious that the proportion of water that can be used naturally, without storage marshes, is small, it is not even 10%. This happens because Spanish rivers have great flow differences between stations: their regime is torrential, and this makes their exploitation very difficult. In France, for example, 40% of the water in rivers is usable with no need to build large dams.

In order to have sufficient water marshes have been built to store the water during the rain season, to regulate the river flow to avoid floods and they may be used to obtain hydroelectric energy. At the moment, dam capacity is higher than 50000 hm^3/year, which gives a water availability of about 2707 m^3/year per person.

Focusing on the regional scope of the Valencian Community, it is clearly necessary to make a previous balance of the region's natural contributions. This area presents a regime of pluviometric contributions of 580 l/m^2, typical in the Mediterranean climate, and irregular, which has been decreasing 14% in the last 50 years. The main natural surface contributions are through the rivers Júcar, Turia, Mijares and Serpis among others. These are regulated by a network of dams with a capacity of 2205 Hm^3 within the region, and of 1,114 Hm^3 outside the region, but belonging to the same river basin, indicator WAT_C01 is almost 100% since all the river beds with a continuous flow, are regulated by dams; this indicator does not apply for dry river beds and watercourses with flow only in punctual flood situations. The total capacity of the dams fails to reach the maximum, currently of 16,77 % and with a decreasing average since 1980 of 11%. Water volume in dams is in some cases canalised towards other regions with a chronic deficit in water contributions within the same community, as in the case of the Jucar-Vilanopo channel, or the Júcar-Turia. All these, plus the numerous wells for agriculture, human and industrial supply are the conventional water contributions of the region.

The Valencian Community has currently a population of 4.692.449 inhabitants according to the 2005 census, and in 1980 there were 3.646.778. This is equivalent to a rate of growth of 1,14% per year and towards 2015 a similar rate is expected, besides a floating population due to tourism of 700,000 people. In average climatic conditions, not subject to droughts or to humid periods, water resources of the Valencian Community would be some 3200 Hm^3/year. With this natural supply and leaving the seasonal population due to tourism on one side, the Valencian territory would have a supply of 770 m^3/inhabitatnt, far below the 2707m^3/inhabitant of the Spanish average and the 3100 m^3/inhabitant of the European Union.

Over the last years, seawater desolation has been acquiring relevance as means of water supply favoured by technological improvements, cost reduction and the promotion of its installation as much by the public sector as by the private. At the moment, within the Valencian Community there is a total of 5 sea water desalination plants producing an annual total of 19 Hm^3, and 8 new plants are in construction project.

Wastewater reuse plays a fundamental role, as currently, there are a total of 409 facilities, which have purified 509 Hm^3 as opposed to 30% in 1980. 90% of the use of this water is destined to agriculture.

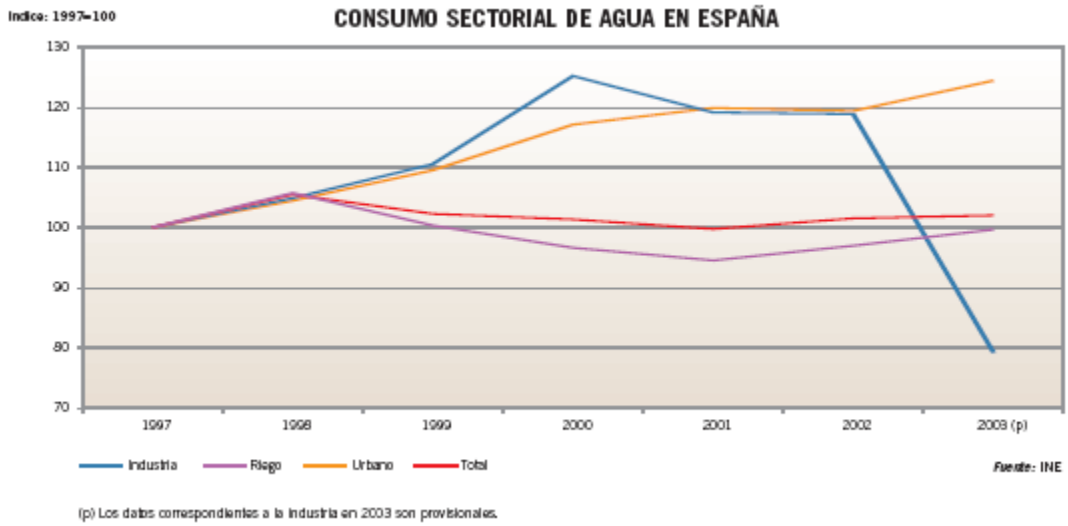
On this summary table indicators are shown, compared to national data.

Year: 2005	Spain	Comunidad Valenciana
Average precipitation in depth (mm/yr)	636	580
Water resources: total internal renewable (Km3/yr)	111.2	3,2
Water resources: total renewable per capita (m3/inhab/yr)	2 707	770
Production of non-conventional water (km3/year)	0,12	0,019
Waster water reused	6,4	0,509

Source: Self elaboration

2.2 Water demand and the pressure on resources

Water demand evolution during the past years reflects the economic tendency of many developed countries, but with the Spanish climatological characteristics. Water consumption in agriculture is stable in general, with oscillations linked to the results of every hydrological year. Consumption in urban supply increases and there is a remarkable reduction in industrial consumption.



The consumed water proportion in the Valencian Community is 11.4% of the national total, and the demands of the different sectors are:

- Agrarian demands: 2641 Hm^3 annual
- Urban Demands: 556 Hm^3 annual
- Industrial Demands: 107 Hm^3 annual
- Tourist Demands: 150 Hm^3 annual

This makes a total of 3454 Hm^3 (WAT_P02 = 3,454 KM^3), which translates into a very fragile equilibrium between demand and supply, even under normal natural conditions, which does not happen currently and, according to forecasts, will not be happening in the near future. This scarcity confronts greatly transcendent demands, both social and economical, in which water plays a determining role. It is necessary to state that agricultural, industrial and urban-tourist activities generate more than one and a half million in employment and a gross added value of almost 6000 million euros.

The insufficiency of superficial water resources has caused the increasing groundwater use. At the present time, it can be estimated that around 88% of the municipalities and 55% of the population satisfy their domestic water needs from the continuous exploitation of aquifers, and the same happens with 55% of the irrigated surface. These uses, together with others such as the industrial, would generate groundwater consumption close to 1500 Hm^3 per year, which could go near 2000 Hm^3 in drought periods. With these data we can calculate indicator WAT_C03 at 47%. Another worrying indicator is WAT_P03 that measures the proportion between the consumed water and the natural contributions of the system, which in the case of the Valencian Community would be almost 115%.

Regarding emissions of Oxygen Biological Demand for 5 days (BDO5), considering the volume extracted by water purifiers and that its purification effectiveness is 92% according to data provided by the EPER (Polluting Sources State Organisation) in 2005 we calculated an indicator WAT_C03 of 13.124.000 kg.

On this summary table, indicators are shown, compared to national data.

Year: 2005	Spain	Comunidad Valenciana
Total Demand (Km3/year)	22,64	3,454
Agriculture demand index	77%	80%
Urban demand index	18%	15%
Industrial demand index	5%	5%
Exploitation index of renewable natural resources	20,3%	115%
Non-sustainable water production index	25%	47%
Emissions of organic water pollutants (Kg/day)		35956

Source: Self elaboration

2.3 Degradations and threats affecting the resources, installations, the ecosystems and the populations

The two greatest threats on water resources are, undoubtedly, effluent contamination and aquifer overexploitation. The main sector with the highest pollution load for water resources is agriculture, especially in groundwater, as, regarding surface water, there has been an improvement in quality. 62% of the total lengths of rivers present a good physico-chemical quality in 2002 as opposed to 52% in 1995. As for reservoirs' water, as Spain has few natural lakes, there is a high eutrophication, especially in Catalonia, Galicia and the Duero and Tajo Basins.

Non-sustainable exploitation of natural water resources results in degradation of the ecosystems that depend on the presence of water bodies (rivers, lakes, wetlands, aquifers) and occurs specially in places where water quantity may be critical for the survival of the species and the ecological processes, like, for instance, in the Ruidera Lagoons or the Albufera Lake in Valencia.

Groundwater pollution, especially nitrates, is a generalised problem in the country due mainly to agricultural contamination, urban pollution and the high degree of salination, particularly in coastal aquifers, negatively influence groundwater quality. 13% of the aquifers present proportions larger than 50 mg/l (which is the limit established by the water quality regulations). Nevertheless, regarding coastal water quality Spain has been very successful in the implementation of the Leisure Coastal Water Directive of the EU. 98.3% of these areas meet the requirements.

Since 1980 until now the rural areas abandonment has been constant in favour of large population areas. This has created a relocation of the urban demand pressuring local natural resources, and having to look for other supply sources of lower quality like aquifers and desalination. On the diagnose on the water resources situation carried out in the White Water Book in Spain, the existing scarcity risk on exploitation systems integrating the different

hydrogeological units was examined, reaching the conclusion that the Segura basin, the Júcar basin, the South coast, and the internal regions of Catalonia are in scarcity risk.
Again, the following box will focus on the Valencian Community:

One of the great threats for water resources apart from the already mentioned climate change and the progress towards a more arid climate, is aquifer overexploitation. The generalisation of excessive pumping has led to an overexploitation regime of many aquifers, with evident reductions of the piezometric levels and salination of the stored resources, either by marine intrusion or by invasion of saline triasic strata. On the other hand, in places with permeable surfaces where an agricultural or cattle activity is intensive, it is frequent to find processes of diffuse contamination by nitrates, chlorides, sulphates, heavy metals etc. that surpass the limits established by several communitarian directives.

In general terms and for indicator WAT_C08 on water quality, the following table should be analysed.

	Spain	Comunidad Valenciana
Before Treatment		
Biochemical Oxygen Demand (DBO5)	311,6	274,7
Suspension solids	298,9	262,0
Total Nitrogen	41,7	45,0
Total Phosphorous	12,5	7,4
Metals	0,7	0,0
After treatment		
Biochemical Oxygen Demand (DBO5)	24,6	21,2
Suspension solids	22,2	17,4
Total Nitrogen	19,2	21,4
Total Phosphorous	5,5	2,7
Metals	0,1	0,0

Units in milligram/ litre

Source: Self elaboration

A tendency to the improvement of water quality after a depuration process is evident.

It is significant that "The White book of Groundwater" admitted the extraction of a volume higher than 120 hm^3 of non-renewable reserves for Júcar River Basin Authority and of 700 hm^3 in the national scope. This is why 15 hydrogeological units have been declared overexploited, two of which are within the Valencian region and a great part of coastal aquifers present marine intrusion and nitrates excess. This groundwater overexploitation has also reduced the flow of main rivers like Júcar and Turia in their middle and low basin in order to attend to new irrigation.

The repercussion of these facts on wetlands for which the index WAT_C06 = 44,862 Has is

available, is the increasing salinity of these protected zones with its later repercussions to the flora and fauna of native and allochthonous species as it can be observed in the route diversions of migratory species.

To the above information, it is necessary to add a very important factor for aquifer recharge, and this is the index of forest mass that has been continuously devastated due to fires in the last 30 years to 57% of forest surface, increasing the run-off of rainfall.

Other great threats in the coastal zones are the massive urbanisation, which has been calculated to multiply by almost the urbanised surface in the last ten years, with the consequent water demand that this entails and the settlement in flood risk zones. 10,52% of the population, about 400,000 people, live in these areas according to sources of PATRICOVA (Territorial Action Plan with sectorial character on Flood Risk Prevention in the Valencian Community) of the GVA. These large urbanised areas are impermeable as well which means they do not recharge properly from aquifers.

Regarding sedimentation index in dams, it is important to say that this factor is not relevant for recently constructed dams in the Valencian region (less than 40 years) as these have bottom water-drainages that avoid the sediment formation on the base. In regards to old constructed dams, there are several dredging projects and environmental improvements applied to avoid sedimentation, which is why the index is lower WAT_C02 10%.

After evaluating all these threats to the environment, we can classify them as follows, according to their importance:

1º Aquifer overexploitation and its consequences
2º Water resources contamination
3º Massive urbanisation
4º Dam sedimentation

2.4 Access to drinking water and to sanitation and collection and treatment of waste water

In Spain practically all population nuclei have access to drinking water, but not all of them have a wastewater treatment centre. With an indicator WATC_10= 54% in waste water treatment, there are still numerous population nuclei that do not meet waste water treatment 271/91, but the effort to adapt to this legislation from the administration is remarkable, in 2005, the construction of 56 water treatment centres was offered for 1075 million Euros.

Many of the country's large industries have a water treatment system in their premises, this is not the case in the small and medium industries as the money subsidised by the different competences is not substantial and this water is treated in public facilities. One of the objectives of the Public Health Ministry since the year 2000, has been access to drinking water supply for all the population. In Communities with more than 500 inhabitants, 87.4% of the population is

connected to public water supply systems. As for supplied drinking water quality, the population's agreement rate is 98% for the Communities with more than 500 inhabitants, but 70% in the case of smaller Communities. The non-compliance with this quality is associated to free residual chlorine and specific pesticides, which occurs occasionally except for in eastern coastal areas. Despite this, the number of hydrological illnesses has decreased, although, in supply systems, the installing of more periodical revisions and more control parameters should be considered

Population full access to drinking water within the Valencian Community is practically met except for some concrete cases of supply due to drought seasons. We can give an indicator WAT_P04 of 99% since this parameter has a basis of a minimum allowance of 20 l/hab. and for this case , the average close to 200 l/hab.

The wastewater sanitation network also reaches all of the urban nuclei as urban management plans impose this requirement, thus leaving an indicator WAT_P05 of 99%

As for waste water treatment, as it has already been mentioned, the volume is 509 Hm^3 through the 409 existing facilities, obtaining with water emission data provided by industries and towns (813 Hm^3) an index WAT_C10 of 62,6% in 2005 and 18,7% in 1980. These data comply with the Communitarian Directive 271/91 on depuration. Due to the implanted depuration canon in the domestic water bill part of the foreseen activities within the sanitation plan have been financed.

	Spain	Comunidad Valenciana
Proportion of the population having a durable access to an improved water source	99%	99%
Proportion of the population having access to an improved sanitation system	99%	99%
Share of collected and treated wastewater by the public sewage system	54%	63%

(Sources: INE, Consellería de Territorio y Vivienda, Patricova, Ministry of Environment, CEDEX, EPER)

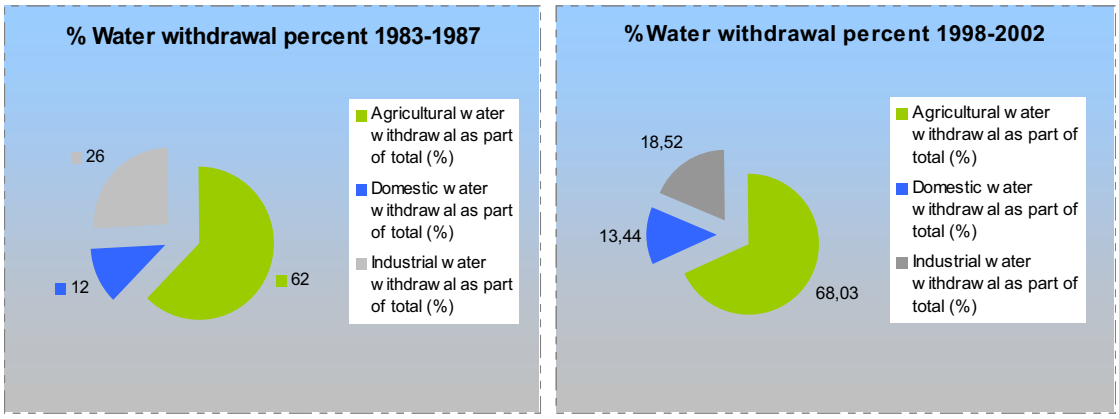
3. Improve efficiency in the sectors of activity using the water demand management policies

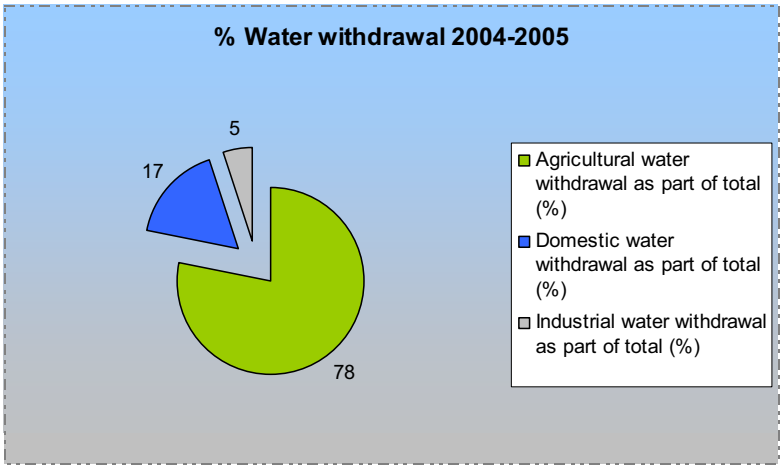
3. 1 Data and indicators

National data of water uses per sector:

Spain	Water resources: total exploitable (10^9 m3/yr)	Agricultural water withdrawal (10^9 m3/yr)	Domestic water withdrawal (10^9 m3/yr)	Industrial water withdrawal (10^9 m3/yr)	Total water withdrawal (summed by sector) (10^9 m3/yr)	Agricultural water withdrawal as part of total (%)	Domestic water withdrawal as part of total (%)	Industrial water withdrawal as part of total (%)	Total water withdrawal: per capita (m3/inhab/yr)	Desalinated water produced (10^9 m3/yr)
1983-1987	46.3	28.43	5.502	11.92	45.85	62	12	26	1 181	
1988-1992	46.3									0.1002
1998-2002	46.3	24.24	4.79	6.6	35.63	68.03	13.44	18.52	869.5	
Std. Dev	0	2.961	0.5035	3.763	7.227	4.266	1.021	5.287	220.4	

Source: FAO





As it can be observed in this table, demand of water use in agriculture with respect to the total, has followed a tendency to rise from 1983 to 2004, like the domestic use, but the later at a lesser degree; industrial water shows the opposite tendency.

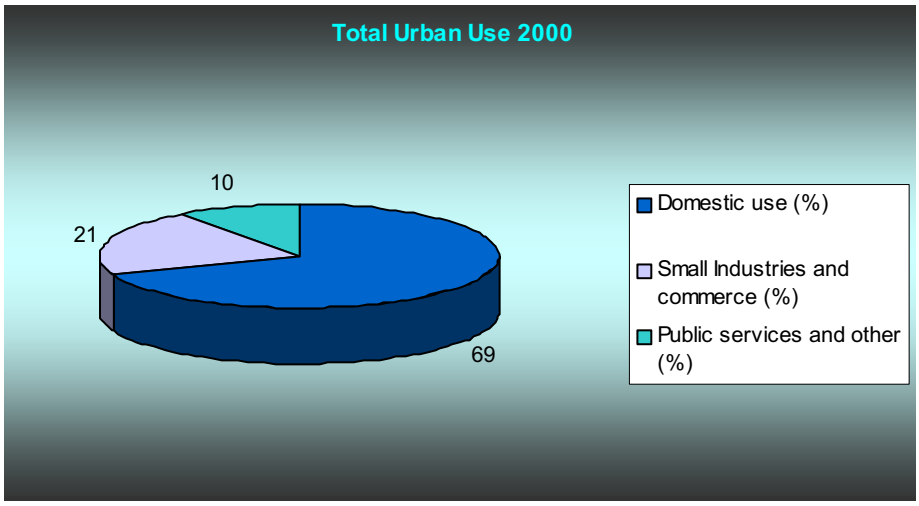
3.1.1. Agriculture and *Water*

The area equipped with irrigated land systems, tends to increase from the period of 1978-1982, this change is not very significant, but it is expected that the tendency for the next years will sensibly raise this increase with the implementation of improvement measures of irrigation systems efficiency.

As for the total crops in Spain, the area occupied by irrigated surfaces in 2002, is almost 20%, having increased around 3% from period 1988 to 1992. Herbaceous crops take 45% of the total consumption; the rest is distributed among fruit, olive and vegetable crops. The used irrigation techniques in proportion are: dripping (27 %), sprinkling (22%) and gravitating (51%), with efficiencies of 0.8, 0.7 and 0.5 respectively, indicator WAT_P01= 6.25

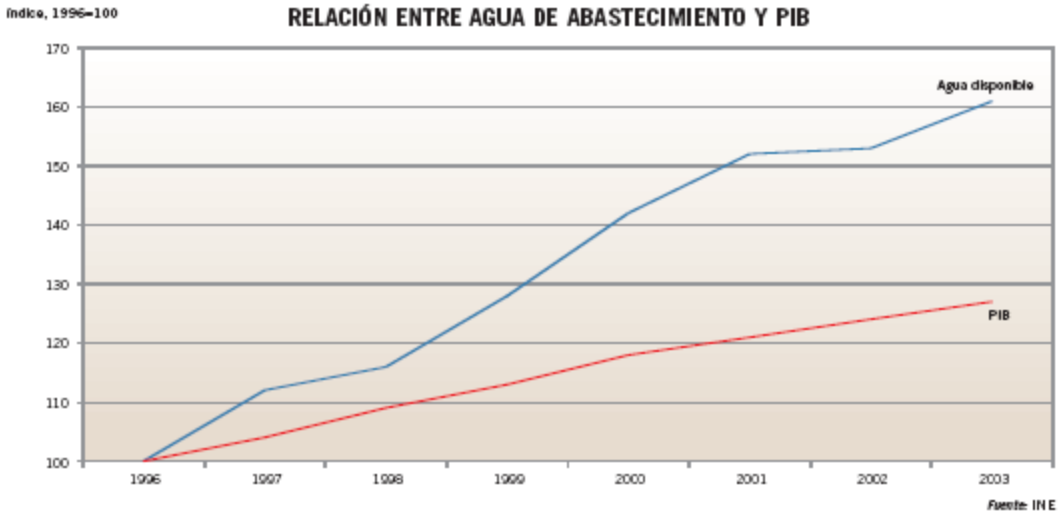
3.1.2. *Water, domestic sector and industry*

The average water urban use per capita has stayed stable since the mid nineties, under 290 litres per day (varying from the 250 in the Canary Islands to the 350 litres in the Júcar River Basin)



Non-registered water lowered from 32% of supply water in 1990 to 25% in 2000. From this non-registered volume of water, water leaks in the supply network have been estimated in 45%. Other factors intervene as well, like mistakes in water meters (18%) and fraud (4%).

In the following graph, evolution of water demand in Spain is reflected, as well as GDP:



It shows that the differences between the volume of water available and the GDP are higher and higher, although there seems to be a stabilisation in the last few years. If this evolution followed the same guidelines in the next years, this would mean that water saving and efficiency of urban water consumption are reachable.

Below, the focus of these same data for the Valencian Community will be presented, chosen because of its present pressure and urban growth and because of its long tradition in agriculture, an analysis of the indicators evolution for the different sectors will be developed.

3.1.2. Water for agriculture Valencian Community

The demand of water for agriculture is the most important of the sectors since it means an index WAT_P02 for agriculture of 80%. Cultivated surface cultivated in the Valencian Community declared irrigated zones ascend to 342,156 Has of very diverse crop types, specially citrus fruits and vineyards, which create a demand of 2.641 Km^3 per year and generates an agrarian income of 1715.5 million euros. From this entire surface 122,000 Ha have localised irrigation systems, obtaining an indicator WAT_C04= 35.7%.

Irrigation efficiency for agriculture depends on the method used for irrigating. For traditional irrigations, where there is a high waste, efficiency is of 0,5 and for localised irrigations it is of 0,8 giving us an efficiency of WAT_P01=0.61 very similar to the average national. This slight difference, as opposed to the vast difference in Surface equipped with modern irrigation systems, is due to the fact that almost the whole modern irrigation system in the Valencian Community is dripping, while sprinkling is barely significant for the efficiency index.

	Spain	Comunidad Valenciana
Water demand for irrigated agriculture	77%	80%
Efficiency index of irrigation water used (1=total efficiency)	0.62	0.61
Surface equipped with modern irrigation systems	49%	35.7%

3.1.3. Water for domestic and industrial uses. Valencian Community.

The water demand for domestic uses and tourism is 0,706 Km^3. This supposes an allowance of about 77m^3 per person and year (including an average of 700,000 tourists with a mean consumption of a month of stay). Index WAT_P02 for this sector is of 15%. The production costs of the distributed water are about 340 million euros and for depuration about 73 million euros. This gives us a cost per inhabitant of 88 euros per year, and the price that the average amount urban consumers pay in their water bill is 120 euros.

Water demand for industrial uses is relatively low, with an index of WAT_P02 5%.

Evaluating all three sectors, it can be highlighted the water losses in distribution networks, which entail 18.7% for Spain and 28.4% for the Valencian Community, the region with the highest loss index in the country.

Source INE 2003

3.2 Retrospective analysis

The enormous change that has taken place in all the social, political and technical aspects since 1980, in the water situation mainly due to the aggravating shortage in the resources, the population increase and life standard, is obvious.

The agricultural sector, due to the intensive exploitation of water resources has seen huge changes: change of soil uses, increase in the water cost, subventions for changes in irrigation systems, tensions between regions due to the allochthonous rivers and the current systematic abandonment of the irrigated zones because of the low prices paid in the sector. The incentives at the time of improving irrigation infrastructures came in first instance with the Royal Decree 678/93 that applies to rationalisation and improvement works of the networks of irrigation water distribution in irrigated areas older than 25 years, whose objective was to save water, being excluded irrigable area extension works. 40% of these works were subsidised. One of the common measures adopted to improve agricultural management, is to stimulate the adoption of new techniques through granting subventions to improve gravity irrigation, and facilities of pressurised irrigation, reaching subventions of 50% for farmers.

Between 1980 and 1990 the new licenses were also multiplied to carry out pumping for different supply uses, industrial but mostly for agriculture, therefore overexploiting aquifers. Simultaneously, new Irrigators Societies or conversions of old Irrigators Communities into societies or cooperatives were created.

The following table shows evolution of irrigation land in Spain, where the increase in ligneous crops can be appreciated, but is slightly lower than herbaceous crops, which fairly decrease in their surface, keeping global demand more or less stable, indicating evolution towards crop transformation.

IRRIGATION	1989	1991	1993	1995	1997	1999	2001	2003
Herbaceous crops	2.253.00	2.244.00	2.198.00	2.158.80	2.349.40	2.287.20	2.215.80	2.167.30
Ligneous crops	714.2	748.1	748.6	809	885.1	960.7	1.054.60	1.117.60

Source INE

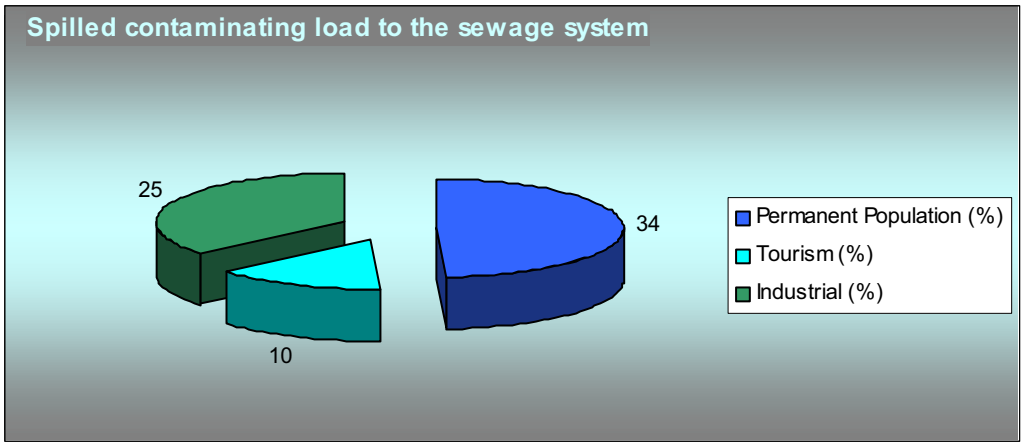
In urban use the transport networks and wastewater collectors have been remarkably improved, until a few years ago existing irrigation ditches were still used in several towns to evacuate wastewater, with all the environmental problems that this entailed. The faecal waters were also spilled directly to the channels reaching extreme cases like the systematic contamination that underwent the fertile lowland of the Segura River. Currently, as indicated by the R.D.L.1/2001 of 20 July, by which the adapted text of the Water Law (TRLA) and art. 245 of the Public Hydraulic Domain Regulation (RDPH) are approved, modified by R.D. 606/2003, they are spills the ones made directly or indirectly to continental waters, as well as the rest of the Public Hydraulic Domain (DPH), whatever the used technical procedure is.

In order to spill to the river, on the basis of this legislation an authorisation is required to spill to the river water and residual products susceptible to contaminate continental water or any other element of the DPH. This authorisation has as objective the attainment of established environmental objectives, and to obtain it, the improvements in depuration for the spill will be considered, with the intention of obtaining improvements in the environmental quality, respecting the fixed emission limits of.

The emission limits are classified based on quality indicators or parameters, thus having the following classification: fluvial section with normal spill, vulnerable spill (to nitrogen contamination) and sensible spill (to nitrogen and phosphorus contamination).

The treated effluent types come from industrial and urban water (including cattle activities).

The total pollution load represents almost 70 million of p.e. which are distributed as follows:



Most of the urban population is connected to sewage networks, with about 6 million people without a connection. Networks are combined and carry both waste and rain water. Currently 46 million p.e. are connected to the public wastewater treatment network, this figure corresponds to 66% of the pollution load, which flows in the sewage systems.

Direct industrial spills control has been reinforced since the nineties, in 1993 only 17% of the industrial spills license holders (excluding refrigeration, mining and fish farm sectors) were operating with definitive license. In 2002 the rate increased to 51% (65% in volume terms). The final rate of licenses in wastewater treatment plants increased from 26% to 44% (63% in volume terms) during the same period.

An example of good practices is the case of Saragossa city. In 1997, a project was proposed showing it was possible to solve water scarcity problems by increasing water use efficiency. The results obtained are as follows:

- In 1997 a collective will was born: save 1.000 million litres of water in one year: the final saving equalled 1.176 million litres.
- Introduction of 50% efficiency water use best practices in the city.
- 96 litres is the ratio of domestic consumption per inhabitant and day, the lowest in Spain.
- Instead of the current 80 Hm^3, the City Hall of Saragossa wants to achieve the amount of 65 Hm^3 for the total water consumption of its 650.000 inhabitants.
- 60% of the citizens that were not aware of saving measures has decreased to 28%
- The Plan achieved the collaboration of 150 entities: public institutions, NGOs, enterprises, labour unions etc.
- 69% of educational centres in Saragossa participate in the Educational Programme.
- 65% of the sewage commercial centres, water tap businesses etc., participate in the Plan.
- Sales and price reduction on home water saving kits.
- Edition of the Water Newspaper (Periódico del Agua)
- 100% of participation from garden shops and nursery plant from Saragossa
- Dissemination of an electronic bulletin with information on the project.

The strong urban increase of coastal zones, either for tourism or holiday home for many families of the region, and agricultural zones being located in the same space has made agriculture yield, reaching in some cases levels like in the Gandia and Miramar area which lost between 17% and 25% of their agricultural ground between 1985-2000 and other zones like Campello or Torrevieja which lost up to 50% in the same period. All these new areas are in numerous occasions associated with other facilities as golf courses, up to 21 fields have been constructed in this period (and the same number are in project of construction for the next years), with a surface of 1219 Has and a yearly allowance of 10,000 m^3, much greater than the allowance destined for the crop previously occupying the area (mainly citrus fruits, which don't go over 6000m^3 per year). In order to respond to this great tourist demand both directly (nº of visitors) and indirectly (nº of tourist facilities) the use of groundwater has replaced the use of superficial water or, in the case of Alicante, with the interbasin diversion of the Tajo-Segura.

An example of this, is the situation of the municipality of Calvia (in the Balearic islands) that has obtained an improvement in water resources and life quality of its inhabitants for the attainment of a sustainable development on the strong demographic pressures that the country is undergoing in coastal zones, through Agenda 21, (see appendix).

3.3 Prospective analysis

The tendencies in water consumption in Spain have increased remarkably as far as agriculture is concerned. This sector is the one that requires the highest water consumption, representing almost 77% of the total consumption of the sectors. Around 18% of the total is water requirement for domestic use; this number mainly continues increasing due to the demographic pressure, especially in coastal zones, which has increased water consumption in urban zones, whereas

the consumption in countryside stays stable. The industrial sector represents 5% in the total percentage with respect to the others and is the sector presenting a tendency to decrease.

Agriculture water

Of these consumption tendencies, the most worrying is agriculture, even though the increase of irrigation surfaces has been put on hold, not only for the demanded percentage, but for the implications in the water quality derived from agricultural practices and contaminated problems associated, in addition to the ground effectiveness loss and the salination if these practices are not carried out correctly.

This practice has looked for cost-effectiveness for a while, leaving serious associated problems of environmental nature that decrease the soil where it is based and the quality of the irrigation water. This is the problem why many cultures have abandoned crops, leaving behind deficits in the soil structure and in the infiltrated water quality. In other cases, the irrigation type has been changed, looking for a higher cost-effectiveness, but environmental problems persist.

The great majority of the proposed measures for the solution of water management use in agriculture is centred in the improvement of the water resources management through modernisations of existing infrastructures for traditional irrigations, treated waste water reuse and the rearrangements of the hydraulic infrastructure of the cultivated area and sanitation network. In many cases alternatives of general sanitation and water treatment of the uses demanded by the agricultural and industrial sectors are proposed.

The National Water Quality Plan begins to deal with the water loads of rain episodes, some cities are beginning to equip with tanks for its later treatment in water treatment plants, avoiding therefore the lightening to the river beds and the promotion of performances directed to I+D+i in the field of sanitation and water treatment.

The financing sources for the Plan will come from the AGE, State Societies, CCAAs (Autonomous Communities), Cohesion funds, Spill canon of sanitation and treatment, municipal tariffs for sanitation and treatment, and private financing.

In order to quantify the economic effort of the end water users, data of about 215 euros per inhabitant of equivalent investment is obtained.

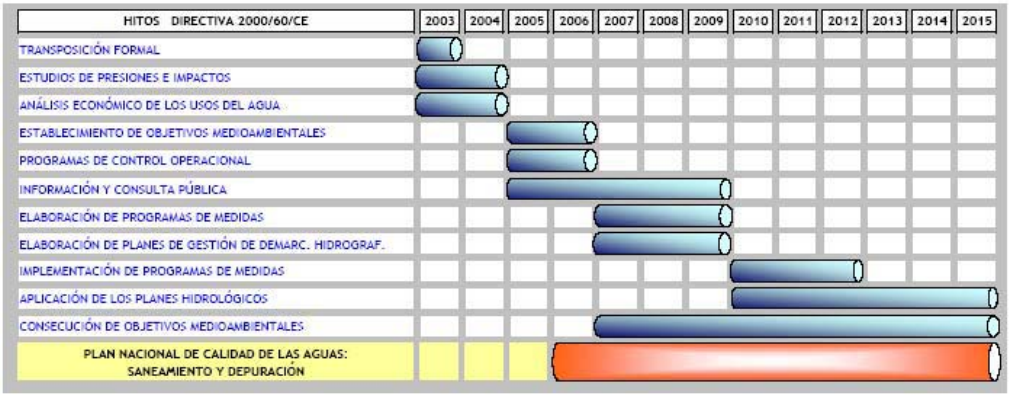
Another excellent data is the investment made for civil work of 50%, which will have an amortisation term of 20 years, whereas the electromechanical part (50% rest) has a term of amortisation of 12 years.

An important aspect of this plan is the social and management measures encouraged by the participation of interested agents, like:

- Promotion and public participation through seminars
- The possibility of statutorily developing the figures existing in the current state legislation (spill companies art. 267 and ss of RD 606/2003) for its possible use for management optimisation by entities in charge of Urban Agglomeration.
- Development of seminars on Urban Agglomeration management figures (mainly the small ones) as an incentive for those of reduced size
- Connection with the activities of the Action programmes of Agenda 21, contemplating the active participation of the local corporations, and sanitation systems and waste water evacuation sustainable management integrated in this Agenda within the thematic area of water management. (Attached is a model of implementation of the Agenda in a Spanish municipality).

An aspect to emphasise of this Quality Plan is the **definition of investment and management indicators** that will allow the follow-up organisation to establish future action guidelines.

The main landmarks of the WFD and proposal of the execution Plan through the Quality Plan are shown below:



Principales Hitos de la Directiva Marco del Agua y propuesta de plazo de ejecución del Plan Nacional Calidad de las Aguas: Saneamiento y Depuración

Source: MMA

Industrial Water

As for industrial water use, the present actions are based on the quality improvement of the emission of polluting agents and the reduction of this use through better techniques, in the context of norm **16/2002 of integrated Prevention and control of Contamination,** which is "to

avoid or, when it is not possible, to reduce and to control the contamination as a whole, through prevention and control systems that avoid their transmission from one environment to another". The principle of this law is to be applied to the whole of the industrial activities shown in annex 1 of the Law. Its term of application differentiates between new facilities (the ones created after the enforcement of the law), and the already existing ones, for which it establishes a period of adaptation until the 30 of October 2007.

This norm introduces the figure of a single permission, Integrated Environmental Authorisation (AAI), integrating and/or coordinating existing procedures and authorisations, for which the total administrative coordination of the organisations implied in its concession is essential and the encouragement of a dialogue and exchange of information between the industrial administrations and sectors, to establish voluntary plans of performance and agreements that allow to reach the objectives and terms fixed by the law.

As far as the direct repercussions for the companies, we can emphasise:

- The obligation to be aware of the BATs defined or considered for its sector.
- The simplification of the administrative proceedings.
- Through the EPER Inventory and other mechanisms of information the promotion of the informative transparency of the industrial complexes towards the public and other interested parts.

This figure agglutinates and replaces the set of existing environmental authorisations until now, and an environmental condition is established for the operation of industrial complexes that develop activities included in their scope of application. This authorisation is granted previously to other authorisations or indispensable substantive licenses, like regulated by Law 21/1992 of Industry and the Decree 2414/1961 that the municipal license of classified activities regulates, maintaining in any case its binding character with the environmental condition of activities.

In article 9 of Director IPPC 96/61 the obligation to have a permission that contains limit emission values based on the Best Available Techniques (BATs) for all the industrial enumerated in Annex I of Directive is stated.

- *Better,* the most effective to reach a high level of protection of the environment as a whole.
- *Available*, applicable in economically and technically viable conditions
- *Technical*, the technology used along with the form in which the installation is designed, constructed, maintained, exploited and paralysed.

The BATs applicable to the different industrial sectors are gathered at European level in BREF Documents and at national level in BATs Guide in Spain and certain Guides of BATs autonomic level.
Currently there are the following guides available:

Guides of the Best Techniques Available in Spain, per Sectors (MMA)
BAT Guide in Spain for aviculture meat sector
BAT Guide in Spain for the laying aviculture sector
BAT Guide in Spain for the porcine sector
BAT Guide in Spain for the sea products sector
BAT Guide in Spain for the DCE, MVC and VPC sector
BAT Guide in Spain for chicken and hen transformed slaughterhouse sector
FINAL DRAFT BAT GUIDE ORGANIC FINE CHEMISTRY
FINAL DRAFT BAT GUIDE GLASS
BAT Guide in Spain Transformed Vegetables
BAT Guide in Spain Taned Sector
BAT Guide in Spain Cement Sector
BAT Guide in Spain Sugar Sector
BAT Guide in Spain Meat Sector
BAT Guide in Spain Brewing Sector
BAT Guide in Spain Dairy Sector
BAT Guide in Spain Refine Sector
BAT Guide in Spain Textile Sector

Also, it is important to mention that treatments like the bioreactors of membranes for the recycling of used industrial waters are being carried out, as these eliminate approximately 99% of the chemical and biological polluting load, which would make this water available for reutilisation.

On the other hand, there is a canon for any type of spill to the Public Domain, the price of this canon depends on the spilled volume of water to the DPH, the characteristics of the spill, environmental quality and degree of contamination of the average receiver. At the moment a first draft of a Law is being elaborated in which the payment of an extra amount if these canons are breached, is anticipated, as well as for a higher consumption than stipulated for industrial activities and domestic use, as preventive measure for wasting water.

Domestic Water

For the case of the water uses reduction of the domestic sector, it encourages fundamentally the awareness campaigns of the population through the media, as well as the mobilisation of the qualified personnel to less economically and culturally developed areas to make them aware of the importance of their acts in the valuable natural resource that is water.

An example of awareness in the domestic sector is the campaign made by the Autonomous Community of Castilla La Mancha "Each drop counts", in which they propose a series of measures very easy and reasonable to carry out by the population:

Keep the tap off while you clean your teeth or shave
Do not turn the washing machine or dishwasher on if they are not full
Choose showers instead of baths
Places a bottle within the cistern to reduce its capacity
Don't use the hose as a broom
If you have leaks in taps or pipes, mend them as soon as possible

A new example as for management is proposed by the Waste Water Treatment and Sanitation Plan, performances have been carried out to solve the problem of the waste water spills of the urban nuclei and to obtain a substantial improvement of the water quality, which is later spilled to the natural spaces that conform the territory of the Autonomous Community. The important tool of management and planning of this Autonomic Administration in the matter of water, the Public Water Organisation of Castilla La Mancha, is complementing this Plan. The Plan of investments being developed by the mentioned Organisation has predicted the investment of more than 420 million euros in the construction of 367 water treatment plants for 412 municipalities. With these projects, in 2008 98% of the population of Castilla La Mancha will be able to obtain a suitable treatment of their residual waters and to fulfil the criteria included in the European Regulation (Directive 91/127/EEC) and in the National Plan for Sanitation and Treatment. 2008 has been proposed as a horizon so that all the municipalities of the Region with a population higher than 2,000 inhabitants have a suitable treatment of their residual waters. From 1984, Castilla La Mancha has invested to 339.8 million euros (56,500 million pesetas) in sanitation and treatment activities.

The Agreement of 14 of March of 2005, reached between the President of Castilla La Mancha and the Government of Spain has managed to guarantee by law the commitment to respect the Hydrological Basin Plan, to suppress works of high environmental impact, to undertake diverse essential hydraulic infrastructures for the Castilian-Manchegos and to start up the necessary actions to protect our rivers and wetlands.

Complementary to the performances anticipated in the Agreement of 14 of March, whose investment in water issues water exceeds 2,000 million euros, the Water Supply Plan in Castilla La Mancha is a reality in its operation and an example of good planning that focuses on the demands of the municipalities and "mancommunities" to ensure supply to all urban centres, in sufficient quantity and quality, promoting an efficient and rational use of water compatible with the protection of the environment. In this sense, and either through the mentioned Agreement or through direct Autonomous Community Council, infrastructures to allow the redistribution and diversification of the available supply sources are being promoted. In parallel, technical and management instruments that allow a better use and water saving are being developed, like the creation of joint systems which will guarantee and give the highest stability to the supply using superficial resources, or as the renovation of the municipal networks of provision through a

Framework Agreement subscribed with each one of the five Provincial Delegations and for a global amount of 50 million euros for the period 2005-2007.

Castilla La Mancha has invested, from 1984 to 2005, more than 360 million euros (60,000 million pesetas) to assure the water supply to the municipalities. Two clear examples that the water demands in Castilla La Mancha are being addressed are the beginning of works to supply with resources from Tajo the LLanura Manchega, project paralysed from 1995 and that today has begun to be a reality for the direct benefit of 490,000 people, or the impulse given to a project so that 26 municipalities from Cuenca, bordering to theTajo-Segura aqueduct, can be supplied with quality waters which circulate around the infrastructure of the interbasin diversion, solving therefore the restrictions suffered due to the fragility of their supply systems.

It is a fact that Castilla La Mancha advances in water resources management and in the creation of the administrative structure that allows, from the efficiency, to assume the new challenges of the national water policy (the fulfilment of the Water Framework Directive, revision of the river basin plans, the new hydrographic demarcations, quality of waters, hydrological planning, etc.). In this sense, during the year 2006 autonomous organs like the Delegated Water Commission and the Regional Council of the Water, have started operation, two organs that work in coordination to defend the demands of the population.

At national level, other lines of performance oriented to the sustainability and management of fluvial spaces through the denominated "Agenda 21" exist (integrating tool towards the sustainable development), towards the support for the integral management of the fluvial spaces (EFLUS Cooperation Project) or towards the importance of the social and voluntary participation in the management of the fluvial spaces (Project Rio).

It is expected that with the irrigation improvement and consolidation works, as well as with the urban supply and sanitation, loses in water transportation and distribution will decrease, providing a more efficient use (an estimated 80%) thus reducing water demand in the sectors. Despite all this, social awareness and good practices play an important role in the agricultural and industrial sector.

4. Towards integrated policies for water resource and demand management. Take into account the environmental objectives, integrate WDM in water policies

The Environmental Action Programmes have politically oriented the normative and administrative activity of the European Community and the member countries in this matter. In itself, the fight against contamination of fresh water occupies an outstanding place, even though the quality objectives for the aquatic environment are more and more confirmed in the quantitative aspects and rational utilisation of the resource. This is probably the reason why, even though water resources are present in the Community -except for seasonal or regional problems – the utilisation is becoming more expensive and one might even predict a future of shortage which may endanger supply and hydro dependent economical activities like industry, agriculture, tourism and thermoelectricity, who are the most contaminating.

The Fifth Environmental Action Plan "Towards Sustainable development" set the objectives until the year 2000:

- To prevent groundwater and superficial water resources particularly preventing contamination from their origin.
- Rehabilitate natural groundwater and superficial water to ensure an adequate drinking water supply.
- Balance water demand and supply through a more rational use and management of water resources.

According to the report of the Water Commissariat of Bjerregaard of 1996, the application of this Programme began to prove effective controlling the industrial and urban spills, but it lacked adequate planning for the agrarian contamination and detected the worsening of drinking water availability. On the same year, the Council, the Regions Committee, the Economic and Social Committee and the European Parliament asked for the Commission to present a Framework Directive for the Communitarian Water Policy, since the protection of aquatic ecosystems was left pending.

Keeping to communitarian competence and to the subsidiarity principle, the proposal of the Commission addressed the protection of aquatic ecosystems and water resources, which indirectly means a significant contribution to the rest of factors that compose a sustainable water policy: drinking water supply, provision for the economic activities and attenuation of the adverse effects of floods and droughts.

The Water Framework Directive (Dir. 2000/60/ EEC) specifies in its article 4 the environmental objectives that are to be reached by the Member States and the admitted exceptions. Also it indicates line of action to follow by the member states when putting in practice the programmes

specified in the hydrological plans, as much for superficial water as groundwater and protected areas.

Some of the techniques offered by the Directive already had a long tradition in Spain like the case of an equivalent regulation (hydrological plans, control of spills, structuring in River Basin Authorities...), which is why it can be stated that in that sense the Spanish law has served as a model for the Community. In some aspects, the Spanish regulation goes even further as in the case of the unitary management of the river basins through the River Basin Authorities or the submission to concession of the privative uses. The Water Framework Directive raises a hydraulic but demanding policy towards the environmental subjects, which is why planning, Cannon of spills and exhaustion of resources, amongst others, are subjects that have recently been addressed by the Spanish Administration, like the matters related to tariff aspects.

The Spanish Hydrological National Plan (PHN) is a Planning legal instrument that regulates and coordinates water management actions. It was approved by Law 20/2001 of 5 of July. This first version of the PHN established, among other measures of performance, interbasin water diversion from North to South river basins. The new alternative to the PHN was introduced by means of Royal Decree 2/2004 and Law 11/2005 of 22 of June, by which Law 20/2001 of 5 of July was modified. It introduced new measures related to demand management, resources reusability and further development of the technologies for obtaining water resources, like desalination.

4.1 Taking into account of environmental objectives in the water policies

4.1.1. Integration of the environmental objectives in the Spanish Water Policy.

Environmental objectives in the Spanish water policy are based on the Water Framework Directive, which fundamentally covers:

- Measures for the protection, improvement and regeneration of groundwater, surface, transition and coastal water.
- Guarantee sufficient ecological flow for the maintenance of aquatic and terrestrial ecosystems.
- Contribute to palliate floods and droughts.
- Protected areas register.

This implies to recognise that for the economic development to be sustainable, planning and management of the water- of the ecosystems in general- must be environmentally solvent and not to consider like the most viable option the strictly utilitarian from an economic point of view.

4.1.2. Environmental deficiencies in the Spanish Water Policy.

The model of integration of environmental objectives in the Spanish Water Policy has been based on the elimination of environmental damages derived from infrastructures for supply and

resources for the urban demand, irrigation supply and the regeneration of overexploited aquifers and the improvement of the water bodies status and their flows.

The environmental objectives in water policy were destined fundamentally "to palliate" effects already inflicted to the environment or to develop the necessary infrastructure for the demand in question, so that the impact on the environment is minimum. Planning in water policy would have to follow an interactive planning model, whose objective consists in constructing more desirable prospects instead of predicting how the future will be.

One of the main environmental deficiencies in the Spanish water policies is a systemic approach that recognised the complexity of relations and functions that suppose "fluvial hydrosystems" constituted by the river bed and all its interactions with the vegetation, forests of gallery, abandoned beds, endorreic lagoons, hyporreic systems and their associated aquatic fauna, integrating these to the concept of river basin as a functional unit.

Also, Spanish water policy was limited to act in extreme situation cases (for instance, droughts) through emergency works that would satisfy the resource's demand in scarcity conditions.

4.1.3. Conservation and integrity of aquatic ecosystems

The definition of the conservation of the IUCN (IUCN/UNEP/WWF, 1991) specifies three objectives:

1. To maintain essential ecological processes and systems that support life
2. Ensure that the use of species and ecosystems is sustainable.
3. To preserve genetic diversity.

Gumbrine (1994) defines it as "the management that integrates scientific and traditional knowledge with the ecological relations, within a complex socio-political and value framework with the primary target of protecting the original ecosystems in the long term".

The ecological and environmental principles, are considered the pillars of environmental sustainability:

- To protect life, protecting the ecosystems
- To protect and to improve biodiversity
- To maintain and to improve the integrity of ecosystems and to recover those degraded
- To develop and implement adaptive and preventive strategies to respond to the threat of global ecological change.

The decisions related to water allocation would have to fulfil forecasts to maintain the integrity of fresh water ecosystems since:

- Rivers, lakes, wetlands and underground water are "waste pipes" in which landscape drains. Fresh water ecosystems are bound to the river basin or zone of influence to

which they belong and they are influenced by the uses or modifications derived from human beings, as much in land as in water.

- The dynamic patterns of flow that stay within the natural rank of variation will promote the integrity and sustainability of fresh water ecosystems.
- In addition, aquatic ecosystems require that sediments, coastlines, physico-chemical properties, and populations of flora and fauna fluctuate within the natural ranks, without experiencing excessive oscillations or being maintained at constant levels.

4.1.4. Role of aquatic ecosystems protection in water policy.

The aquatic ecosystems provide many raw materials with high economic value and many services to society. Among these services we find transport, recreation, habitat for plants and animals, production of market goods, etc. Currently, the protection and conservation of aquatic ecosystems is put aside in water policy, whilst the point of development and implementation of adaptive strategies is the priority.

The conservation efforts should have been focused on the application of knowledge of the interaction and operation in a wide range of scales of the different sector of the hydrosystem. The rates, magnitudes and relevance of these sectors vary with the size of the river and this would have to be applied to the mentioned states of conservation.

4.1.5. Current situation of Spanish aquatic ecosystems.

The current situation of Spanish rivers is that reservoirs, dams, canalisations, conductions or interbasin diversions regulate their flows. This regulation reduces the natural and inter and intra annual variability of flows, reducing floods, ensuring flow for irrigation demand, increasing lower flows and regulating the natural discharge of the river.

Biota, on small space scales, adapts in greater or smaller degree, to the variability, moment and periods of different flow intensity. At river basin level, where hydrological parameters are given a secondary role in relation to water quality parameters, temperature and load of solutes and solids in suspension prevail over the relations of biota with the variability of water flows.

Therefore, the future of water policies must arise from the principle that the river is a dynamic system that operates within an wide range of temporary and space scales, and that any action on it has consequences at river basin level, natural islands where biota exists and is restricted by capacity of dispersion, by pressures of selection and by genetic derivation processes, which result in that biota to become isolated.

This aspect of the genetic variability is important from the point of view of adaptation capacity of a population and therefore its evolution, since populations with high levels of differentiation are not qualified for evolution or respond before environmental fluctuations.

Another associated risk is the transference of non-indigenous species from a system to another as well as that of competitors, disease vectors, invading species and parasites species that modify the structure and the operation of the communities.

In fact, water policy should integrate as a first concept water as life support and as ecosystem support, considering all the functional, biotic and quality variables on different space-time scales.

The approach of present water policies, oriented by the consumption and in a fragmented way, does not allow to solve the problems of degradation of the aquatic ecosystems.

4.1.6. Proposals for a better aquatic ecosystems management.

For the improvement of aquatic ecosystems management (based on....) it is recommended to:

- Frame national, regional and local water handling policies to explicitly incorporate the necessities of fresh water ecosystems along with water quality and quantity, being the most important necessity of the ecosystem to have a pattern of natural flow variation.
- Define water resources including associated river basins, so that water is considered in a context of landscape and ecosystem and not as political jurisdiction or geographically isolated body, since many of the problems that fresh water ecosystems present come from outside of the rivers, lakes and wetlands.
- Increase communication and equation through the different involved disciplines (engineers, hydrologists, economists and ecologists) to facilitate an integral point of view of fresh water resources.
- Increase restoration efforts using as guides well founded ecological principles, integrating hydrological, geomorphologic, biological and chemical processes.
- Maintain and protect fresh water ecosystems that still have high integrity.
- Admit the dependency of society and ecosystems maintenance.
- Request a long-term vision of the water related processes, since aquatic ecosystems have evolved by eras and their sustainability must be considered from a long-term perspective.

4.1.7. Implemented instruments in water policies to secure water resources and ecologic status of the ecosystems.

The implemented instruments in water policies to secure water resources arose from the water resources shortage in certain regions of the country and the great imbalances between them. This shortage resulted in the absence of water resources in some areas and their derived environmental problems.

Therefore, the line of performance in Spain focused on ensuring the good status of water resources, to reach a state of physical, chemical and biological quality of the water bodies. Also, this line of action implied the maintenance of an ecological flow, which must be stable in each hydrographic sector so that the abiotic effects (depth, current speed, turbulence, water quality,

draught width, etc.) produced by flow decrease do not significantly alter the ecosystem dynamics, in order to:

- Preserve ecosystem populations
- Maintain ecosystem functionality

The calculation of the ecological flow is based on the characterisation of the flow regime according to the potential habitat of the species with greater ecological interest.

For the attainment of the aquatic ecosystems sustainability it is necessary to maintain the natural flow variability, the suitable sediment and organic matter entrance, light and heat fluctuations, clean water and the natural diversity of plants and animals communities.

The new Spanish water policy (WFD, HNP) considers protection objectives and resources guarantee in regards to the current water demand by the different sectors in Spain, and also protection and environmental requirements of the aquatic and terrestrial ecosystems associated to the resource.

Environmental aspects for the consecution of the above-mentioned objectives have been considered, as well as integrated resource planning in order to foresee possible scarcity situations and the derived environmental problems.

The main lines of action for the attainment of protection, guarantee of the resource and the satisfaction of water ecosystems requirements are:

- Characterisation of water bodies: surface waters (including coastal and transitions) and groundwater bodies are classified, depending on their ecological status and responding to physical, chemical, hydromorphological and biological parameters and the possible relation among these. Classifications for the ecological status of water bodies are thus obtained, with action and restriction indications depending on the degree of deterioration of the water body. (See annex on characterisation of water bodies).
- Ecologic flow: consists on the calculation of a flow, with its seasonal variation ranks, which must be maintained for aquatic and terrestrial ecosystems sustainability. For this calculation, a sort of objective is set, according to its degree of endemism, vulnerability, degree of threatening or other legal protection figure, adjusting it, through hydrobiological methods, which consist on the combination of maximum and minimum seasonal flows and adjusting the obtained results to fitness of the habitat modelation for each one of the stadiums of the species – young, junior, adult fish -. Besides, there is the intention of characterising a flood regime, which regulates geomorphologic structure of the flow, preventing progressive narrowing and colonisation.
- Protected areas register: a register for protected areas destined to human supply has been created according to article 7 of the WFD; Areas destined for the protection of significant aquatic species from an economic point of view; recreational water bodies, including areas declared for bathing in Directive 76/160/CEE; Areas sensitive to nutrients and areas destined to the protection of species or habitats when maintenance or

improvement of the water bodies status constitutes an important factor for its protection, including points Natura 2000 and RAMSAR.

- Planned management: to satisfy demand in extreme scarcity of the resource situations, preventing thus infrastructures on the environment and environmental problems derived from water scarcity.

With these lines of action, the ecosystemic requirements are reflected in all the aspects, as water bodies' characterisation as well as resulting in a good ecological status, can lead to the prohibition or determination of actions to carry out in the analysed bodies to prevent fragmentation of the ecosystem. Maintenance of the ecological flow allows a close up approach to natural flow variability of the ecosystem, which, in turn, has repercussions on fluctuations and diversity of the ecosystem flora and fauna. With water bodies and ecological flow characterisation, there is a tendency to a wider view of the basin in the ecosystemic and landscape level, not only a mere geographical distribution. The protected areas register allows to set up the lines of action to preserve the integrity of water bodies and their associated ecosystems.

With this action lines, ecosystemic requirements are met completely in all their aspects, as water body characterisation helps to achieve not only a good ecological status, but also the establishment of a prohibition or determination of actions to be carried out on these bodies in order to avoid ecosystem fragmentation. Ecological flow maintenance allows to get as close as possible to ecosystem natural flow variability, which, in time, affects the ecosystem's flora and fauna fluctuations and diversity. This is not completely contemplated, as ecological flow choice is based on the flow selection for the most significant species in the selected area (either due to its degree of endemism, vulnerability, fragility, etc.) relegating ecosystem interaction, with the possible consequences maintaining this flow might have for other. With water bodies and ecological flow characterisation there is a tendency to view the basin in the ecosystem and landscape level, not just as a geographical distribution. Protected areas registry allows to give the action guidelines to preserve water bodies and associated ecosystems integrity.

4.1.8. Current situation and proposals for the improvement of water management in ecosystems and resources protection.

As for competence aspects, in Spain, a characteristic situation is observed, in regards to river basin management. This is due to a complex and non-homogeneous distribution of competences between the State and the Autonomous Communities. Besides this, there are several organisations that manage coasts, ports, etc.

Management of aquatic ecosystems in Spain is divided among various sectors at the moment, on the one hand there is the State Administration, which through the River basin authorities

raises the Hydrological Planning of the river basin, the use and advantage of the resource, the protection of the hydraulic public domain, the operation of hydrological resources, the quality of the water and the contamination, etc; leaving the ecological management aspects to other administrations with environmental competence. Also, some autonomous communities have also transferred competences related to Hydrological Planning, Resources protection and Hydraulic Public Domain protection to their legislation.

River and wetland management at ecological level in Spain is competence of the different Autonomous Communities that form the State; they are the competent authorities regarding the ecosystem management decision, its recovery if it is deteriorated, the accomplishment of measures to guarantee biodiversity and the improvement of the ecosystem integrity. The problem derived from this competences division is a sectorialised or incomplete ecosystems, and water in general, management, as in many occasions the extension of the Autonomous Community is not the same as the ecosystems basins.

Therefore, following the water concept as life and aquatic ecosystem support, the current proposal is based on a policy that guarantees the sustainable ecological development of the aquatic ecosystems, with water policy as a basic legislation for the improvement and the protection of resources and biota associated to the ecosystems and the environmental policy as a complementary policy for the maintenance of the natural biological processes of the ecosystems.

4.2 Taking into account of water demand management (WDM) in the water policies

4.2.1 Evolution in Spanish water policies

The hydrological planning in Spain, established formally with the Water Law of 1985, is structured through the National Hydrological Plan and the Hydrological Plans of river basins, the latter are developed in the territorial scope of the River Basin Authorities. In the case of the Júcar River Basin Authority, its Hydrological River Basin Plan is approved by Royal Decree 1664/1998 of 24th of July. This Plan is based in the water perspective, as essential resource, for a respectful social development with the inherent environmental values of the above-mentioned vital resource.

With the incorporation of the European Water Framework Directive (WFD), water resources management, the accomplishment of environmental objectives and the coordination with neighbouring countries for managing transboundary basins are prioritised.

As previously stated, water policy in Spain, as for environmental objectives presented deficiencies, the report of 2003 of the OECD indicated these deficiencies by the little use of economic instruments encouraging a more efficient use of water resources.

However this trend is progressively changing. The existing water pricing system in Spain includes changes for the services provided by the River Basin Authorities (regulation and

transportation mainly) to irrigation associations, municipal services and industrial users, and these in turn charge for their own distribution and treatment services to the final users.

Urban tariffs to domestic and industrial users are mainly 3 block tariffs (in major cities there can be up to 5 blocks) to penalise for excessive usage. Industrial tariffs discriminate for bigger users both in the fixed and variable charges.

The Water Law allows River Basin Authorities to modulate charges to incentive water savings, increasingly irrigation associations are establishing charges by volume and penalisation for excessive use where water is scarce, as in the Mediterranean basins.

On the other hand, in spite of the level of reached economic development in Spain, problems as far as water guarantee and quality subsist, as much in rural and urban areas.

In addition, Spain is living a law reform, which includes the development of a Hydrological Planning Regulation.

The National Hydrological Plan, was obsolete in regards to the European regulations of the Water Framework Directive, so the contents were modified in Law 11/2005 of 22nd of June. In this plan, some basic principles of the water policy adapting to European regulations like the creation of Programme A.G.U.A (Performances for the Management and Use of Water). The basic concept is that "the water is patrimony of all the citizens and must contribute to the sustainable development of all and each one of the territories". This new water policy adapts to the criteria and norms of the European Union that guarantee more fairness, more efficiency and more sustainability, taking advantage of the best technologies available. The Government will reinforce the public control of the use and the quality of water and will harness the participation and the co-responsibility of the citizens to fight water wastefulness, speculation, insufficiency and contamination.

Programa AGUA

The Programme A.G.U.A. materialises the reorientation of the water policy, through the explanation and diffusion of concrete performances designed to guarantee water availability and quality in each territory. In addition, it will allow all the citizens to know and to better understand the water policy, to act in a more responsible and demanding way, contributing even by submitting suggestions and proposals to the Ministry of Environment.

Some points to emphasise about this programme are:

1) Priority to efficient water management, so that it is not a limiting factor for the sustainable development of the territory. Certain performances of improvement and management of the water provision and quality are considered urgent, as well as the exigency of mandatory reports to the River Basin Authorities, before the approval of urban plans or other land uses involving an increase in water demand.

2) The guarantee of more quality water in the quickest possible way:

- Irrigation and supply saving and modernisation, through measures of optimisation of regulation infrastructures, storage and distribution avoiding or lessening losses. With this measure an increase of 231 Hm^3/ year is calculated in the resource amount.
- Encouragement to treated water reuse, with the incorporation of tertiary treatments and the support of separation networks, particularly in municipalities that spill directly to the sea. It is expected to obtain an extra 137 Hm^3/ year.
- New intakes and regulations with new resources contribution: 74 Hm3 /year.
- Desalination in coastal municipalities, with the fundamental aim of using these resources instead of groundwater for urban supply. An additional 621 Hm^3 /year.
- Performances related to flood prevention and environmental improvements to increase the safety for people, goods, to reduce contamination and restoration of fluvial ecosystems.

3) Greater control of the consumptions and the spills, with the economic penalty and promotion of the water police as Environmental Agents.

4) Better guarantees for higher quality water allocation for urban supply and protection perimeters to guarantee the non-affection of water resources for supply.

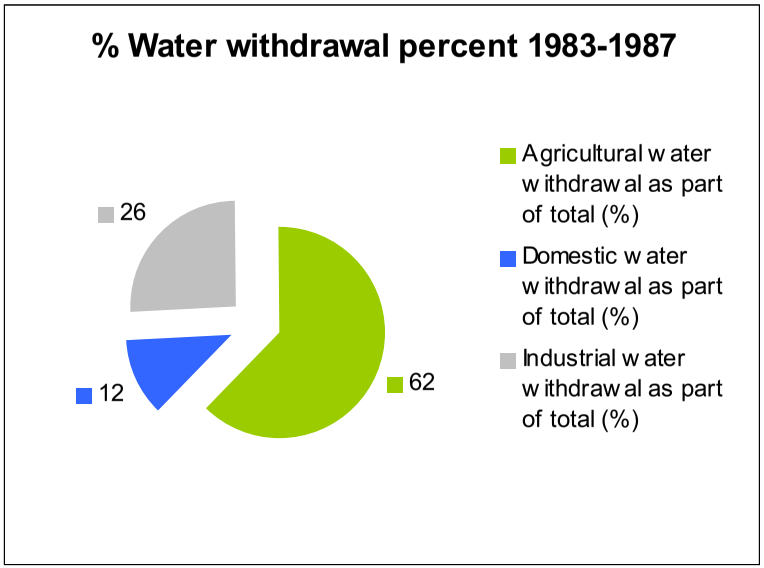
5) Obligation of prescribed regulations that ensure water quality according to its use to guarantee the health, and the basic conditions for purified water reuse according to the predicted uses.

6) Exigency for future hydraulic works to be declared "general State interest ", of a report that justifies their economic, technical, social and environmental viability, including specificities on cost recovery.

4.2.2. Past changes in water demands and possible trends.

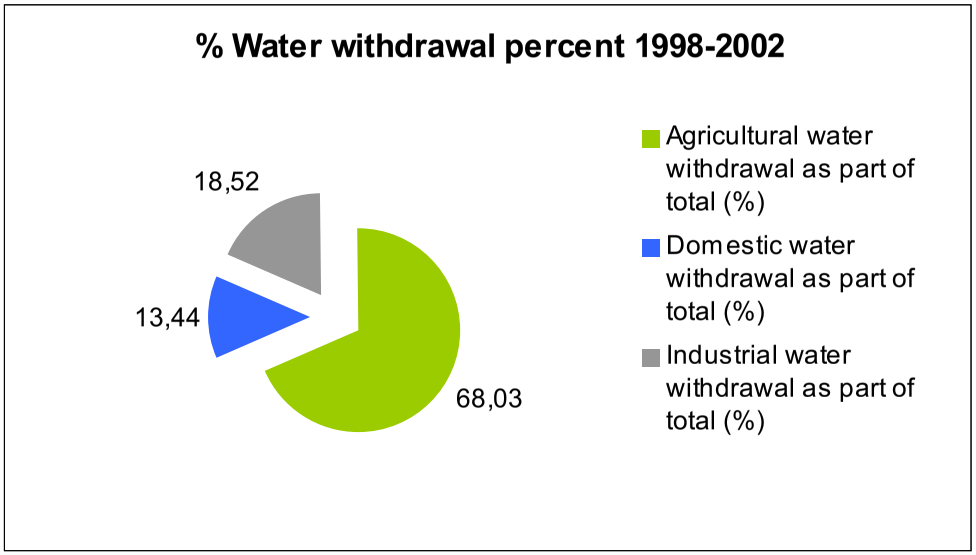
Evolution table on resource demand in water uses in Spain

1983-1987	Agricultural water withdrawal (10^9 m3/yr)	Domestic water withdrawal (10^9 m3/yr)	Industrial water withdrawal (10^9 m3/yr)	Total water withdrawal (summed by sector) (10^9 m3/yr)	Agricultural water withdrawal as part of total (%)	Domestic water withdrawal as part of total (%)	Industrial water withdrawal as part of total (%)	Total water withdrawal: per capita (m3/inhab/yr)	Ag water withdrawal as perc. of total renewable water resources (a) (%)	Total water withdrawal as perc of total renewable water resources (a) (%)	Mean	Std. Dev
Spain	28.43	5.502	11.92	45.85	62	12	26	1 181	25.5	41.12	144	364.9
Mean	28.43	5.502	11.92	45.85	62	12	26	1 181	25.5	41.12		



1998-2002	Agricultural water withdrawal (10^9 m3/yr)	Domestic water withdrawal (10^9 m3/yr)	Industrial water withdrawal (10^9 m3/yr)	Total water withdrawal (summed by sector) (10^9 m3/yr)	Agricultural water withdrawal as part of total (%)	Domestic water withdrawal as part of total (%)	Industrial water withdrawal as part of total (%)	Total water withdrawal: per capita (m3/inhab/yr)	Ag water withdrawal as perc of total renewable water resources (a) (%)	Total water withdrawal as perc of total renewable water resources (a) (%)	Mean	Std. Dev
Spain	24.24	4.79	6.6	35.63	68.03	13.44	18.52	869.5	21.74	31.96	109.4	267.7
Mean	24.24	4.79	6.6	35.63	68.03	13.44	18.52	869.5	21.74	31.96		

Source: Aquastat Database FAO 2007.



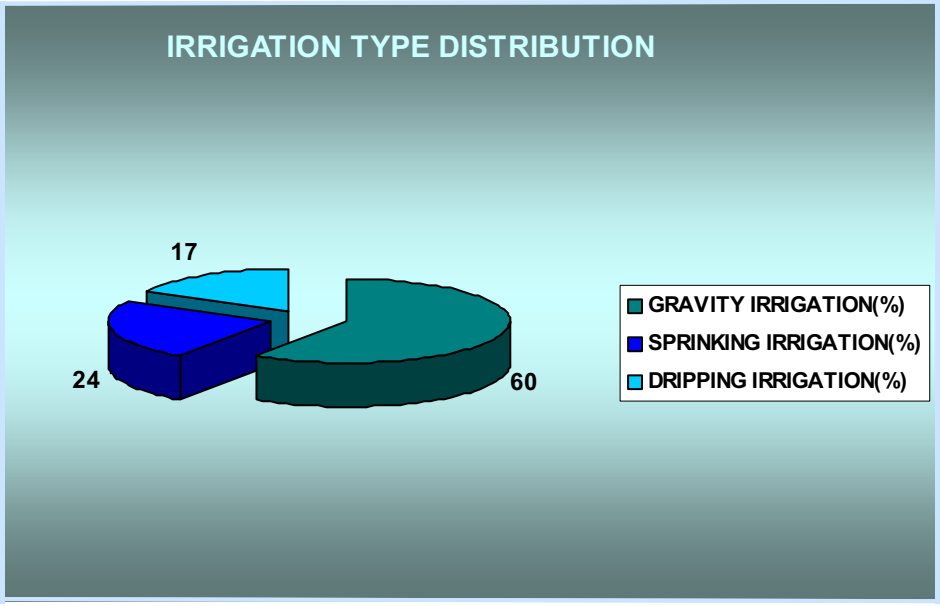
As it can be appreciated, from the data collected for period 1983-1987 and 1998-2002, water demand by sectors shows a tendency in uses to lower in the amount of demanded resource. The INE (National Statistics Institute) provides data showing that, for the year 2004, the Total Water Demand in Spain was 22.64 km^3, which continues to indicate a decreasing tendency.

Extrapolating this tendency quantitatively, it could be pointed out that for period 2015/2025, this diminution will stay. We should add to these tendencies the new hydrological planning management consisting in the coordination of the different Hydrological Basin Plans in force, with the Demarcation plans, in which aspects are addressed horizontally. In addition to the development of existing management programmes such as the delimitation of the Public Hydraulic Domain, concessions Registry, water quality control, together with the development of follow-up, evaluation and reporting plans on the water availability for new urban developments, measures for the achievement of the good status of water, with special attention to the ecological flow, management improvement for supply and irrigation saving and, measures for the optimisation of dam management.

Delimitation of the Public Hydraulic Domain, forest-hydrological restoration, drought management, elaboration of studies for the determination of the ecological flow, groundwater management, management of sustainable urban supply, concession management, water quality control, management of sanctioning files to avoid irregular well situations or uncontrolled spills, along with pollution control are the main measures that are being carried out in Spain and with them, it is intended to achieve the political objectives to satisfy water management in the different uses and compliance with the Water Framework Directive and the national objectives established through River Basin Management Plans.

4.2.3. Instruments implemented from a reorientation of the water polices and cost-effective study

Ensuring a rational water use is the greatest challenge of water management in Spain, where there is a vast unbalance between offer and demand. In 2004, irrigation represented 80% of total water consumption. In 2004, Spain had the largest irrigation surface in the EU, some 33.400 km^2 (OECD 2004), which means 13% of the total crop land and 50% of the production value, being 6 times more productive than dry crops. 86% of the land has les than 10 hectares of irrigation. The table below shows a graph of irrigation distribution in Spain in 2004:

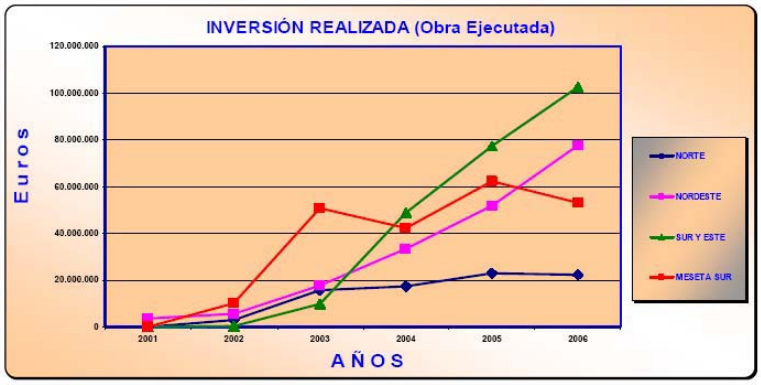


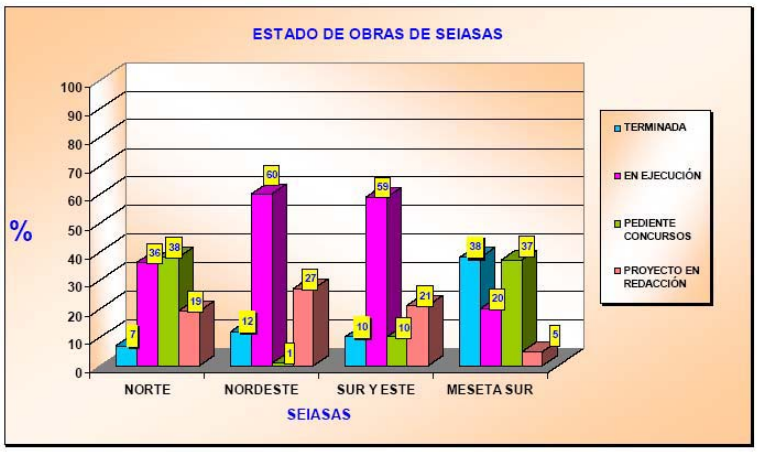
National and European legislation and policy promote a reorientation of the irrigation plans, and with this purpose, the "Shock irrigation" plan 2006-2007 has been elaborated to meet the WFD objectives, increase available resources while respecting environmental objectives and obtain a 1,200 Hm^3 water/year saving, which together with the saving from other measures is expected to achieve the figure of 3000 Hm^3 water/year by the end of 2008. The most remarkable aspect of this "Shock irrigation" plan is the synchronisation of the performances developed by the Ministry of Environment and the Ministry of Agriculture through the State Societies of Agrarian Infrastructures and State Water Societies.

In relation to the produced water saving, it will be used to consolidate the existing irrigable surface or to increase the irrigation guarantee. As complement to the modernisation of the irrigation systems, irrigators are incorporated in Telematic information to develop a services sector associated to the agro-industrial irrigation system, fixing the population and increasing the quality of life of the rural inhabitants, as this entails the creation of temporary job vacancies of about 3000 in labour force for sowing and harvesting. The programme of consolidation and improvement of irrigated land along with the National Irrigation Plan brings the predicted investment for 2007 to about 1,022 million euros.

Source: Ministry of Environment

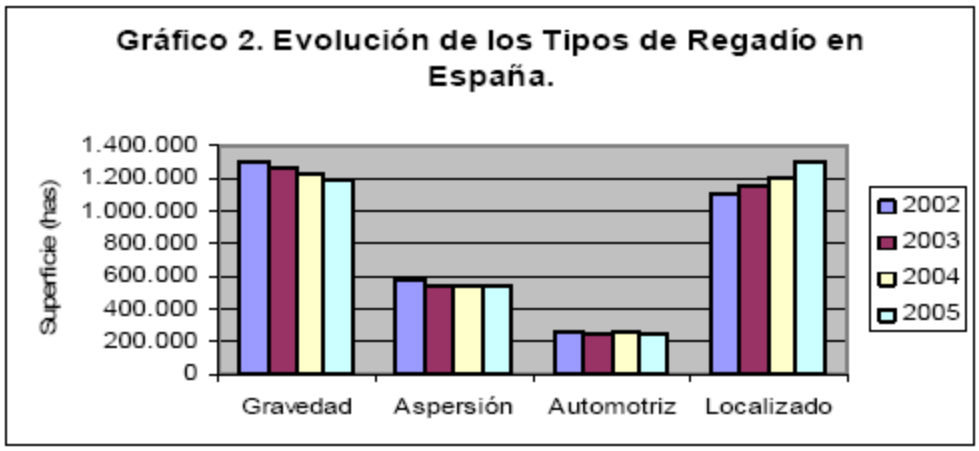
For the Ministry of Agriculture, Fishing and Food (MAPA) the investment for 2007 will be of about 200 million per year, of which 80 million are destined to SEIASAS.





Source:MAPA

The objectives intended by irrigation modernisation are directed to the reduction of water saving through new technologies showed in several activities, of which we can underline localised irrigation that represents 30% of the budget. The effectiveness of this measure together with the improvement of the irrigation facilities control through tele-control and the desalination systems or water reusability, resulted in, for the first time in 2005, a localised irrigation over gravity irrigation by 9.2%.



As for water reuse systems, it is important to underline the increasing relevance of brackish water and seawater desalination as an alternative to interbasin diversions, which is the way Spain used to face water scarcity in the different regions. With desalination plants, autosufficient supply can be achieved in the hydrographical demarcations where they have been installed, thus obtaining a resource with the adequate quality parameters in the deficitary areas.

Currently Spain is suffering a drought period (transitory anomaly, more or less prolonged, characterised by a period of time with precipitation values lower than the normal in the area). The initial cause of all droughts is the scarcity of rainfall (meteorological drought), which derives in the insufficiency of the water resources (hydrological drought) necessary to supply the existing demand. Spain is specially affected by the drought phenomenon, as during the period 1880-2000 more than half of the years have been qualified as dry or very dry. During the 80's seven years were considered dry or very dry and during the 90's five years received the same qualification.

Droughts affect all the regions in Spain, although the areas where annual rainfall does not exceed 600mm, suffer the consequences more strongly. In the described situation, desalination of the resource to guarantee supply and quality of the resource to satisfy first of all urban demand, becomes important.

The following graph shows the evolution of the desalination plants situation from the above mentioned Programme AGUA, where we can observe the increase of the resource from 140 hm ^{3}/year at the beginning of 2004 to 713 hm ^{3} /year with the Programme's investment of 1945 million euros.


SITUACIÓN DE LAS PLANTAS
DESALINIZADORAS DEL PROGRAMA A.G.U.A.
Enero de 2007
Todas las cifras de capacidad en hm³/año
MINISTERIO
DE MEDIO AMBIENTE
Programa
AGUA
+AGUA
Para Siempre
Girona: 10
10: Ampliación La Tordera
Barcelona: 60
60: Barcelona
Castellón: 33
15: Moncófar
18: Oropesa
Baleares: 17
17
Valencia: 8
8: Sagunto
Murcia-Alicante: 334
24: San Pedro del Pinatar I
6: Ampliación de Alicante I
24: San Pedro del Pinatar II
50: Valdelentisco
24: Alicante II
5: Ampliación Águilas
60: Águilas/Guadalentín
80: Torrevieja
4: Ampliación Mojón
9: Denia
18: Campello/Mutxamel
20: Vega Baja
10: Jávea
Almería: 117
42: Carboneras I
20: Níjar
5: Adra
20: Bajo Almanzora
30: Campo de Dalías
Málaga: 100
20: Marbella
60: El Atabal
20: Costa del Sol Occidental
Canarias: 19
9
10
Ceuta : 7,5
7,5
Melilla: 7,5
7,5
BALANCE GENERAL DE LAS PLANTAS DESALINIZADORAS
SITUACIÓN
RECURSOS hm³/año
INVERSIÓN Millones de €
AGUA DESALADA A PRINCIPIOS DE 2004 140
Puestas en servicio en 2005-2006 176 375
En construcción 135 288
Adjudicadas 239 747
En licitación o próxima licitación 83 280
En información pública actual o próxima 20 40
En redacción 60 215
Total promovido por el Programa A.G.U.A. 713 1.945
TOTAL GENERAL PREVISTO 853

4.2.4.Intruments to be promoted for a better water management

Water modellates the territory, in addition, it is a support for the development and establishment of populations, generating wealth and social welfare. A proposal for the improvement in water resources management is an approach of the land management policies adjusted to water criteria and land uses, since these tend to consider land as the main factor.

In the light of the WFD and the EU, resides recommendations from the OECD, Spain must carry out cost-benefit analysis more thorough and transparent for the infrastructure and hydrological development projects, since the ones developed to date have caused doubts between some groups, as it was not clear if they were destined to define the project scope and evaluate different options, like decision making help tools, or, on the contrary, they were destined to justifying the projects

On the other hand, despite new legislations in regards to cost recovery, water prices stay low and tariffication is not used enough to manage demand. Taxes for municipal water services policy tariffication, spill canons, irrigation and environmental taxes are not enough and they do not consider possible external factors, besides possible doubts in accomplishing cost recovery related to requested subsidies to the EU.

5. Taking into account of water demand management in the cooperation and development aid policies

The interest in water and hydrological ecosystems protection arises internationally around the end of the sixties in a general context of preoccupation by the environmental conservation.

In 1968, the European Council approves the Water Letter, in which the role of water in life is analysed and an approach to the problematic one of the water resources in the continent is carried out.

In 1977, the Plan of Action approved by the United Nations Conference on Water celebrated in Mar de Plata, Argentina; exhaustively deals addresses the problem of water resources administration from the perspective of economical and social improvements of humanity, specially the developing countries, and tries to favour coordinated actions at regional and international level.

Special emphasis is made in protection of water quality and environment, which must be preserved based on the diverse uses to which it is going to be destined and in addition the natural qualities that allow its biological function must be maintained.

With this aim, evaluations on the hydraulic infrastructure begin, water exploitation, the arrangement of tourist establishments and recreational activities, the preservation of sections of rivers of special singularity, as well as water falls, lakes, wetlands etc., and the preventive fight against contamination.

Later "Programme 21" approved by the United Nations Conference on environment and development, celebrated in 1992 in Rio approaches the subject of quality protection and fresh water provision as one of the pressing problems, promoting the application of integrated criteria for the exploitation, arrangement and use of natural fresh water resources, considering the operation of aquatic ecosystems with the purpose of satisfying and conciliating water needs for human activities.

The key for the operation of these Programmes is the international cooperation that supports and complements the national efforts.

Communication in Water Management Policy in the developing countries and priorities of the EU Cooperation for Development are based on the recommendations for action formulated in the International Bonn Conference on Fresh Water and promote the preparation of a EU initiative as key point of the World Summit on Sustainable Development agenda; its strategic approach is the sustainable access to water resources management and integrated management in sectorial and cross-sectional issues that affect all aspects of sustainability, economic, social and environmental. As far as institutional sustainability and prevention of conflicts, the participation of

stakeholders in the decision making process, particularly women, about information exchange and fluvial river basin management will be very important.

Another important aspect to emphasise is the line of action for the co-management of the EU cooperation for development, which follows the lines of action of climate change effects mitigation and impact of the commerce globalisation, with the intention of reducing poverty worldwide and improving sustainable development. As it can be observed, the average growth of

Spain	Population	Female Population	Female Population (as % of male)	Population Growth (in %)	GDP pc, US$ (2004)	GDP pc, PPP US$ (2004)	Avg. annual growth rate GDP pc, 1990-2004 (in %)
	40 397 842	20 651 697	51.1	0.13	24 360	25 047	2.3

Spain	ACCESS TO RESOURCES	Share of women in wage employment in the non-agricultural sector (in % of total)	Male Contributing Family Workers (in % of total, 1995-2004)	Human Development Index (Rank)	Gender Empowerment Measure (Rank)	Gender-related Development Index (Rank)	Gender, Institutions and Develpment Index (Rank)
	..	42	36	19	15	19	13

Source: OEC

the GDP in Spain, is 2,3 % since 1990, highlighting the role of women - who represent 51,1% of the percentage of population with respect to men- in the economic development associated to activities depending on water use and management, as agriculture. This indicates a change in the present Spanish economy that, until now, was relegated to men and that has been possible thanks to the investments destined to sex equity through different organisations and institutions (see annex tables 1 and 2. Source: OECD).

The European Union has four Structural Funds (ERDF, ESF, EAGGF, FIFG) to canalise the financial aid for the resolution of structural economic and social problems in order to reduce to the inequalities between regions and social groups. A very concrete example, which fulfils one of the WFD principles AXIS 3 "Environment, natural environment and water resources" whose lines of action are divided in:

1. Water supply for the population and economic activities.

2. Improvement of the effectiveness of the existing infrastructure and water use.

3. Environmental Actions in coasts.

4. Sanitation and waste water treatment.

5. Protection and regeneration of the environment.

5.1 European Initiatives at regional level

The European Union encouraged during the World Summit for Sustainable Development (WSSD), celebrated in Johannesburg in September 2002, the European Water Initiative (EUWI), an ideal instrument to establish strategic associations and to reach the Millennium Development Goals (MDG) related to water.

The Initiative has as general objectives: eradication of poverty, improvement of health, achievement of better life conditions, economic sustainable development and, perpetuation of peace and safety in the world.

This action is developed in regional components. The Latin American regional Component is an association between Latin America and the European Union. It is lead by Spain, Portugal and Mexico, and includes all the Spanish and Portuguese speaking nations in the American continent, in addition to Caribbean countries like Cuba and Dominican Republic, since they have similar necessities and deficiencies.

The compromise of the Latin Component of the EUWI and its effective contribution are based on the possibility of providing drinking water and sanitation systems to more than 40 million people. In the case of the Latin American component the thematic areas are:

- Water supply and sanitation.
- Integrated Water Resources Management, with special interest in the development of river basin organisations.
- Prevention of extreme phenomena, as floods and droughts, and consequences management and mitigation.
- Sustainable Water Use in agriculture

Considering these thematic areas, necessities, programmes and potential projects have been identified to be developed in the region.

Within the framework of IV World Water Forum, celebrated in Mexico in March 2006, a declaration for the strategic association of Latin America and the European Union on water resources and sanitation was signed, an agreement that entails a progress to resolve the numerous problems related to water in the region.

After this compromise between the European Union and the Latin American countries Spain, Portugal and Mexico continue with the task of developing the works and foreseen objectives established by the Component.

5.2 Importance of International Organisations in the water field: the example of MENBO

Adequate information is a prerequisite to succeed in water demand management. It has to be a continuous process in which technology and education improve solidarity and participation to the

stakeholders and a more efficient use of the resource. There exists a general consensus that, in order to avoid conflicts and to move from confrontation to cooperation, water development projects require the participation of the social groups affected by the projects, the stakeholders. The participation should begin in the early stages of the project and should be, as much as possible, bottom-up and not top-down.

Good and reliable information is crucial to facilitate cooperation among water actors. All stakeholders should have easy access to good, reliable data on water quality, and quantity. Current information technology allows information to be made available to an unlimited number of users easily and economically.

A good example of participation in the cooperation and water development projects and initiatives is the Mediterranean Network of Basin Organisations. MENBO, is a Regional Network within INBO (International Network of Basin Organisations) that promotes an integrated water resources management at the river basin level, as an essential tool for sustainable development. This organisation seeks to improve relationships among organisations in charge of water management in the Mediterranean region.

The Regional Network was established recently, and is currently adding international members from the Mediterranean region. This network is growing stronger with the support and collaboration from most of the Mediterranean countries that deal with river basin management.

This organisation participates in projects related to Mediterranean cooperation for the sustainable development, like, for instance, TWINBASIN. In the framework of this project, MENBO has promoted several twinnings within Spain: Júcar-Buzau (Romania), Júcar-WABD (Bulgaria), Júcar-Syrdarya-Amudarya (Uzbekistan), Crete-Segura, Ebro-Moulouya and Segura-Mauritania.

The main objectives of the TWINBASIN project are:

- To establish twinnings between river basin organisations.
- To encourage cooperation between countries (always bearing in mind IWRM, EUWI, and WFD).
- To establish guides to promote a more efficient water management.

The work dynamics structure is organised in different groups by the Technical Support Service (OIEAU, GWPO, TECHWARE) and a Steering Committee made up of 17 international members (Basin Organisations, NGO's, Local Groups, universities, private Sector) through the implementation of a common system and the exchange of information and personnel.

www.twinbasin.org

Other projects in which MENBO collaborates are the MELIA and the SPI-Water Project.

Project "**MELIA**": Mediterranean Dialogue on Integrated Water Management. Started in September 2006.

- Promoted by "Consejo Superior de Investigaciones Científicas" (CSIC) and the International Centre for Med. Agronomic Studies (CIHEAM-IAMB)
- Objective: create an efficient regional management of water resources under scarcity conditions and to improve communication amongst Mediterranean countries.

MENBO's role: participation in 5 working groups:

- Assessment of Technological Perspectives in Water Management
- Water Policy
- Prevention and Mitigation of water conflicts
- Building Knowledge
- Recommendations on the application of the WFD (co-leader of the group)

http://www.meliaproject.eu/

SPI-Water: Setting up a mechanism to enhance the use of RTD tools and extend the implementation of the WFD to non-EU countries.

The main objectives of the project are:

- Analysis and evaluation of projects in the field of river basin management that are potential use for the WFD implementation.
- Dissemination activities through the use of a science-policy interfacing instrume (the WISE-RTD Web Portal) in the context of the development of the WFD riv basin management plans.
- Development of the EU Water Initiative / WFD joint process activities for facilitati the implementation of Integrated Water Resources Management principles focus on the non-EU countries.

MENBO is the leader of working group related to the EUWI "Transfer of WFD experience outside the EU.

http://www.spi-water.eu

The Permanent Technical Secretariat of MENBO is located within the Júcar River Basin Authority premises, designated in 2002 as pilot river basin in Spain for the implementation of the Water Framework Directive. Spain also participates in Mediterranean cooperation programmes, for instance, with Morocco via the Bilateral Cooperation Agreement between the Spanish Ministry of Environment and the Moroccan Ministry for Land Management, Water and Environment. There also exist other lines of action regarding cooperation projects, carried out by the General Water Directorate in the Ministry of Environment.

6. Overview and conclusion

There is an imperative need for change and awareness of society and its classes, in all aspects, of another approach to all issues related to water, due to a main fact: water demand is higher than water availability in some areas (concentrated mainly in Mediterranean coastal areas). This fact, together with the need to maintain our life standards and face a not so optimistic future in terms of climate change, implies a change in our global vision about society, politics, technology and environment.

A greater demand exists and a greater use of resources in the coastal zones for two main reasons, these areas are very attractive for tourists, which implies the mobilisation of great amounts of the resource for other tourist uses (thematic parks, golf courses, etc.), and, in addition, in the Mediterranean areas, climate is much more favourable for the agricultural practices. In spite of these data, the average Spanish consumption of water resources stays more or less stable in the temporary evolution because of the compensation of other regions of the country and because of technical and political advances in water resources management. Even so, the environmental deterioration has been inevitable driving us to a situation of saturation of the hydrogeologic system capacity and decreasing the quality of life of biota associated to aquatic ecosystems. Another problem associated to these demographic concentrations in coastal areas is the great number of population located in flood water retention areas, but the question that we must ask ourselves is to what extent economic benefits generated by employment, tourism, etc compensate if we compare them to the damage and the risk derived from an abusive water use.

As far as the use of the water is concerned, the agricultural sector presents the highest demand and its tendency is to increase this demand of the resource, followed by the industrial sector that contrarily to agriculture tends to diminish in the water use demand. Currently, the domestic sector is the one with the lowest water resources requirements, but its tendency is to increase due to the raise of the use in urban areas (since in the rural ones it has practically stayed stable).

The improvements for water uses in agriculture are centred in the social management in coordination with other programmes of action, like AGENDA 21 for the improvement in the effectiveness of irrigation systems.

The improvements for water use in the industrial sector are based on the improvement of the quality of the spills through techniques of improvement in the parameters of the water quality in a high percentage leaving it suitable for reuse.

The improvements for water use in the domestic sector fundamentally appeal for the awareness of the rational use of the resource, using campaigns that, in many cases, are disseminated in the media. In last instance, the imposition of aggravating canons in the tariffs of water consumption

is the chosen option, when these surpass the rational average consumption. Other undertaken action lines promote aquatic ecosystems sustainability, through a careful management and sustainable tourist exploitation.

The environmental objectives in water policy have been dedicated fundamentally "to palliate" inflicted effects on the environment or to develop the necessary infrastructure for the demand, so that the impact on the environment is minimum, leaving the concept of river basin as functional unit and without recognising the total complexity of relations and functions that entail fluvial hydrosystems, as it can result in serious ecological risks to treat the parts of the hydrosystem separately. Now, the water policies take into account the ecological flow and the protection of the water resources, but this focus needs more attention in quality parameters and uses. The ecological flow is only based in the necessities of a singular or vulnerable species and their habitat, but isn´t in agreement with the relations between other habitats or species requirements. It would be recommended that water polices take into account the complexity of relations and functions between the differents ecosystems that are part of the hydrosystem fluvial basin.

The planning in water policy is following a model of interactive planning, whose objective consists in the construction a more desirable future, instead of predicting what it will be like. This planning should be coordinated with land management policies that take into consideration soil and water, instead of focusing only on the soil.

Despite policies progress, water demand management isn't near to be sustainable. The rivers' water quality is low (especially in drought periods when flow is very low and the extractions by human use, industrial use ans particularly agriculture, are continuous). Most of the dams have eutrofisation problems and there are several polluted subterranean aquifers with over exploitation problems that prompt saline intrusion in coastal zones. It is necessary to manage coastal zones to face in the correct way the social development preasure in these zones.

Although there are new dispositions regarding cost recovery, water prices are still low and tariffication is not used enough for demand management.

The increase of the female population positioning in jobs related to water demand and management, play a very important role towards the turn of the Spanish economic development; that, together with the subventions coming from structural funds and Mediterranean Cooperation Agreements, has obtained remarkable changes in the matter of water for the reduction of regional inequalities and social groups.

The deep water policy reform that is currently happening, which fully integrates participatory approaches and environmental objectives, and promotes irrigation systems modernisation (highest water demand sector) is leading to a more sustainable use of water. Spain is in the

process of changing from a demand forecast to a water demand management both environmentally and economically.

As final conclusion, the object of the action lines should be based on the maintenance of the sectors' water resources demand compatible with the development and growth of society in a sustainable way using social public awareness, tariffs and policies that reward the good practices in the different sectors.

7. Appendices to be joined to the report

Annex 1: Situation: Valencian Community, Castilla – La Mancha and Júcar River Basin

Annex 2: The Júcar River Basin

Annex 3: Spanish Organisation of the Hydraulic Administration

Annex 4: FAO tables

Annex 5: Extrapolation of data Tables.

Annex 6: Water resources: graphs and tables (Point 2)

Annex 7: Water withdrawal: graphs and tables (Point 3)

Annex 8: Crops and active population: graphs and tables (Point 5)

Annex 9: Good practices examples: Saragossa, Alcobendas, Calvia, and La Roda (Point 3.2)

Annex 10: Membrane bioreactor. Industrial water recycling

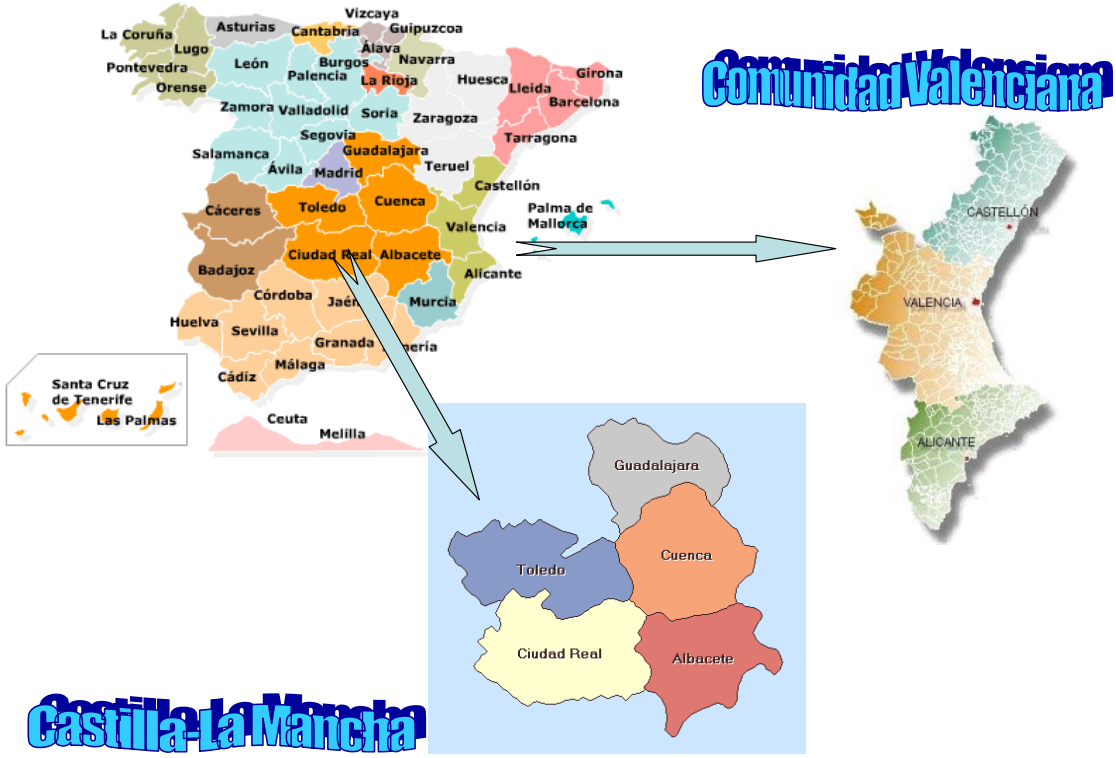
Annex 11: Growth Rate GDP since 1990

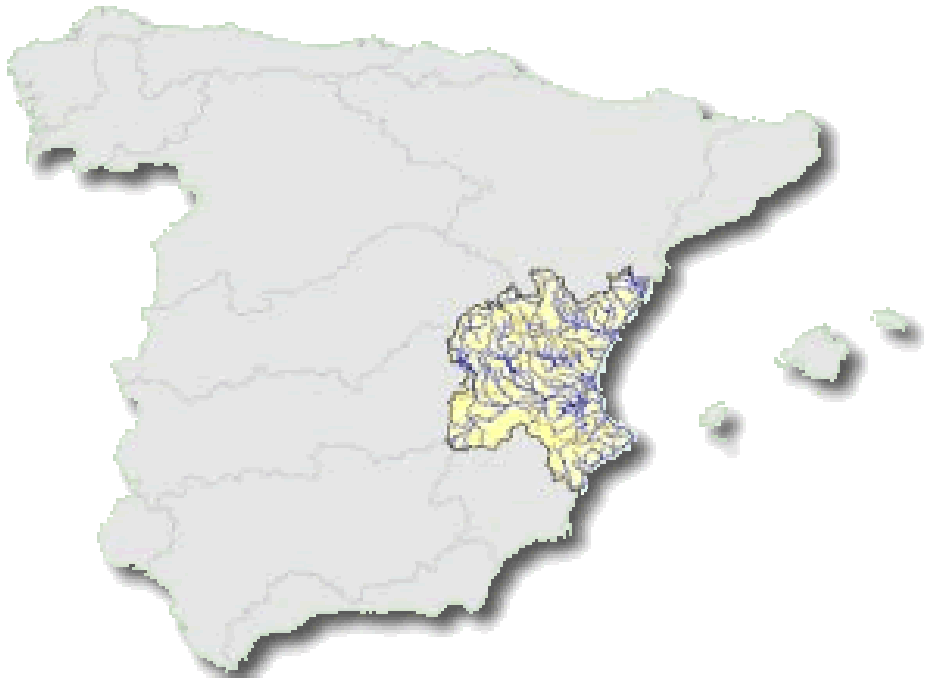
Annex 12: Public Development Assistance dedicated to Resources Access

Annex 13: Voluntary Contributions to International Organisations 2007

Annex 14: Water required for ecosystems

Annex 1: Situation: Valencian Community, Castilla-La Mancha and Júcar River Basin





Annex 2: The Júcar River Basin

2) La Cuenca del Júcar: Un ajustado equilibrio

Ámbito territorial

En España a efectos de planificación hidrológica, se han establecido quince ámbitos territoriales distintos, basados en el concepto de cuenca hidrográfica. El ámbito territorial del Plan Hidrológico de cuenca del Júcar, comprente el territorio de las cuencas hidrográficas que vierten al mar Mediterráneo entre la margen izquierda de la Gola del Segura en su desembocadura y la desembocadura del río Cenia, incluída su cuenca, además la cuenca endorreica de Pozohondo. Dicho ámbito territorial, denominado en adelante cuenca del Júcar, está situado al este de la Península Ibérica, ocupa una extensión de 42.989 km' y afecta a cuatro Comunidades Autónomas: Aragón, Castilla-La Mancha, Cataluña y Comunidad Valenciana.

Población

La población es de 4.127.563 habitantes, a los que hay que añadir unos 700.000 habitantes- equivalentes debido al turismo, fundamentalmente en la Comunidad Valenciana.

Provincia COMUNIDAD AUTÓNOMA	Extensión en la cuenca (km²)	Población de Derecho (habitantes)
Teruel	5.651	48.226
ARAGÓN	5.651	48.226
Albacete	7.628	241.222
Cuenca	8.109	112.199
CASTILLA- LA MANCHA	15.737	353.421
Tarragona	281	17.722
CATALUÑA	281	17.722
Alicante	4.701	1.124.231
Castellón	5.830	442.849
Valencia	10.789	2.141.114
COMUNIDAD VALENCIANA	21.320	3.708.194
TOTAL	**42.989**	**4.127.563**

fuente: http://hispagua.cedex.es/instituciones/distribucion/img/poblacion.JPG

Recursos hídricos

La cuenca del Júcar es una importante demandante de agua para riego y abastecimiento, en la que la situación de los recursos hídricos disponibles y las demandas atendidas presenta una serie de hechos diferenciales, entre los que podemos citar los siguientes:

- La cuenca, en su conjunto y en la actualidad, se caracteriza por un ajustado equilibrio entre los recursos hídricos y las demandas, cuantificados ambos en unos 3.200 hm3/año; este equilibrio global enmascara situaciones localmente importantes de déficit de recursos, en algunos sistemas de explotación, así como una limitación general al desarrollo de futuras demandas.
- Un 50 % de los recursos hídricos disponibles tienen un origen subterráneo, existiendo asimismo una importante reutilización directa de aguas residuales depuradas.
- La importante capacidad de embalse de la cuenca, 3.000 hm3,que permite regular en un año medio del orden de 1.200 hm3.
- La demanda agraria supone del orden del 80 % de la demanda total, atendiéndose el riego de unas 370.000 hectáreas.
- La red fluvial presenta una longitud total de cauces de primer orden de unos 10.200 km., siendo sus cauces principales el Júcar, el Turia, el Mijares, el Serpis y el Vinalopó.

El Plan hidrológico del cuenca del Júcar

Un Plan Hidrológico de cuenca es un documento, que establece una ordenación de los usos del agua, en su ámbito territorial, para un periodo determinado. Define las líneas maestras para los usos y aprovechamientos del agua, fijando las grandes orientaciones, directrices y prioridades a fin de conseguir una gestión global y equilibrada del recurso. Establece una ordenación de usos derivada de las planificaciones sectoriales (abastecimientos urbanos, agricultura, usos industriales, etc.) a las que el Plan se somete y da servicio, en búsqueda de un equilibrio global que module intereses contrapuestos, introduzca racionalidad en la gestión del recurso y preserve los sistemas naturales. El horizonte temporal del Plan es doble: a diez y a veinte años, con revisiones periódicas previstas en plazos no superiores a ocho años.

Objetivo del Plan

El objetivo del Plan es conseguir la mejor satisfacción de las demandas de agua y equilibrar y armonizar el desarrollo regional y sectorial, incrementando las disponibilidades del recurso, protegiendo su calidad, economizando su empleo y racionalizando sus usos en armonía con el medio ambiente y los demás recursos naturales, tratando de evitar o paliar en lo posible los efectos originados por las situaciones hidrológicas extremas.

Contenido básico del Plan

De acuerdo con el objetivo general marcado, el Plan se estructura de acuerdo con el siguiente contenido básico:

Realiza un inventario fiable de los recursos hidráulicos disponibles en su doble vertiente superficial y subterránea, integrando la gestión de los mismos a fin de conseguir un planteamiento unitario.

Analiza los usos y demandas existentes y realiza previsiones sobre su evolución futura desde una perspectiva de corresponsabilidad en el uso del agua.

Establece los criterios de prioridad y de compatibilidad de usos, que permite determinar el orden de preferencia, entre los distintos aprovechamientos.

Atiende la asignación y reserva de recursos hídricos para los usos y demandas actuales y futuros, así como para la conservación y recuperación del medio natural.

Determina las características básicas de calidad de las aguas y de la ordenación de los vertidos de aguas residuales.

Plantea las normas básicas sobre mejoras y transformaciones en regadío, que aseguren el mejor aprovechamiento del conjunto de recursos hidráulicos y terrenos disponibles.

Estudia los perímetros de protección y las medidas para la conservación y recuperación del recurso y entorno afectados.

Formula los Planes hydrological forestales y de conservación de suelos, que hayan de ser realizados por la Administración.

Establece las directrices para la recarga y protección de acuíferos.

Determina las infraestructuras básicas requeridas por el Plan.

Define los criterios de evaluación de los aprovechamientos energéticos y la fijación de los condicionantes requeridos para su ejecución.

Los criterios sobre estudios, actuaciones y obras para prevenir y evitar los daños debidos a inundaciones, avenidas y otros fenómenos hidráulicos.

1.- La gestión integral del agua

Aguas superficiales

La Ley de Aguas define el agua como un recurso unitario. Instituye una identidad de naturaleza y función entre aguas superficiales y subterráneas, estando, en su conjunto, subordinadas al interés general y puestas al servicio de la nación.

El Plan Hidrológico de cuenca del Júcar se ha redactado teniendo en cuenta las diferentes características de ambas, respetando su relación e interdependencia así como las correspondientes descargas al mar.

El Plan enuncia, con carácter general, una gestión coordinada de aguas superficiales y subterráneas, y potencia el conocimiento de los recursos mediante el establecimiento de redes de control, investigación hidrogeológica, protección frente a la contaminación y sobreexplotación de las aguas subterráneas.

El Plan establece una división del ámbito territorial en nueve Sistemas de Explotación:

- Cenia-Maestrazgo
- Mijares-Plana de Castellón
- Palancia-Los Valles
- Turia
- Júcar
- Serpis
- Marina Alta
- Marina Baja
- Vinalopó-Alacantí

La determinación de los recursos hídricos, integrando las aguas superficiales y subterráneas, se realiza restituyendo al régimen natural los datos de aforos o planteando en su caso los balances hydrological correspondientes.

2.- La protección del medio acuático y la dimensión medioambiental del Plan

Siguiendo las pautas marcadas por la Ley de Aguas el Plan pretende, entre otros objetivos, racionalizar los usos del agua en armonía con el medio ambiente y el resto de recursos naturales, para ello incorpora un conjunto de normas de protección medioambiental.

LA CALIDAD DE LAS AGUAS

El control y la lucha contra la contaminación de las aguas constituye uno de los grandes retos para los responsables del medio ambiente, la salud y la política hidráulica de la cuenca del Júcar. El Plan persigue mejorar la calidad de las aguas de la cuenca, por lo que se han establecido unos requisitos de calidad en función de los usos, fijando unos objetivos de calidad para los ríos de la cuenca, masas de agua libre, captaciones de agua potable, acuíferos y zonas sensibles, que garanticen que su cumplimiento proporcionará un medio ambiente adecuado. Señala las directrices a seguir en materia de depuración y vertidos y los criterios a adoptar en las distintas actuaciones. Define la reutilización planificada de los efluentes y adopta la normativa de vertidos vigente, indicando las actuaciones en casos de emergencia y vertidos incontrolados. Plantea una serie de actuaciones básicas para el control de la calidad de las aguas, como la mejora en la explotación de la red Integral de Calidad de las Aguas (ICA), la ampliación de las actuales redes de control, la actualización del inventario de vertidos y la implantación progresiva de modelos de calidad. Establece, además, las normas generales para la ordenación de los vertidos.

LOS CAUDALES MEDIOAMBIENTALES

El Plan Hidrológico de cuenca del Júcar prevé una asignación de recursos para garantizar las necesidades del medio natural y que los caudales circulantes tengan asegurado un mínimo para la recuperación ambiental. Establece que la fijación de los caudales mínimos medioambientales se realice de forma individualizada para cada tramo de cauce a fin de precisar la demanda en cada época del año, marcándose como objetivo el mantenimiento de la dinámica de los ecosistemas actuales o su restablecimiento.

PERÍMETROS DE PROTECCIÓN. LA CONSERVACIÓN Y RECUPERACIÓN DEL RECURSO Y SU ENTORNO

El Plan recoge la relación de zonas húmedas y los tramos fluviales de interés ambiental existentes en la cuenca, estableciendo las medidas preventivas que

garanticen su conservación. Determina criterios y prioridades para delimitar perímetros de protección en las zonas húmedas, lagos y lagunas más importantes, mostrando el listado de los espacios singulares que serán objeto de protección. Potencia el mantenimiento o recuperación de aquellas zonas o tramos fluviales de interés medioambiental que no dispongan de figura de protección. Asume los espacios naturales protegidos declarados por las comunidades autónomas. Hoces de/ río Cabnel A Incluye la posibilidad de solicitar, de común acuerdo con la Autoridad Ambiental, estudios de impacto ambiental previos a los proyectos u obras que se proyecten y afecten a espacios protegidos. Establece criterios prioritarios para delimitar perímetros de protección de aguas subterráneas.

CONSERVACIÓN DE SUELOS Y PLANES HYDROLOGICAL-FORESTALES

El Plan, dentro de su ámbito territorial, asume los planes hydrological forestales y de conservación de suelos de las distintas Administraciones Públicas con responsabilidad en la Planificación Hidrológica Forestal y de Conservación de Suelos. Incluye la realización de labores de hidrotecnia, mejora de cubierta vegetal y labores de conservación de suelos agrícolas, como actuaciones a llevar a cabo. Adopta lo previsto, es este tema, por las Administraciones competentes, centrándose de manera específica en las afecciones que estos planes pueden producir al medio hídrico y a las infraestructuras. Los diferentes programas y actuaciones a desarrollar se realizarán de forma conjunta y coordinada con la Comunidad Autónoma implicada, de acuerdo con la distribución competencial existente.

3.- La gestión de situaciones de riesgo: avenidas, inundaciones y sequías

PROTECCIÓN FRENTE A LAS AVENIDAS

El Plan presta la mayor atención al fenómeno de inundación por avenidas. Propone, como líneas de actuación, para la protección contra avenidas un mejor conocimiento de las zonas afectadas, del fenómeno hidrológico-hidráulico y una definición y valoración de las actuaciones de previsión, prevención y corrección.

Define un inventario de zonas inundables y los criterios generales de ordenación de las mismas a desarrollar por el conjunto de las Administraciones competentes.

Considera como actuación básica, los estudios tendentes a la adecuación de las presas existentes al vigente Reglamento Técnico sobre Seguridad de Presas y Embalses, así como a la Directriz Básica de Planificación de Protección Civil ante el riesgo de inundaciones.

Dispone, para la predicción, seguimiento y control de avenidas, del Sistema Automático de Información Hidrológica (SAIH).

LUCHA CONTRA LAS SEQUÍAS

El Plan se enfrenta a situaciones de sequía hidrológica definiendo una serie de normas para las situaciones de emergencia, fundamentalmente en función de los recursos disponibles para cada demanda.

El objetivo de protección consiste en reducir la frecuencia y la intensidad de las situaciones en que la demanda no puede ser atendida y minimizar los efectos desfavorables ligados a situaciones de extrema escasez de recursos en los sistemas de explotación.

Determina dos líneas de actuación:

- Puesta en servicio de las infraestructuras básicas del Plan, tanto las de carácter general (incremento de los recursos del sistema) como las específicas para ser activadas en situaciones de sequía.
- Definición de normas de gestión de los sistemas de explotación de recursos en situaciones de sequía

4.- La utilización de los recursos

USOS Y DEMANDAS

El Plan dedica gran atención al estudio de los recursos disponibles, analizando con rigor el grado de eficiencia de los actuales aprovechamientos.

Analiza los diferentes usos del agua y las demandas existentes, estudiando como satisfacerlas en el momento actual y en un futuro. Contempla las restricciones de carácter medioambiental y las ligadas a la mejora de los acuíferos. Determina las dotaciones a emplear, fija niveles de eficiencia mínima y pone de manifiesto las posibles actuaciones de mejora de eficiencia para conseguir un ahorro de recursos.

El Plan propone hacer un uso racional del agua, mediante una estrategia activa y voluntaria a fin de que se moderen los consumos de agua, mejorando la gestión hidráulica en todos los usos y demandas.

Establece los criterios de garantía del suministro para reducir la vulnerabilidad y aumentar la seguridad frente a la irregularidad hidrológica o a incidencias de todo tipo.

Dado que la demanda agrícola en la cuenca supone cerca del 80% del total, con 2.284 hm3 anuales para 370.000 Has. de regadío, el Plan establece las dotaciones máximas de riego para las diferentes zonas así como la adecuación de los sistemas de regadío, a fin de alcanzar una eficiencia global mínima establecida en un 50, 70 y 80 % según el riego se realice por gravedad, aspersión o localizado.

Respecto al abastecimiento urbano el Plan exige que se destinen a él, los recursos de mejor calidad y los que, protegiendo su calidad, mejor garanticen el abastecimiento.

Se fijan los caudales medioambientales que garanticen el mantenimiento y la recuperación de los ecosistemas y promueve el aprovechamiento hidroeléctrico como fuente de energía limpia y renovable.

5.- Prioridad y compatibilidad de usos

El Plan establece, de acuerdo con lo dispuesto en la Ley de Aguas de 1985, un orden de prioridad de usos:

1. Abastecimiento a poblaciones
2. Agrarios
3. Hidroeléctricos
4. Refrigeración energética
5. Industriales, distintos de los dos anteriores
6. Acuicultura
7. Recreativos

8. Otros usos no clasificados

El Plan considera el mantenimiento de los caudales ecológicos, así como los caudales necesarios para la conservación de los humedales y su protección frente a la intrusión marina, como una restricción a las disponibilidades hídricas.

Fija un orden de preferencia de los aprovechamientos, dentro de la prioridad de usos, situando en primer lugar aquellos de mayor utilidad pública o general (por ejemplo abastecimientos públicos a Consorcios, Mancomunidades, etc.), seguidos de los que introduzcan mejoras técnicas que originen un menor consumo de agua y de los que causen una afección ambiental negativa menor. todos los recursos disponibles, el desarrollo de proyectos de carácter comunitario y cooperativo, la regulación de los recursos subterráneos y la conservación de su calidad, la sustitución, en el abastecimiento de poblaciones, de aguas subterráneas con problemas de calidad por otras de mejor calidad o por superficiales, todo ello enmarcado dentro de una política de ahorro de agua, de mejora de la calidad de los recursos y de recuperación de los valores ambientales.

6.- Asignación y reserva de recursos

La reserva de recursos se define como la correspondiente a las asignaciones establecidas, en previsión de las demandas que corresponde atender con las obras hidráulicas especificas, cuya realización sea competencia de la Administración Pública, del Estado o de las Comunidades Autónomas, o por fines de utilidad pública.

La asignación y reserva de recursos se establece para los horizontes del Plan, diez y veinte años, y para cada de los nueve sistemas de explotación en los que se estructura la cuenca.

Respecto a determinadas demandas no satisfechas adecuadamente con los recursos disponibles en el ámbito territorial, el Plan requiere expresamente el aporte de recursos cuyas características y procedencia serán determinados por el Plan Hidrológico Nacional.

En particular, y dada su complejidad, determinada por sus especiales características, se recogen las asignaciones y reservas de recursos en el sistema de explotación Júcar, que figuran en el artículo 32 de la Normativa de este Plan.

SISTEMA DE EXPLOTACION JUCAR

Criterios básicos

Consolidación de usos existentes con el siguiente orden de prioridad:

- Abastecimiento.
- Riegos tradicionales de la Ribera del Júcar.
- Riegos del acuífero de la Mancha Oriental y de la zona regable del canal Júcar-Turia.
- Indemnizaciones, en su caso, a las concesiones hidroeléctricas afectadas.
- Movilización de los caudales medioambientales.
- Sobreexplotación de acuíferos y déficit de abastecimientos en los sistemas del Vinalopó- Alacantí y la Marina Baja.
- Reservas para demandas futuras: recurso actual y generados con ahorro ó nuevas infraestructuras.

Asignaciones

- 725 hm3/año para los riegos tradicionales de la Ribera del Júcar.
- 40 hm3/año en cabecera y tramo medio del Río Júcar.
- 95 hm3/año para la zona regable del canal Júcar-Turia.
- Riegos del acuífero de la Mancha Oriental.
  - 320 hm3/año de recursos subterráneos.
  - 80 hm3/año de recursos superficiales para sustitución de recursos subterráneos
  - Cumplimiento de un Plan de Explotación.
  * Integración obligatoria de los usuarios en una única comunidad.
  * No podrán autorizarse nuevas extracciones posteriores al 1 de enero de 1997.

Reservas

- 3 m3/s completando los actuales 3 m3/s para el abastecimiento de Valencia.
- 1 m3/s para el abastecimiento de Sagunto.
- 1 m3/s para el abastecimiento de Albacete.
- Hasta 25 hm3/año para el abastecimiento y nuevos regadíos en Cuenca para mantenimiento demográfico.
- Hasta 65 hm3/año para consolidación y posibles nuevos regadíos en Castilla-La Mancha (Real Decreto 950/1989).
- Hasta 80 hm3/año para paliar la sobreexplotación y el déficit de abastecimiento en el Vinalopó-Alacantí y la Marina Baja, siendo necesario establecer normas de explotación. l
- Consolidado lo anterior, el Estado se reserva los nuevos recursos generados por mejora y modernización de regadíos que se distribuye de la siguiente manera:
  - Hasta 120 hm3/año para redotación y nuevas transformaciones en Castilla-La Mancha.
  - Hasta 120 hm3/año para la corrección de déficit hídrico en la Comunidad Valenciana, en primer lugar en la zona regable del canal Júcar-Turia y el resto en el sistema Vinalopó-Alacantí.

7.-Normas sobre aprovechamientos

El Plan Hidrológico de cuenca del Júcar, considerando las planificaciones de los diferentes sectores demandantes de agua, formaliza una amplia serie de normas que tiene por objeto garantizar una mejor utilización del recurso en los principales usos y aprovechamientos.

Desarrolla normas básicas sobre mejoras y transformaciones de regadío, sobre aprovechamientos anergéticos y sobre recarga y protección de acuíferos, definiendo las directrices sobre las concesiones y su revisión.

Respecto a los regadíos y usos agrícolas, el Plan trata de satisfacer todas las demandas potencial incluidas en el Plan Nacional de Regadíos o promovidas por los órganos competentes de las Comunidades Autónomas, dando preferencia a la mejora y consolidación de los regadíos existentes y especificando las zonas susceptibles de transformación en regadíos dentro de los horizontes de Plan.

Señala los requisitos que han de cumplir los estudios de viabilidad de los nuevos regadíos, fija los criterios de selección de las transformaciones (por ejemplo que exista o esté en vias de constituirse una comunidad de regantes), determina los sistemas de

información que deben incorporar las redes de riego y drenaje y especifica la necesidad de que las mejoras o transformaciones se provean de una evaluación medioambiental.

Identifica las zonas de actuación prioritaria para la reutilización de las aguas residuales teniendo en cuenta el grado de explotación de los recursos, las necesidades de agua para riego, la mejora de la calidad de las aguas subterráneas, la lucha contra la intrusión y otros usos admisibles.

Establece las condiciones sanitarias mínimas y los tratamientos requeridos para la reutilización de las aguas residuales depuradas en usos agrarios o recreativos, debiendo, su aplicación, ser objeto de un programa completo de seguimiento y control.

En lo que concierne a los aprovechamientos energéticos, el Plan establece los criterios de evaluación y los condicionantes a la ejecución de los citados aprovechamientos. Incorpora de manera automática, al primer horizonte, las instalaciones consideradas de forma concreta y expresa por el Plan Energético Nacional.

Identifica los posibles nuevos aprovechamientos y considera las condiciones medioambientales exigibles a las infraestructuras hidráulicas.

Fija normas para la explotación de las unidades hidrogeológicas, estudia los acuíferos sobreexplotados y define los perímetros de protección, extendiéndolos a las captaciones para abastecimientos y zonas de especial interés ecológico, paisajístico, cultural o económico.

Contempla posibles actuaciones en materia de recarga artificial.

Determina que cada concesión habrá de justificar adecuadamente las necesidades hídricas, el caudal anual requerido y su modulación durante el año, además de la rentabilidad económica del aprovechamiento.

8.- Infraestructuras y actuaciones básicas

Como consecuencia de los objetivos a atender por el sistema hidráulico de la cuenca, en el Plan se definen una serie de infraestructuras básicas necesarias, clasificándolas en función de su tipología:

- Corrección del déficit hídrico
- Saneamiento y depuración
- Defensa contra las inundaciones
- Mejora, modernización y conservación de infraestructuras
- Mejora y protección ambiental
- Nuevas transformaciones de regadío
- Equipamiento hidroeléctrico de las infraestructuras del Estado.

El Plan contempla además la realización de una serie de estudios y actuaciones complementarias estructuradas en los siguientes Programas:

- Gestión del Dominio Público Hidráulico y mantenimiento del patrimonio hidráulico.
- Corrección del déficit hídrico
- Calidad de las aguas
- Medio ambiente

- Defensa frente a avenidas
- Mejora y desarrollo de los aprovechamientos.
- Mantenimiento y reposición de la infraestructura hidráulica pública.
- Estudios preferentes de Investigación y Desarrollo.

9.- La gestión de la información del agua

El Sistema Automático de Información Hidrológica (SAIH), implantado en la cuenca, responde a la necesidad de racionalizar y agilizar el, uso cuantitativo del recurso mejorando los procesos de explotación en tres objetivos fundamentales:

- Informar suministrando automáticamente datos en tiempo real sobre las variables climáticas, hidrológicas y del estado de la infraestructura hidráulica de la cuenca.
- Prevenir a corto plazo la evolución de los niveles y caudales en los ríos y embalses, alertando de forma automática en casos de riesgo de inundación.
- Gestionar de forma integrada la explotación de los embalses y de las conducciones y canales de la cuenca mediante el conocimiento instantáneo de la disponibilidad de los recursos hidráulicos.
- A fin de cumplir todos estos objetivos se ha dispuesto una red de telemedida y telecontrol que transmite y procesa todas las variables captadas.

Integran esta Red 148 puntos de control o estaciones remotas y un centro operativo.

De forma similar, pero centrado en los aspectos de calidad del recurso hídrico, existe un Sistema Automático de Información de Calidad de las Aguas (SAICA), compuesta por estaciones automáticas ubicadas estratégicamente en puntos fluviales adecuados, para realizar una vigilancia permanente de las aguas.

Estas estaciones proporcionan información en tiempo real, realizando la medida en continuo de diferentes parámetros de calidad de las aguas, disponiendo de analizadores, instalaciones, equipos auxiliares y sistemas de adquisición y teletransmisión de datos de avanzada tecnología.

10.- La gestión del Plan

La Ley de Aguas determina que los planes hydrological sean públicos y vinculantes, sin perjuicio de su actualización periódica y revisión justificada.

El Plan Hidrológico de cuenca del Júcar se concibe como un instrum dinámico y flexible, abierto a un razonable y continuo proceso de reformula por los estudios, análisis y aportaciones que surjan a lo largo de su desarrollo.

El Consejo del Agua de cuenca, órgano colegiado de planificación de la Confederación, está presidido por el presidente del propio Organismo y cuenta representantes de la Administración central del Estado, las Comunidades Autónomas, los usuarios y los servicios técnicos del Organismo.

El Consejo del Agua de cuenca podrá acordar su revisión cuando las desviacion que se observen en los datos, hipótesis o resultados del Plan así lo aconseje. Por su parte, el Ministerio de Medio Ambiente podrá ordenar una acción revisora.

En todo caso, la Ley prevé que se lleve a cabo una revisión completa y periódica del Plan, cada ocho años, desde su aprobación.

El Consejo del Agua de cuenca será el responsable de elevar al Ministerio de Medio Ambiente las revisiones del Plan, para ello ha de contar con el apoyo técnico de la Oficina de Planificación Hidrológica de la Confederación Hidrográfica del Júcar.

La Confederación Hidrográfica del Júcar ha de realizar el seguimiento del Plan, informando acerca de su desarrollo, con periodicidad no superior a un año, a la Junta de Gobierno, al Consejo del Agua de cuenca y al Ministerio de Medioambiente.

Serán objeto de especial seguimiento los aspectos del Plan que conciernen a:

- la variación en la disponibilidad de los recursos
- la concurrencia de circunstancias no previstas que hagan imposible la realización de determinadas obras esenciales
- la modificación del sistema de financiación de manera que no sea posible el cumplimiento de los objetivos
- la incorporación de modificaciones derivadas de la aprobación del Plan Hidrológico Nacional la declaración de sobreexplotación de un acuífero o su riesgo de estarlo

El Plan estipula que, en el proceso de planificación, exista una presencia activa de todos los agentes que intervienen en la gestión de los Organismos de cuenca en régimen de participación, tales como la Asamblea de Usuarios, las Juntas de Explotación y las Comisiones de Desembalse.

Trata de potenciar el desarrollo sostenible y la ordenación del territorio de la cuenca, pero también de impulsar entre todos los ciudadanos una mayor conciencia y valoración medioambiental, paisajística y recreativa acerca del recurso y su entorno.

Las grandes conquistas del Plan

Se prevé que el Plan Hidrológico de cuenca del Júcar, al ejecutarse paso a paso, con el imprescindible consenso de la sociedad, expresado a través del Consejo del Agua, proporcione una serie de beneficios:

Abastecimiento a todas las poblaciones de la cuenca con aguas de calidad, con la garantía necesaria para permitir su desarrollo social y económico.

Mejor gestión del agua incrementando las eficiencias en su uso y perfeccionando el Organismo de cuenca en su vertiente funcional y administrativa.

Impulso decisivo a las actividades productivas, a la creación de riqueza y a la generación de empleo estable en todo el ámbito de la cuenca, con intervenciones de regulación y suministro ajustadas a los postulados de la nueva cultura del agua.

Preservación y regeneración de los ecosistemas hídricos.

Reforzamiento significativo de los aspectos medioambientales en todos los planteamientos y actuaciones del Organismo (establecimiento de caudales ecológicos en los ríos, lucha contra la contaminación de las aguas, mantenimiento y protección de espacios ribereños, etc.).

Minimización de las afecciones causadas por los embalses, con planes de restitución territorial.

Configuración más ágil y descentralizada del Organismo, fiel a su principio de subsidiariedad.

Un consenso social y político con relación a las denominadas "guerras del agua", mediante la transparencia en la asignación de los recursos hídricos disponibles y generados por actuaciones de mejora de eficiencia y reutilización de aguas residuales depuradas.

Con la mirada puesta en el futuro

El agua es un elemento natural imprescindible para la vida. Constituye uno de los bienes que hacen único a nuestro planeta.

La vida que surgió del agua continúa dependiendo de ella.

Forma una parte muy importante de los seres vivos, es básica para su metabolismo y un componente fundamental de la dieta.

El agua es necesaria para la mayoría de las actividades productivas; para los cultivos agrícolas, la ganadería, la industria, la generación de energía, la salud personal, el saneamiento y el ornato de nuestras ciudades.

Los cursos y masas de agua, ríos y lagos, son creadores de paisajes, soporte de ecosistemas, motivo de asentamientos humanos, vertebradores de territorios, etc.

El agua es garantía para la libertad y la autonomía de pueblos y hombres. Manifestación de historia y tradiciones, generadora de señas de identidad cultural y clave de nuestro futuro.

Es símbolo de prosperidad y expresión de calidad de vida.

El agua es de dominio público.

Un rico patrimonio que hay que proteger y defender, mediante un uso eficiente y solidario que respete el bien común y que posibilite un futuro para los habitantes del territorio de la cuenca.

Annex 3: Spanish Organisation of the Hydraulic Administration

1): Organización española de la Administración hidráulica

. Introducción

La Constitución española (CE) organiza el Estado territorialmente en municipios, provincias y comunidades autónomas, gozando todas estas entidades de autonomía para la gestión de sus propios intereses (art. 137).

En el marco del estado autonómico (art. 2 CE), basándose en el principio de autonomía anterior y en el de descentralización territorial, el Estado y las Comunidades Autónomas ostentan competencias de distinto rango sobre las diferentes materias. Las competencias a ejercer pueden ser legislativas (potestad de

dictar leyes), reglamentarias (potestad de dictar reglamentos) y ejecutivas (cumplir y hacer cumplir las anteriores). La forma de repartirse estas competencias sobre cada una de las materias entre el Estado y las CCAA hace que se hable de:

Competencias exclusivas: cuando uno de los dos entes ostenta competencia plena sobre una materia.

Competencias compartidas: cuando cada uno de los entes se reparte las facultades. Por ejemplo el Estado dicta la legislación básica sobre una materia y la C.A. desarrolla la ley y la ejecuta.

Competencias concurrentes: cuando los dos entes ostentan las mismas facultades sobre la misma materia.

Así mismo, la CE establece en el art. 148 las materias cuya competencia pueden asumir las CCAA en sus Estatutos y en el art. 149 las que son competencia del Estado. Establece diferentes grados de competencia y, en el art. 150, la posibilidad de transferir competencias estatales mediante leyes marco y leyes de transferencia.

Pues bien, el problema del agua afecta a numerosas materias de las recogidas en la Constitución, como pueden ser medio ambiente, pesca, agricultura, energía, sanidad, deporte y ocio, protección civil, etc, sobre la que cada una de las entidades territoriales tiene algún grado de competencia.

2. Principios generales de la Administración Pública del Agua

El Dominio Público Hidráulico es Estatal

Respeto a la unidad de la cuenca hidrográfica, de los sistemas hidráulicos y del ciclo hidrológico

Tratamiento integral, economía del agua, desconcentración, descentralización, coordinación, eficacia y participación de los usuarios

Compatibilidad de la gestión pública del agua con la ordenación del territorio, la conservación y protección del medio ambiente y la restauración de la naturaleza

Cuenca hidrográfica como unidad de gestión. A este efecto se considera indivisible

Distinción de dos tipos de **cuencas hidrográficas** a efectos de distribución de competencias:

- **Cuencas Intercomunitarias**: su territorio comprende todo o parte de territorio de varias Comunidades Autónomas
- **Cuencas Intracomunitarias**: su terriotorio está comprendido íntegramente dentro del territorio de una Comunidad Autónoma

3. Funciones del Estado en relación con el Dominio Público Hidráulico:

La planificación hidrológica y la realización de los planes estatales de infraestructuras hidráulicas o cualquier otro estatal que forme parte de aquéllas

La adopción de las medidas precisas para el cumplimiento de los acuerdos y convenios internacionales en materia de aguas

El otorgamiento de concesiones referentes al dominio público hidráulico en las cuencas hidrográficas intercomunitarias

El otorgamiento de autorizaciones referentes al dominio público hidráulico, así como la tutela de éste, en las cuencas hidrográficas intercomunitarias. No obstante, la tramitación de las mismas podrá ser encomendada a las Comunidades Autónomas.

4. Régimen jurídico básico aplicable a las Comunidades Autónomas:

La Comunidad Autónoma que en virtud de sus Estatutos de Autonomía ejerza competencias sobre el dominio público hidráulico en cuencas hidrográficas comprendidas íntegramente dentro de su territorio, deberán ajustar el régimen jurídico de su administración hidráulico a las siguientes bases:

A los principios recogidos anteriormente

La representación de los ususarios en los órganos colegiados de la Administración hidráulica no será inferior al tercio de los miembros que los integren

Los actos y acuerdos que infrinjan la legislación hidráulica del Estado o no se ajusten a la planificación hidrológica y afecten a su competencia en materia hidráulica pueden ser impugnados ante jurisdicción contencioso-administrativa.

5. Marco competencial en materia de aguas

En el medio hídrico existen diversidad de elementos de distinta naturaleza: gea, flora o fauna, cuyos regímenes jurídicos son distintos y sus correspondientes **competencias están distribuidas, de forma exclusiva o compartida, entre el Estado y las Comunidades Autónomas**, de acuerdo con lo establecido en la Constitución y en los respectivos Estatutos de Autonomía.

La Constitución Española establece el siguiente marco competencial:

- Son **competencias exclusivas** del Estado en materia de aguas, las siguientes:

Artículo 149.1.22 de la Constitución: **legislación, ordenación y concesión de recursos y aprovechamientos hidraúlicos** cuando las aguas discurran por más de una Comunidad Autónoma (cuencas intercomunitarias) y la **autorización de las instalaciones eléctricas** cuando su aprovechamiento afecte a otra Comunidad o el transporte de energía salga de su ámbito territorial.

Artículo 149.1.24 de la Constitución: **Obras públicas de interés general** o cuya realización afecte a más de una Comunidad Autónoma.

- Y son **competencias que las Comunidades Autónomas** pueden asumir:

Artículo 148.1.10 de la Constitución: **los proyectos, construcción y explotación de los aprovechamientos hidráulicos, canales y regadíos** de interés de la Comunidad Autónoma; las **aguas minerales y termales**.

Todas las comunidades autónomas han asumido la competencia exclusiva en materia de ordenación y concesión de recursos y aprovechamientos hidráulicos cuando las aguas discurran íntegramente por al ámbito territorial de la comunidad autónoma.

Excepto Ceuta y Melilla, que han asumido únicamente funciones ejecutivas sobre proyectos, construcción y aprovechamientos hidraúlicos.

Así, de la propia Constitución parte un tratmiento diferente de la competencia estatal y autonómica, pues en tanto el criterio de asunción de la competencia autonómica relativa a los aprovechamientos, canales y regadíos es el del interés (art. 1481.10), la competencia estatal se rige por el criterio territorial (cuando las aguas discurran por más de una Comunidad Autónoma).

En la franja intermedia que puede hallarse entre ambos preceptos ha sido posible que las Comunidades Autónomas asuman estatutariamente competencias más allá de lo previsto en el art. 148.1.10, pero siempre con la limitación territorial que deriva de lo previsto en el art. 149.1.22.

En el marco de estos preceptos constitucionales, los Estatutos de Autonomía han recogido la competencia en materia de aguas del siguiente modo:

Aprovechamientos hidráulicos, canales y regadíos

Las Comunidades Autónomas que accedieron a la autonomía a través del artículo 151 de la Constitución asumieron en sus Estatutos la competencia exclusiva en materia de aprovechamientos hidráulicos, canales y regadíos cuando las aguas discurran íntegramente dentro del territorio de la Comunidad Autónoma.

Las Comunidades Autónomas que accedieron a la autonomía por la vía del artículo 143 de la Constitución, limitadas originalmentepor el artículo 148.1.10ª, asumieron la com,petencia en materia de proyectos, construcción y explotación de los aprovechamientos hidráulicos, canales y regadíos de interés de la Comunidad Autónoma, si bien todos los Estatutos añadieron una cláusula de territorialidad: cuando las aguas discurran íntegramente dentro del territorio de la Comunidad Autónoma.

Posteriormente, la Ley Orgánica 9/1992, de 23 de diciembre, de transferencia de competencias a las Comunidades Autónomas que accedieron a la autonomía por la vía del artículo 143 de la Constitución, transfirió a las Comunidades Autónomas de Asturias, Cantabria, La Rioja, Región de Murcia, Aragón, Castilla - La Mancha, Extremadura, Islas Baleares, Madrid y Castilla León la competencia exclusiva en materia de ordenación y concesión de recursos y aprovechamientos hidráulicos cuando las aguas discurran íntegramente por el ámbito territorial de la Comunidad Autónoma, competencia recogida posteriormente en las reformas de todos los Estatutos de Autonomía de las Comunidades Afectadas.

Las ciudades de Ceuta y Melilla han asumido únicamente funciones ejecutivas sobre proyectos, construcción y explotación de aprovechamientos hidráulicos.

Aguas minerales, termales y subterráneas

Actualmente todas las Comunidades Autónomas tienen competencia exclusiva sobre las aguas minerales y termales.

Sobre aguas subterráneas han asumido competencia exclusiva las siguientes Comunidades Autónomas: País Vasco, Cataluña, Galicia, Andalucía, Comunidad Valenciana, Navarra, Murcia, Aragón, Castilla - La Mancha y Madrid.

No obstante, en todos los textos de reforma de los Estatutos pendientes de aprobación en el Congreso, excepto el de Baleares (es decir, los de Asturias, Cantabria, La Rioja, Extremadura y Castilla y León), también se recoge dicha competencia.

Los Estatutos de Andalucía, Murcia, Castilla - La Mancha y Madrid, así como los textos pendientes de aprobación en el Congreso de los Estatutos de Cantabria y Extremadura, recogen una cláusula de territorialidad en relación con las aguas subterráneas cuando discurran íntegramente por el ámbito territorial de la Comunidad Autónoma.

El Estatuto de Canarias se refiere a las aguas, en todas sus manifestaciones, incluyendo este concepto, tanto las aguas minerales y termales como las subterráneas.

Por otra parte, cabe señañar que los artículos 137 y 140 CE recogen la garantía constitucional de la autonomía local, lo que, aún sin referencia específica al agua, alude al necesario respeto otorgado constitucionalmente al núcleo de intereses propios locales, dentro de los que se incluyen algunos aspectos relacionados con este recurso.

Esta distribución constitucional de competencias se concreta en el Texto Refundido de la Ley de Aguas que recoge ya la doctrina de la **Sentencia del Tribunal Constitucional, Pleno, 227/1988, de 29 de noviembre**, por la que se resolvieron diversos recursoso de inconstitucionalidad y conflictos positivos de competencias interpuestos por varias Comunidades Autónomas frente a la distribución competencial que establecía la **Ley 29/1985, de Aguas**.

Más información: Consultar texto relacionado en el Libro Blanco del Agua

6. La distribución de otras competencias

La descripción de los criterios específicos que rigen la distribución competencial en materia de aguas -en los que, como ya ha quedado expuesto, resulta decisivo el concepto de cuenca hidrográfica-, resultaría incompleto sin reseñar que, al propio tiempo, las aguas constituyen también el soporte físico de una pluralidad de actividades en las que tanto el Estado como las Comunidades Autónomas poseen competencias sectoriales.

La concurrencia en el mismo espacio físico de competencias de distrintas Administraciones Públicas con distinto objeto jurídico es un fenómeno habitual en distintos ámbitos y se refleja también en la STC 227/1988, que en su FJ 14 afirma que ...las normas que distribuyen competencias entre elEstado y las Comuniddes Autónomas sobre bienes de dominio público no prejuzgan necesariamente que la titularidad de los mismos corresponda a éste o a aquéllas, y que son, en priincipio, separables la propiedad pública de un bien y el ejercicio de competencias públicas que lo utlizan como soporte natural.

En este marco, se resume a continuación el sistema de distribución de competencias en aquellas materias que presentan una incidencia más clara en el sistema de gestión de las aguas continentales.

Distribución de competencias que establece la Constitución Española en las materias más significativas relacionadas con el Dominio Público Hidráulico.

MATERIA	ART. CE	ADMINISTRACIÓN
Pesca Fluvial y Acuicultura	148.1.11	Comunidad Autónoma
Agricultura	148.1.7	Comunidad Autónoma
Puertos no comerciales en aguas interiores	148.1.6	Comunidad Autónoma
Aguas minerales y termales	148.1.10	Comunidad Autónoma
Medio Ambiente	148.1.9 149.1.23	Comunidad Autónoma. Gestión y protección Estado.-Legislación Básica
Deporte y Ocio	148.1.19	Comunidad Autónoma
Turismo	148.1.18	Comunidad Autónoma
Aprovechamientos hidráulicos, canales y regadíos	148.1.10 149.1.22	Comunidad Autónoma Estado, cuando el agua discurra por más de una CA, o el transporte de energía salga de la CA
Montes	148.1.8 149.1.23	Comunidad Autónoma Estado.-Legislación Básica
Sanidad	148.1.21 149.1.16	Comunidad Autónoma Estado.-Legislación Básica y sanidad exterior
Minas y energía	149.2 149.1.25	Comunidad Autónoma Estado.-Legislación Básica
Obras públicas	148.1.4	Comunidad Autónoma Estado.-De interés general o afecten a más de una CA

Esta distribución constitucional de competencias se concreta en el **Texto Refundido de la Ley de Aguas, aprobado por Real decreto Legislativo, 1/2001, de 20 de julio**.

Agricultura
Deporte y ocio
Energía
Medio Ambiente y Vertidos
Obras hidráulicas
Pesca fluvial
Protección civil
Sanidad

7. Competencias asumidas en los Estatutos de Autonomía

- A continuación se presenta un listado en el que se indica donde se recogen estas competencias en los **Estatutos de Autonomía**:

C.A. Andalucía (LO 6/1981, de 30 de diciembre, Estatuto de Autonomía, Art.13.12 y 13.13)

C.A. Aragón (LO 8/1982, de 10 de agosto, Estatuto de Autonomía, Art.35.1)

Ppdo. Asturias (LO 7/81 de 30 de diciembre, Estatuto de Automía, Art. 10)

C.A. Illes Balears (LO 2/83, de 25 de febrero, Estatuto de Automía, Art. 10)

C.A. Canarias (LO 10/82, de 10 de agosto, Estatuto de Automía, Art. 30)

C.A. Cantabria (LO 8/81, de 30 de diciembre, Estatuto de Automíai, Art. 24)

C. Castilla y Léon (LO 4/83, de 25 de febrero, Estatuto de Automía, Art. 32)

C.A. Castilla-La Mancha (LO 9/82, de 10 de agosto, Estatuto de Automía, Art. 31)

C.A. Cataluña (LO 4/1979, de 18 de diciembre, Estatuto de Automía, Art. 9)

C.A. Extremadura (LO 1/83, de 25 de febrero, Estatuto de Automía, Art. 7)

C.A. Galicia (LO 1/81, de 6 de abril, Estatuto de Automía, Art.27)

C.A. Madrid (LO 3/83, de 25 de febrero, Estatuto de Automía, Art. 26)

C.A. Reg. de Murcia (LO 4/82, de 9 de junio, Estatuto de Automía, Art. 10)

C. Foral de Navarra (Ley Orgánica 13/82, de 10 de agosto, de reintegración y amejoramiento del Régimen Foral de Navarra, Estatuto de Automía, Art. 44)

C. A. País Vasco (LO 3/79, de 18 de diciembre, Estatuto de Automía, Art. 10)

C.A. La Rioja (LO 3/82, de 9 de junio, Estatuto de Automía, Art. 8)

C. Valenciana (LO 5/82, de 1 de julio, Estatuto de Automía, Art. 31)

Ciudad de Ceuta (Ley Orgánica 1/1995, de 13 de marzo, de Estatuto de Automía, Art. 21)

Ciudad de Melilla (Ley Orgánica 2/1995, de 13 de marzo, de Estatuto de Autonomía, Art. 21)

8. Concurrencia de competencias

En los casos en que sobre un mismo acto concurren competencias de distintas administraciones la regla general, dejando a salvo los supuestos de informe previo, es que se precisan las autorizaciones de todas y cada una de las administraciones competentes, sin que el disponer de una de elllas exima de disponer de las demás. A continuación se muestra una tabla con las competencias y Administraciones que más frecuentemente concurren en el Dominio Público Hidráulico

ADMINISTRACIÓN	NORMA	ORGANISMO	MATERIA
ESTADO	Art. 149 CE TRLA*	CONFEDERACION	DOMINO PÚBLICO HIDRÁULICO
COMUNIDAD AUTÓNOMA	Art. 148 Constitución	CONSEJERÍA	SANIDAD MINAS MEDIO AMBIENTE CAZA PESCA MONTES

			URBANISMO A. MINERALES Y TERMANLES DEPORTE, OCIO Y TURISMO AGRICULTURA Y GANADERÍA
AYUNTAMIENTOS	LBRL**	CONCEJALÍA	URBANISMO ABASTECIMIENTO SANEAMIENTO RECOGIDA DE BASURAS

* Texto Refundido de la Ley de Aguas

** Ley Reguladora de Bases del Régimen Local

Annex 4: Fao Tables

Spain	Total area (1000 ha)	Arable land (1000 ha)	Permanent crops (1000 ha)	Cultivated area (arable land and permanent crops) (1000 ha)	Total population (1000 inhab)	Rural population (1000 inhab)	Urban population (1000 inhab)	Population density (inhab/km2)	Total economically active population in agriculture (1000 inhab)	Male economically active population in agriculture (1000 inhab)	Female economically active population in agriculture (1000 inhab)
1978-1982	50 599	15 565	4 922	20 487	38 005	10 070	27 935	75.11	2 471	1 764	707
1983-1987	50 599	15 584	4 806	20 390	38 814	9 817	28 997	76.71	2 125	1 487	638
1988-1992	50 599	15 201	4 746	19 947	39 556	9 649	29 907	78.18	1 765	1 220	545
1993-1997	50 599	14 285	4 774	19 059	40 264	9 659	30 605	79.57	1 482	1 007	475
1998-2002	50 532	13 738	4 977	18 715	40 977	9 653	31 324	81.09	1 220	817	403
2003-2007	50 537	13 738	4 977	18 715	41 184	9 627	31 501	81.49	1 113	743	370
2008-2012											
Std. Dev	33.35	872.1	104.1	821.8	1 247	173.1	1 388	2.506	529.5	397.3	132.4

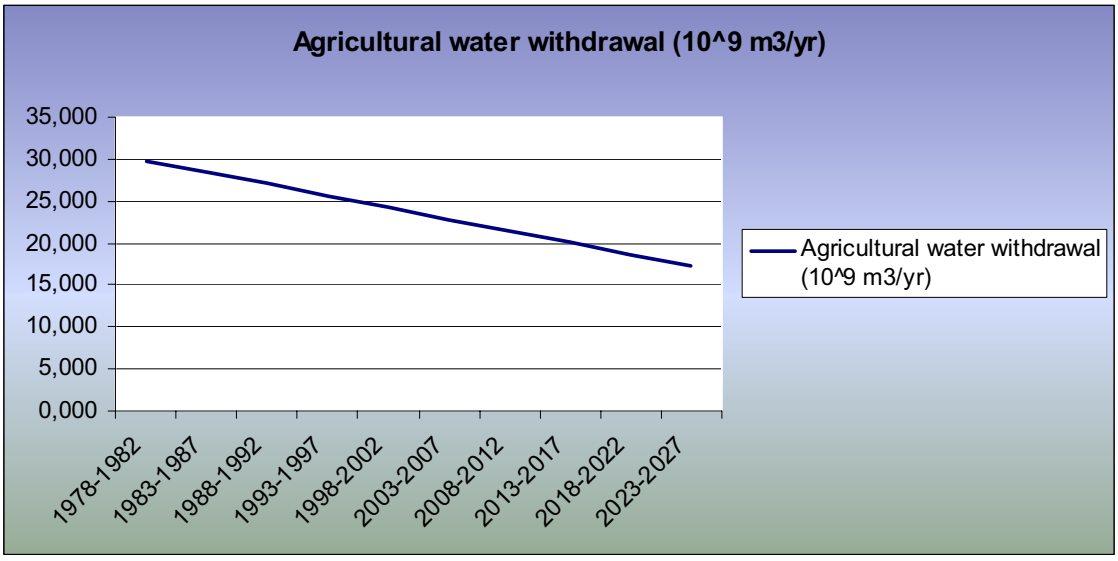
Spain	Average precipitation in volume (10^9 m3/yr)	Average precipitation in depth (mm/yr)	Groundwater: produced internally (10^9 m3/yr)	Surface water: produced internally (10^9 m3/yr)	Overlap: surface and groundwater (10^9 m3/yr)	Water resources: total internal renewable (10^9 m3/yr)	Water resources: total internal per capita (m3/inhab/yr)	Water resources: total external (actual) (10^9 m3/yr)	Water resources: total renewable (actual) (10^9 m3/yr)	Water resources: total renewable per capita (actual) (m3/inhab/yr)	Dependency ratio (%)
1978-1982	321.8	636	29.9	109.5	28.2	111.2	2 926	0.3	111.5	2 934	0.269
1983-1987	321.8	636	29.9	109.5	28.2	111.2	2 865	0.3	111.5	2 873	0.269
1988-1992	321.8	636	29.9	109.5	28.2	111.2	2 811	0.3	111.5	2 819	0.269
1993-1997	321.8	636	29.9	109.5	28.2	111.2	2 762	0.3	111.5	2 769	0.269
1998-2002	321.4	636	29.9	109.5	28.2	111.2	2 714	0.3	111.5	2 721	0.269
2003-2007	321.4	636	29.9	109.5	28.2	111.2	2 700	0.3	111.5	2 707	0.269
2008-2012	321.7	636	29.9	109.5	28.2	111.2		0.3	111.5		0.269
Std. Dev	0.1941	0	0	0	0	0	88.33	0	0	88.57	0

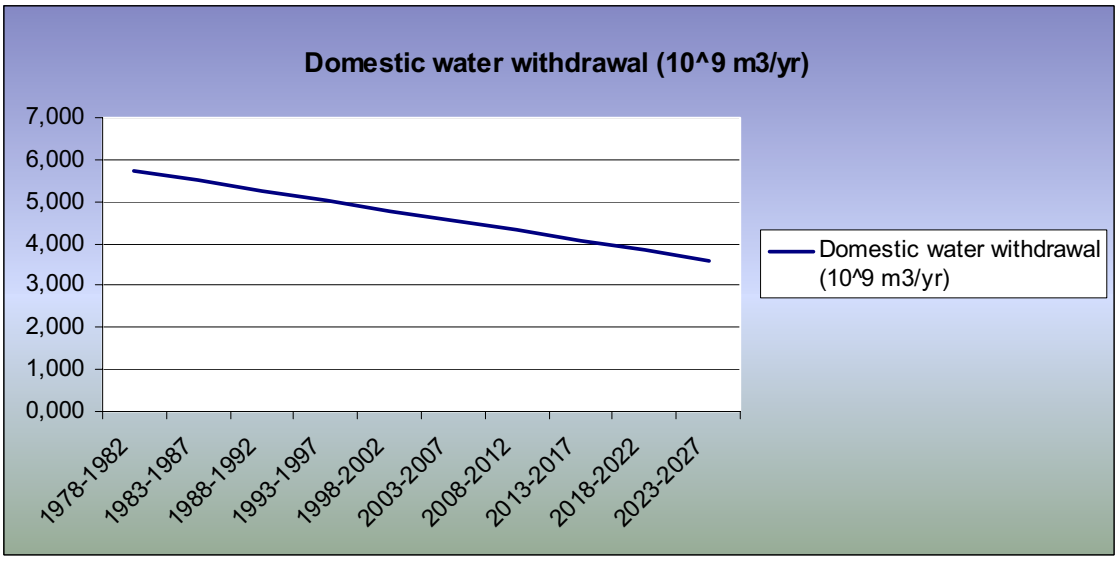
Spain	Water resources: total exploitable (10^9 m3/yr)	Total dam capacity (km3)	Agricultural water withdrawal (10^9 m3/yr)	Domestic water withdrawal (10^9 m3/yr)	Industrial water withdrawal (10^9 m3/yr)	Total water withdrawal (summed by sector) (10^9 m3/yr)	Agricultural water withdrawal as part of total (%)	Domestic water withdrawal as part of total (%)	Industrial water withdrawal as part of total (%)	Total water withdrawal : per capita (m3/inhab/yr)	Desalinated water produced (10^9 m3/yr)
1978-1982	46.3										
1983-1987	46.3		28.43	5.502	11.92	45.85	62	12	26	1 181	
1988-1992	46.3										0.1002
1993-1997	46.3										
1998-2002	46.3		24.24	4.79	6.6	35.63	68.03	13.44	18.52	869.5	
2003-2007	46.3										
2008-2012	46.3										
Std. Dev	0		2.961	0.5035	3.763	7.227	4.266	1.021	5.287	220.4	

Spain	Ag water withdrawal as perc of total renewable water resources (a) (%)	Total water withdrawal as perc of total renewable water resources (a) (%)	Area equipped for irrigation: full control - localized (1000 ha)	Area equipped for irrigation: total (1000 ha)	Flood recession cropping area non-equipped (1000 ha)	Cultivated wetlands and inland valley bottoms non-equipped (1000 ha)	Agricultural water managed area: total (1000 ha)	Area equipped for irrigation: actually irrigated (1000 ha)	Area equipped for irrigation as perc of agricultural water managed area (%)	Part of area equipped for irrigation actually irrigated (%)	Area equipped for irrigation as percentage of cultivated land (%)
1978-1982							3 029				
1983-1987	25.5	41.12	112.5				3 217				
1988-1992			160	3 402			3 402	3 360	100	98.77	17.06
1993-1997				3 527							18.51
1998-2002	21.74	31.96		3 735	0	0	3 735		100		19.96
2003-2007											
2008-2012											
Std. Dev	2.655	6.481	33.59	168.2			300.9		0		1.451

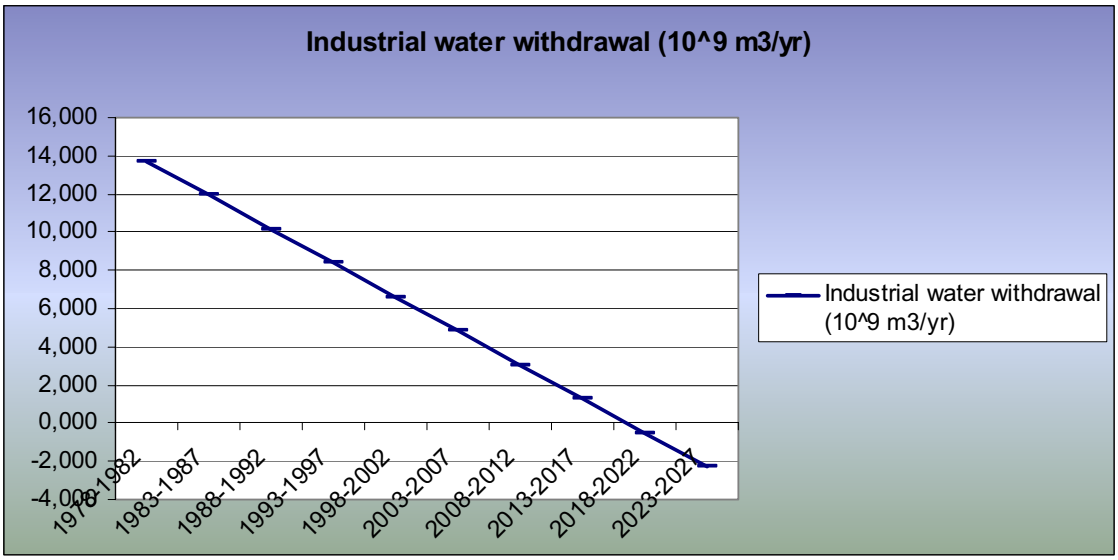
Annex 5: Extrapolation of data Tables
Interpolation of the linearly obtained data in point 3[1]

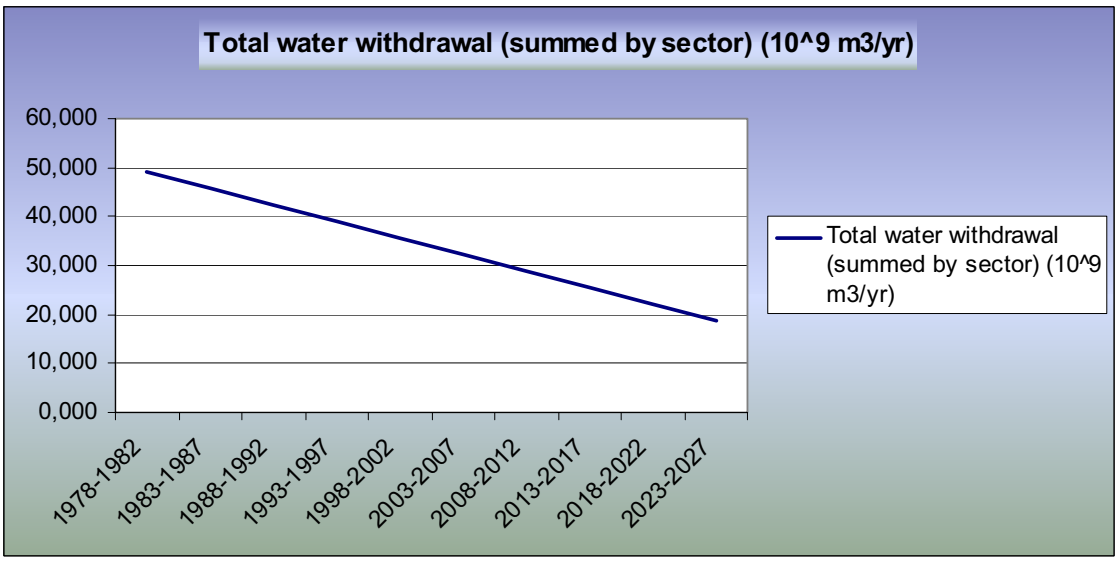
Spain	Water resources: total exploitable (10^9 m3/yr)	Total dam capacity (km3)	Agricultural water withdrawal (10^9 m3/yr)	Domestic water withdrawal (10^9 m3/yr)	Industrial water withdrawal (10^9 m3/yr)	Total water withdrawal (summed by sector) (10^9 m3/yr)	Agricultural water withdrawal as part of total (%)	Domestic water withdrawal as part of total (%)	Industrial water withdrawal as part of total (%)	Total water withdrawal : per capita (m3/inhab/ yr)	Desalinated water produced (10^9 m3/yr)
1978-1982	46.3		29,826	5,739	13,694	49,259	60,55	11,65	27,80		
1983-1987	46.3		**28,430**	**5,502**	**11,920**	**45,852**	**62,00**	**12,00**	**26,00**	**1 181**	
1988-1992	46.3		27,033	5,265	10,147	42,445	63,69	12,40	23,91		0.1002
1993-1997	46.3		25,636	5,028	8,374	39,038	65,67	12,88	21,45		
1998-2002	46.3		**24,240**	**4,790**	**6,600**	**35,630**	**68,03**	**13,44**	**18,52**	**869.5**	
2003-2007	46.3		22,843	4,553	4,827	32,223	70,89	14,13	14,98		
2008-2012	46.3		21,446	4,316	3,054	28,816	74,43	14,98	10,60		
2013-2017	46.3		20,049	4,078	1,281	25,408	78,91	16,05	5,04		
2018-2022	46.3		18,653	3,841	**-0,493**	22,001	84,78	17,46	-2,24		
2023-2027	46.3		17,256	3,604	**-2,266**	18,594	92,81	19,38	-12,19		
Std. Dev	0										





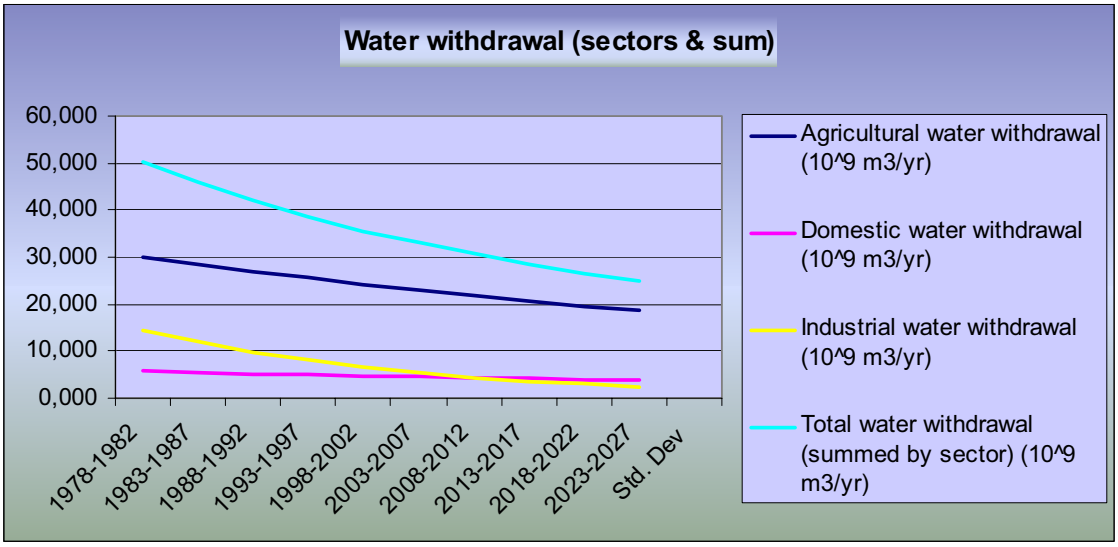
[1] Data obtained through extrapolation have been considered when analysed in the National Report, but a quantitative valuation has been chosen due to the lack of data in the series. Therefore, these calculations are only orientative.


Industrial water withdrawal (10^9 m3/yr)
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0,000
-2,000
-4,000
1978-1982
1983-1987
1988-1992
1993-1997
1998-2002
2003-2007
2008-2012
2013-2017
2018-2022
2023-2027
Industrial water withdrawal (10^9 m3/yr)


Total water withdrawal (summed by sector) (10^9 m3/yr)
60,000
50,000
40,000
30,000
20,000
10,000
0,000
1978-1982
1983-1987
1988-1992
1993-1997
1998-2002
2003-2007
2008-2012
2013-2017
2018-2022
2023-2027
Total water withdrawal (summed by sector) (10^9 m3/yr)

Interpolation of the data obtained in point 3 in an exponential way[2]

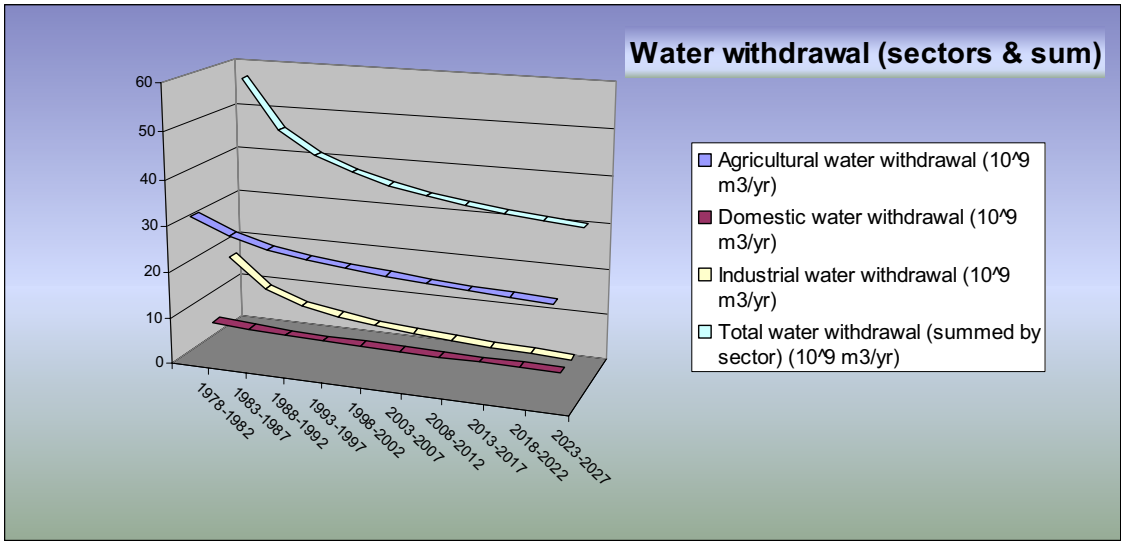
Spain	Water resources: total exploitable (10^9 m3/yr)	Total dam capacity (km3)	Agricultural water withdrawal (10^9 m3/yr)	Domestic water withdrawal (10^9 m3/yr)	Industrial water withdrawal (10^9 m3/yr)	Total water withdrawal (summed by sector) (10^9 m3/yr)	Agricultural water withdrawal as part of total (%)	Domestic water withdrawal as part of total (%)	Industrial water withdrawal as part of total (%)	Total water withdrawal : per capita (m3/inhab/ yr)	Desalinated water produced (10^9 m3/yr)
1978-1982	46.3		29,983	5,762	14,517	50,262	59,65	11,46	28,88		
1983-1987	46.3		**28,430**	**5,502**	**11,920**	**45,852**	**62,00**	**12,00**	**26,00**	**1 181**	
1988-1992	46.3		26,962	5,253	9,790	42,005	64,19	12,51	23,31		0.1002
1993-1997	46.3		25,568	5,016	8,039	38,623	66,20	12,99	20,81		
1998-2002	46.3		**24,240**	**4,790**	**6,600**	**35,630**	**68,03**	**13,44**	**18,52**	**869.5**	
2003-2007	46.3		22,992	4,574	5,421	32,986	69,70	13,87	16,43		
2008-2012	46.3		21,803	4,367	4,452	30,621	71,20	14,26	14,54		
2013-2017	46.3		20,675	4,170	3,656	28,501	72,54	14,63	12,83		
2018-2022	46.3		19,606	3,982	3,002	26,590	73,73	14,97	11,29		
2023-2027	46.3		18,592	3,802	2,465	24,859	74,79	15,29	9,92		
Std. Dev	0										



[2] Data obtained through extrapolation have been considered when analysed in the National Report, but a quantitative valuation has been chosen due to the lack of data in the series. Therefore, these calculations are only orientative.

Interpolation of the potentially obtained data in point 3[3]

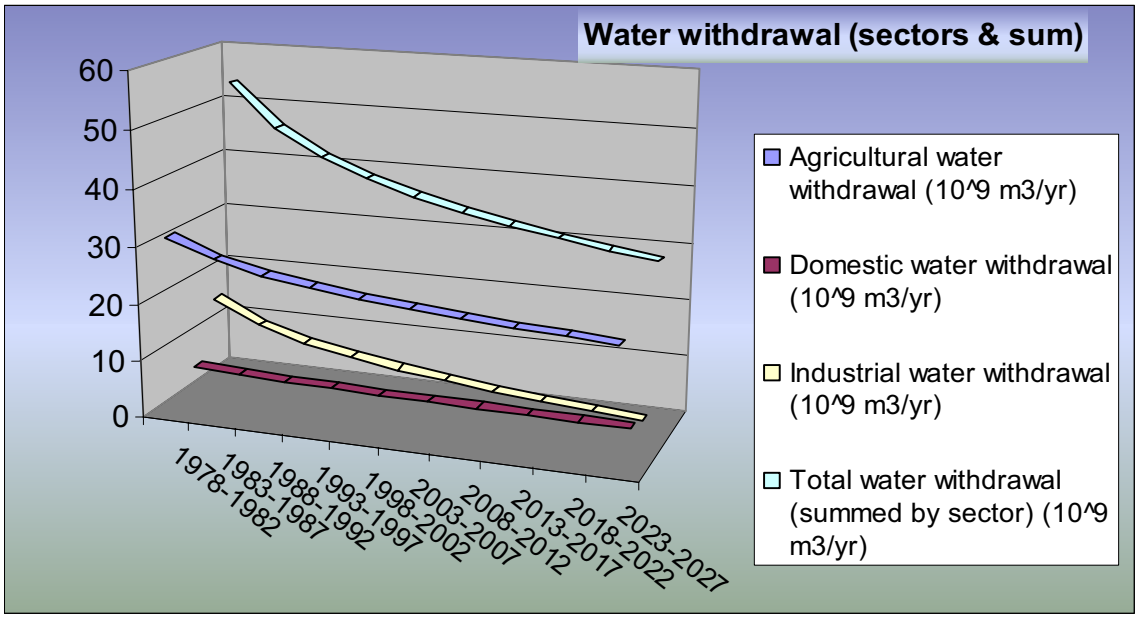
Spain	Water resources: total exploitable (10^9 m3/yr)	Total dam capacity (km3)	Agricultural water withdrawal (10^9 m3/yr)	Domestic water withdrawal (10^9 m3/yr)	Industrial water withdrawal (10^9 m3/yr)	Total water withdrawal (summed by sector) (10^9 m3/yr)	Agricultural water withdrawal as part of total (%)	Domestic water withdrawal as part of total (%)	Industrial water withdrawal as part of total (%)	Total water withdrawal : per capita (m3/inhab/ yr)	Desalinated water produced (10^9 m3/yr)
1978-1982	46.3		32,074	6,110	18,642	56,826	56,44	10,75	32,81		
1983-1987	46.3		**28,430**	**5,502**	**11,920**	**45,852**	**62,00**	**12,00**	**26,00**	**1 181**	
1988-1992	46.3		26,493	5,175	9,176	40,844	64,86	12,67	22,47		0.1002
1993-1997	46.3		25,200	4,955	7,622	37,776	66,71	13,12	20,18		
1998-2002	46.3		**24,240**	**4,790**	**6,600**	**35,630**	**68,03**	**13,44**	**18,52**	**869.5**	
2003-2007	46.3		23,483	4,660	5,867	34,010	69,05	13,70	17,25		
2008-2012	46.3		22,862	4,553	5,312	32,726	69,86	13,91	16,23		
2013-2017	46.3		22,337	4,462	4,873	31,671	70,53	14,09	15,39		
2018-2022	46.3		21,883	4,383	4,517	30,783	71,09	14,24	14,67		
2023-2027	46.3		21,486	4,314	4,220	30,019	71,57	14,37	14,06		
Std. Dev	0										



[3] Data obtained through extrapolation have been considered when analysed in the National Report, but a quantitative valuation has been chosen due to the lack of data in the series. Therefore, these calculations are only orientative.

Interpolation of the data obtained in point 3 in a logarithmic way[4]

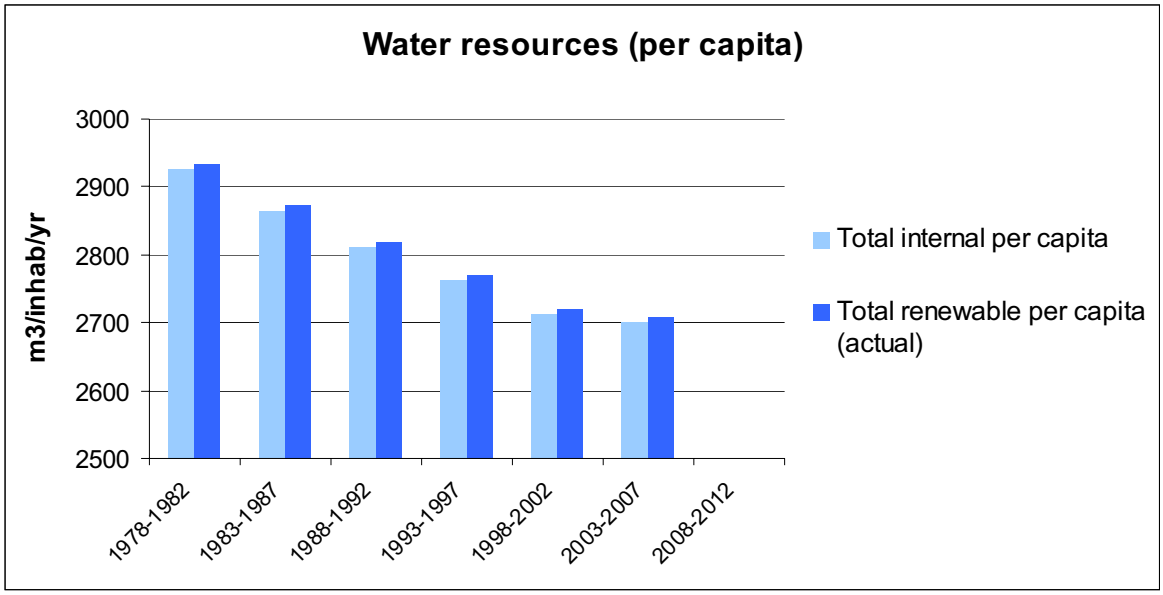
Spain	Water resources: total exploitable (10^9 m3/yr)	Total dam capacity (km3)	Agricultural water withdrawal (10^9 m3/yr)	Domestic water withdrawal (10^9 m3/yr)	Industrial water withdrawal (10^9 m3/yr)	Total water withdrawal (summed by sector) (10^9 m3/yr)	Agricultural water withdrawal as part of total (%)	Domestic water withdrawal as part of total (%)	Industrial water withdrawal as part of total (%)	Total water withdrawal : per capita (m3/inhab/ yr)	Desalinated water produced (10^9 m3/yr)
1978-1982	46.3		31,600	6,041	15,944	53,585	58,97	11,27	29,75		
1983-1987	46.3		28,430	5,502	11,920	45,852	62,00	12,00	26,00	1 181	
1988-1992	46.3		26,576	5,187	9,565	41,329	64,30	12,55	23,14		0.1002
1993-1997	46.3		25,261	4,963	7,895	38,119	66,27	13,02	20,71		
1998-2002	46.3		24,240	4,790	6,600	35,630	68,03	13,44	18,52	869.5	
2003-2007	46.3		23,407	4,648	5,541	33,596	69,67	13,84	16,49		
2008-2012	46.3		22,702	4,529	4,646	31,876	71,22	14,21	14,58		
2013-2017	46.3		22,091	4,425	3,871	30,387	72,70	14,56	12,74		
2018-2022	46.3		21,553	4,333	3,187	29,073	74,13	14,91	10,96		
2023-2027	46.3		21,071	4,251	2,575	27,897	75,53	15,24	9,23		
Std. Dev	0		2.961	0.5035	3.763	7.227	4.266	1.021	5.287	220.4	



[4] Data obtained through extrapolation have been considered when analysed in the National Report, but a quantitative valuation has been chosen due to the lack of data in the series. Therefore, these calculations are only orientative.

Annex 6: Water resources: graphs and tables (Point 2).

Spain	Groundwater: produced internally (10^9 m3/yr)	Surface water: produced internally (10^9 m3/yr)	Overlap: surface and groundwater (10^9 m3/yr)	Water resources: total internal renewable (10^9 m3/yr)	Water resources: total external (actual) (10^9 m3/yr)	Water resources: total renewable (actual) (10^9 m3/yr)	Total internal per capita	Total renewable per capita (actual)	Rural population (1000 inhab)	Average precipitation in depth (mm/yr)
1978-1982	29,9	109,5	28,2	111,2	0,3	111,5	2925,93	2933,82	10070	636
1983-1987	29,9	109,5	28,2	111,2	0,3	111,5	2864,95	2872,67	9817	636
1988-1992	29,9	109,5	28,2	111,2	0,3	111,5	2811,20	2818,79	9649	636
1993-1997	29,9	109,5	28,2	111,2	0,3	111,5	2761,77	2769,22	9659	636
1998-2002	29,9	109,5	28,2	111,2	0,3	111,5	2713,72	2721,04	9653	636
2003-2007	29,9	109,5	28,2	111,2	0,3	111,5	2700,08	2707,36	9627	636
2008-2012	29,9	109,5	28,2	111,2	0,3	111,5				636
Mean	29,9	109,5	28,2	111,2	0,3	111,5	2796,27	2803,82	9745,83	636
Std. Dev	0	0	0	0	0	0	88,33	88,57	173,09	0

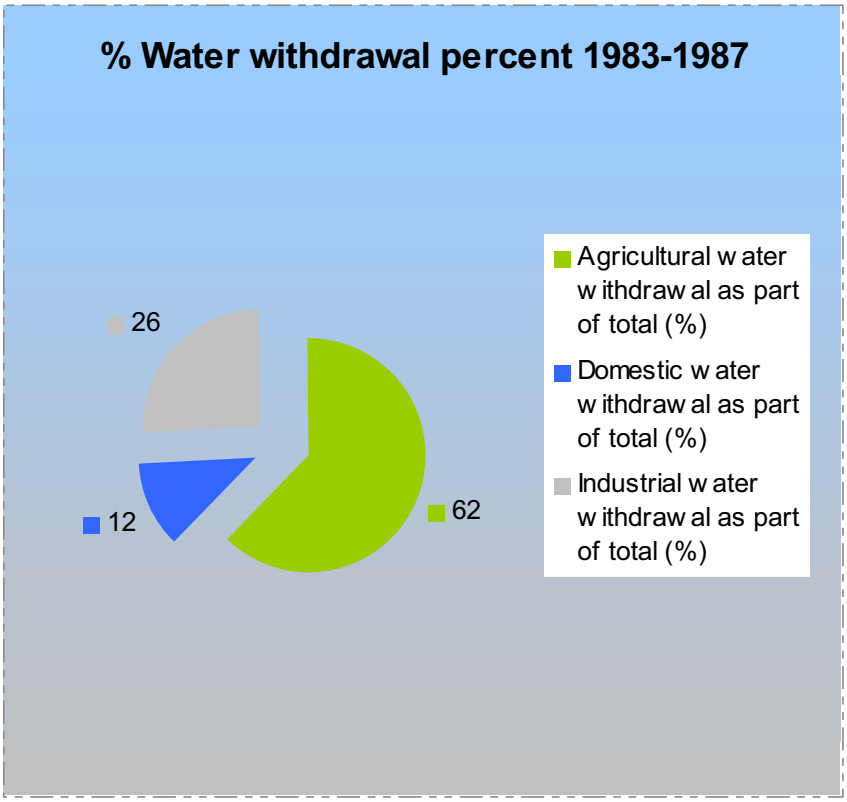


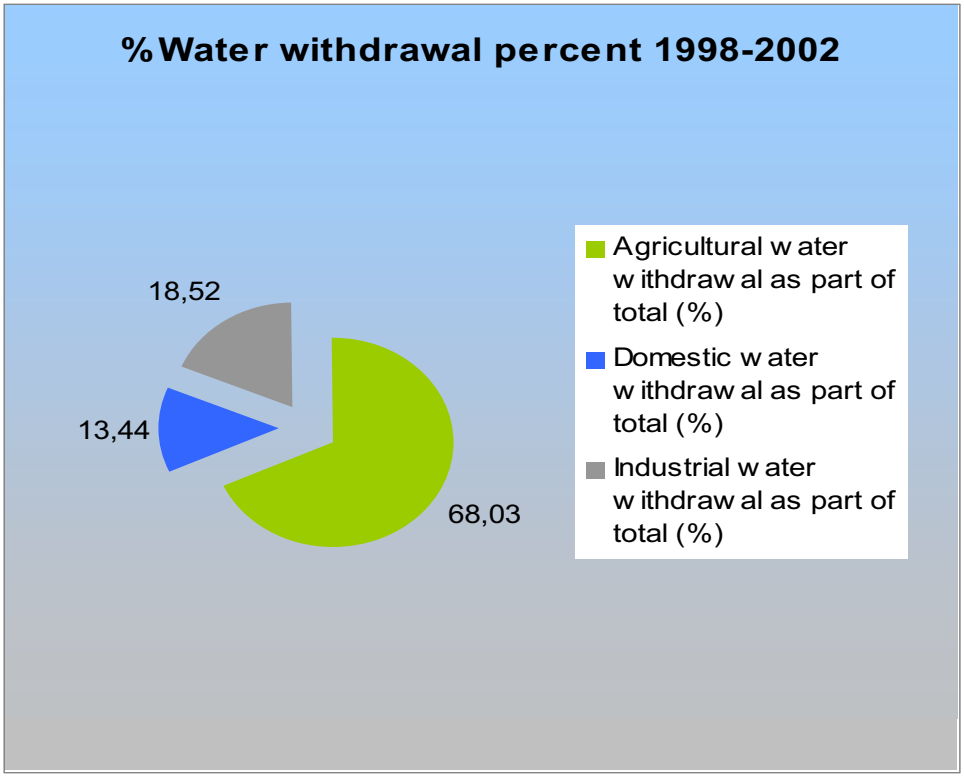
Annex 7: Water withdrawal: graphs and tables. (Point 3)

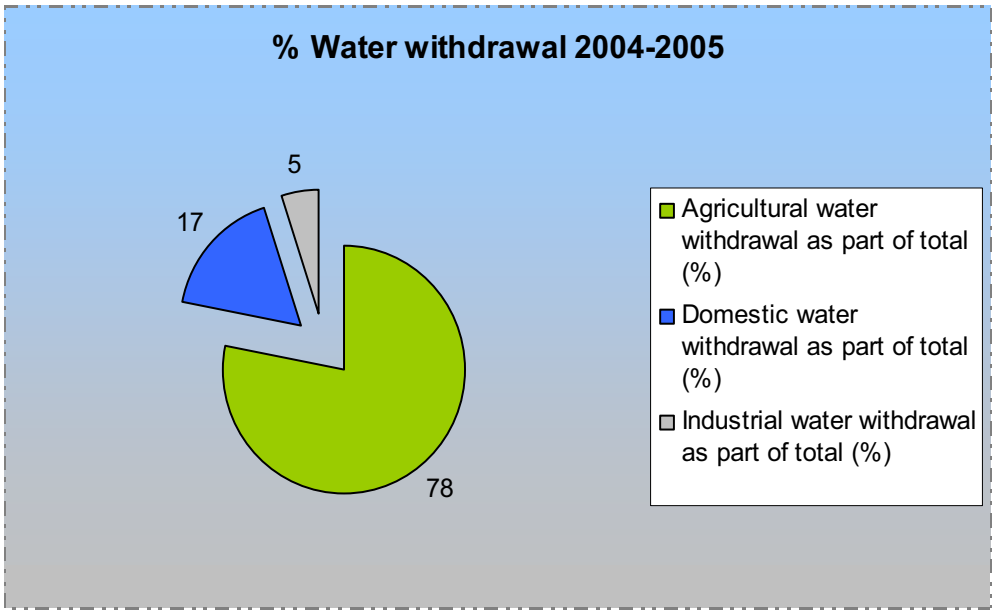
Spain	Water resources: total exploitable (10^9 m3/yr)	Agricultural water withdrawal (10^9 m3/yr)	Domestic water withdrawal (10^9 m3/yr)	Industrial water withdrawal (10^9 m3/yr)	Total water withdrawal (summed by sector) (10^9 m3/yr)	Agricultural water withdrawal as part of total (%)	Domestic water withdrawal as part of total (%)	Industrial water withdrawal as part of total (%)	Total water withdrawal: per capita (m3/inhab/yr)	Desalinated water produced (10^9 m3/yr)
1983-1987	46.3	28.43	5.502	11.92	45.85	62	12	26	1 181	
1988-1992	46.3					0	0	0		0.1002
1998-2002	46.3	24.24	4.79	6.6	35.63	68,03	13,44	18,52	869.5	
Std. Dev	0	2.961	0.5035	3.763	7.227	4.266	1.021	5.287	220.4	

Spain	Ag water withdrawal as perc of total renewable water resources (a) (%)	Total water withdrawal as perc of total renewable water resources (a) (%)	Area equipped for irrigation: full control - localized (1000 ha)	Area equipped for irrigation: total (1000 ha)	Agricultural water managed area: total (1000 ha)	Area equipped for irrigation: actually irrigated (1000 ha)	Area equipped for irrigation as perc of agricultural water managed area (%)	Part of area equipped for irrigation actually irrigated (%)	Area equipped for irrigation as percentage of cultivated land (%)
1978-1982					3 029				
1983-1987	25.5	41.12	112.5		3 217				
1988-1992			160	3 402	3 402	3 360	100	98.77	17.06
1993-1997				3 527					18.51
1998-2002	21.74	31.96		3 735	3 735		100		19.96
Std. Dev	2655	6481	33.59	168.2	300.9		0		1451

Agricultural water withdrawal as part of total (%)	Domestic water withdrawal as part of total (%)	Industrial water withdrawal as part of total (%)
78	17	5

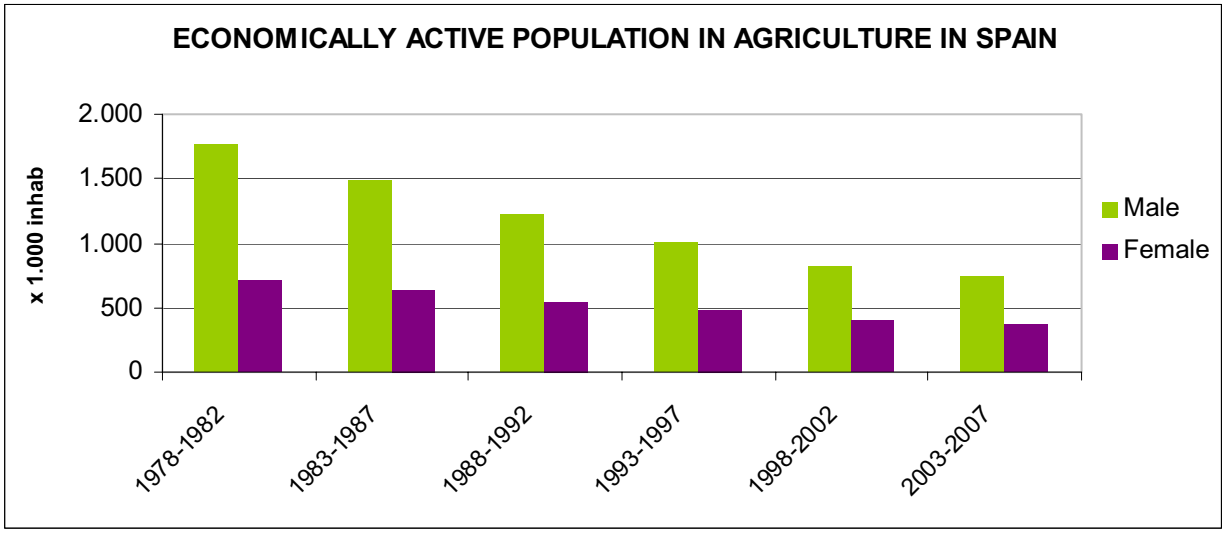



%Water withdrawal percent 1998-2002
18,52
13,44
68,03
Agricultural w ater w ithdraw al as part of total (%)
Domestic w ater w ithdraw al as part of total (%)
Industrial w ater w ithdraw al as part of total (%)


% Water withdrawal 2004-2005
5
17
78
Agricultural water withdrawal as part of total (%)
Domestic water withdrawal as part of total (%)
Industrial water withdrawal as part of total (%)

Annex 8: Crops and active population: graphs and tables. (Point 5)

Spain	Total area (1000 ha)	Arable land (1000 ha)	Permanent crops (1000 ha)	Cultivated area (arable land and permanent crops) (1000 ha)	Total population (1000 inhab)	Rural population (1000 inhab)	Urban population (1000 inhab)	Population density (inhab/km2)	Total economically active population in agriculture (1000 inhab)	Male	Female
1978-1982	50 599	15 565	4 922	20 487	38 005	10 070	27 935	75.11	2 471	1.764	707
1983-1987	50 599	15 584	4 806	20 390	38 814	9 817	28 997	76.71	2 125	1.487	638
1988-1992	50 599	15 201	4 746	19 947	39 556	9 649	29 907	78.18	1 765	1.220	545
1993-1997	50 599	14 285	4 774	19 059	40 264	9 659	30 605	79.57	1 482	1.007	475
1998-2002	50 532	13 738	4 977	18 715	40 977	9 653	31 324	81.09	1 220	817	403
2003-2007	50 537	13 738	4 977	18 715	41 184	9 627	31 501	81.49	1 113	743	370
2008-2012											
Std. Dev	33.35	872.1	104.1	821.8	1 247	173,10	1.388	2.506	529.5	397.3	132.4



Annex 9: Good practices examples: Alcobendas, Vitoria, Saragossa, Calvia, and La Roda. (Point 3.2)

THREE CASE-STUDIES ON URBAN WATER SAVING FROM THE SPANISH TOWNS OF ALCOBENDAS (MADRID), VITORIA, AND ZARAGOZA.

Project "Alcobendas, city of water for the 21st century" 2001

The **objective** of the project "Alcobendas, city of water of the 21st century" is to raise the awareness of the population, local authorities and small and medium-sized businesses, creating a culture that treats water with respect, by providing the technical, legislative, educational means and necessary market mechanisms for that purpose. It started as an initiative of WWF/ Adena (World Wildlife Fund) in collaboration with the LIFE Programme of the EC, promoted by the Alcobendas Town Council, the Community of Madrid and the Tagus River Basin Authority. The action undertaken goes beyond Alcobendas and has enabled it to become a pilot project that sets a standard for other towns interested in encouraging the rational use of water.

Alcobendas is one of the satellite towns on the outskirts of Madrid, and so it has undergone continuous development, urban and industrial growth. With an approximate population pf 90.000 inhabitants, the rational use of water is, in all respects, one of the most important collective challenges facing the town in order to ensure short- and medium term sustainable development.

The specific objectives sought are grouped under the following headings:

A. Exchanging technical and scientific information to encourage the introduction of effective water saving technologies, programmes and water demand management.
B. Promoting new regulations.
C. Stimulating the water-saving technology market.
D. Promoting changes in the productive sector.
E. Increasing public awareness of the need to actively participate in saving water.
F. Offering an example of the introduction of effective water saving measures in new homes.
G. Publicising the results and the methodology so that they can be adapted to other towns.

Mechanisms and tools designed by the project to encourage the continuous saving of water in Alcobendas are the following:

MECHANISMS	TOOLS
• Legislative	• Draft By-law
• Market	• Campaign to promote water-saving devices • Promoting the construction of houses that save water
• Financial	• "Blue loan"
• Technical	• Conferences • Eco-audits • Competition to design an engineering project
• Educational	• Events with public participation • Educational programme for schools

4.840 water-saving devices, with an average capacity for saving, which is shown in the table below, and imply a potential saving of **102.218.863** litres a year, have been provided through this program. Moreover, if water-saving devices are installed in the 3.192 homes of Valdelasfuentes (a residential area within the town), there will be additional savings of 497 million litres.

Environmental benefits for the proposed system:

	Actual situation	Project proposal
Diary potable water supply	246 l/d	128 l/d
Net potable water saving	0 l/d	118 l/d
% potable water saving	0 %	48 %
Reusable grey water	0 %	64 %
Non potable water demand	0 l/d	36 l/d
Reusable black water	0 %	0 %
Black water generation	246 l/d	164 l/d
% black water reduction	0 %	33,3 %
Diary non potable surplus	0 l/d	46 l/d

http://www.wwf.es/casadelagua/index.html

Integrated Water Saving Plan for Vitoria.

This plan is born from the Agenda 21 agreements, and the objective of working towards a sustainable use of resources. To achieve this objective with respects to water resources, Municipal Water of Vitoria made a call for tenders to elaborate a Plan. The first part of the Plan focuses on the assessment of the current water supply situation in Vitoria.

This city consumed throughout 2001 near 21,5 million $m^3$of water with a yield from the network of 85%. This represents an average year consumption of 313 litres/person/day. This yield has allowed the decrease, since 1983, of urban supply by 32%. The evolution of sectorial consumptions through the past 10 years shows how the consumption has increased significantly in domestic and institutional sectors, and in a moderate way, in the industrial and commercial sector.

This reflects the adequate network conservation status and a responsible attitude by most part of the population (89,3%) consumes in its homes less than 100 m^3/yr. If we take into account that all saving possibilities by the improvement of the network's yield are practically met, the hamper of the consumption increase can only be achieved through demand management measures.

The main objective of this Plan is to promote water savings among the different agents linked to its distribution and consumption in the urban area. This objective will be achieved through a series of intervention or operative programs that aim at achieving specific objectives that can be summarised as follows:

- Hinder domestic demand increase
- Maintain the intake of water of primary distribution below 25 hm^3/ yr
- Stabilize current consumption in the industrial-commercial sector
- Reduce current consumption in the institutional sector
- Maintain the network's yield within the past years levels (82-85%)
- Substitute potable water by reused one or by water not currently used for industrial processes, street clean-up and garden watering.

The Vitoria Plan has been structured following the methodology of the Demand Management Plans, and within its operative design, 12 programs have been elaborated with measures or proposals that affect aspects related to infrastructures, voluntary water saving, efficiency, substitution and management. These are programs addressed to the whole population as well as to the different users sectors. The estimated implementation period is 5 years, with an approximate investment for that period of time of 1.200.000€.
http://www.amvisa.org/piaa/es/html/index.shtml

Zaragoza, water saving city

In 1997, a project was proposed showing it was possible to solve water scarcity problems increasing water use efficiency. The objective was to promote a new water culture with a rational management of this resource. The project was intended to promote, among consumers, water saving technology demand, stimulate the market of these products and train and inform professionals from the water field.

First, a campaign was launched giving information on technologies that allow a lasting savings without losing comfort. In order to avoid resistance in this introduction, dissemination of water efficient use examples in the city was promoted.
Public administrations that are linked to water management were introduced as partners in the campaign, not only to obtain funding, but also to count on the expertise of their technicians.

At first, the fixed quantitative objective was to save 1.000 million litres of water in domestic uses in one year (1998) in Zaragoza. To achieve this, a series of actions were introduced:

- Obtaining new water saving sewage equipment (WC, water taps, showers) or installing saving devices in old equipment
- Obtaining water saving washing machines and dishwashers
- Installing individual water meters in homes
- Introduction of water saving habits

This project was planned to act in all the water culture elements. That is why actions were focused into four main audience objectives: professionals working in the water consumption field, large consumers, children and youth and general public.

Results

- In 1997 a collective will was born: save 1.000 million litres of water in one year: the final saving equalled 1.176 million litres.
- Introduction of 50 efficiency water use best practices in the city.
- 96 litres is the ratio of domestic consumption per inhabitant and day, the lowest in Spain.
- Instead of the current 80 Hm^3, the City Hall of Zaragoza wants to achieve the amount of 65 Hm^3 for the total water consumption of its 650.000 inhabitants.
- 60% of the citizens that were not aware of savings measures has decreased to 28%
- The Plan achieved the collaboration of 150 entities: public institution, NGOs, enterprises, labour unions etc.
- 69% of educational centres in Zaragoza participate in the Educational Program.
- 65% of the sewage commercial centres, water tap businesses etc. participate in the Plan.
- Sales and price reduction on home water saving devices kits.
- Edition of the Water Newspaper (Periódico del Agua)
- 100% of participation from garden shops and nursery plant from Zaragoza
- Sending of an electronic bulletin with information on the project.

Funding
Total investment1999-2002: 522.488 euros.
http://habitat.aq.upm.es/dubai/02/bp388.html

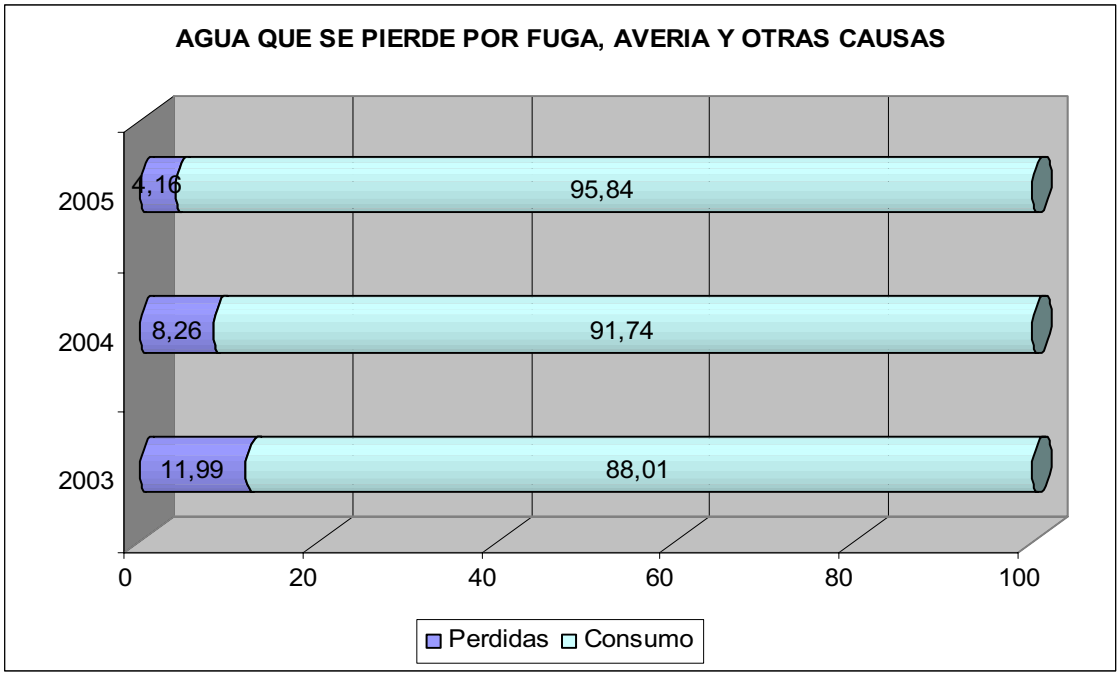
AGUA. LA RODA

INDICADOR 27: CONTROL Y EFICIENCIA DEL SISTEMA DE ABASTECIMIENTO DE AGUA POTABLE	
	Metodología

INDICADOR 27: CONTROL Y EFICIENCIA DEL SISTEMA DE ABASTECIMIENTO DE AGUA POTABLE	
	Metodología
Definición	1. Existencia de un sistema de control del consumo de agua potable. 2. Existencia de un sistema de tarifación del consumo de agua que diferencie los distintos usuarios o niveles de consumo. 3. Cantidad de agua potable que se pierde por motivo de fugas, averías puntuales u otras causas en la red de distribución de agua potable en relación al total aportado desde el origen.
Objetivo de sostenibilidad	Establecer el control y la eficiencia del sistema de abastecimiento de agua potable en los municipios.
Fórmula de cálculo	1. Existencia de contadores a la salida de los depósitos de distribución o de los pozos. 2. Existencia de sistema de tarifación que diferencie por tramos de consumo o por tipo de consumo (doméstico, industrial, …). 3. [(Cantidad total de agua potable aportada en el origen a la red de distribución) - (Cantidad de agua facturada a los distintos sectores consumidores + cantidad de agua consumida por las instalaciones y servicios públicos municipales)/Cantidad total de agua potable aportada en el origen a la red de distribución]*100.
Unidad de Medida	1. Sí/No. 2. Sí/No. 3. % sobre volumen bruto.
Periodicidad de cálculo	Anual.
Fuentes de información	Ayuntamiento o empresa gestora del sistema de abastecimiento.
Tendencia deseable	1. Existencia. 2. Existencia. 3. Disminución.
Principios sostenibilidad	Nº 3/Nº 11
Compromisos de sostenibilidad	Nº 3/Nº 4 /Nº 10
Observaciones	- Indicador obligatorio de la Red de Ciudades y Pueblos Sostenibles de Castilla-La Mancha. - Indicador específico sobre consumo de agua. - Tipo de indicador (1): 3. Respuesta; Tipo de indicador (2): 3. Respuesta; Tipo de indicador (3): 1. Presión.

INDICADOR 27: CONTROL Y EFICIENCIA DEL SISTEMA DE ABASTECIMIENTO DE AGUA POTABLE

Subindicadores	2003	2004	2005
1. Existencia de un sistema de control del consumo de agua potable	Sí	Sí	Sí
2. Existencia de un sistema de tarifación del consumo de agua que diferencie los distintos usuarios o niveles de consumo	Sin Dato	Sin Dato	Sí
3. Cantidad de agua potable que se pierde por motivo de fuga, averías puntuales y otras causas en la red de distribución de agua potable	11,99	8,26	4,16

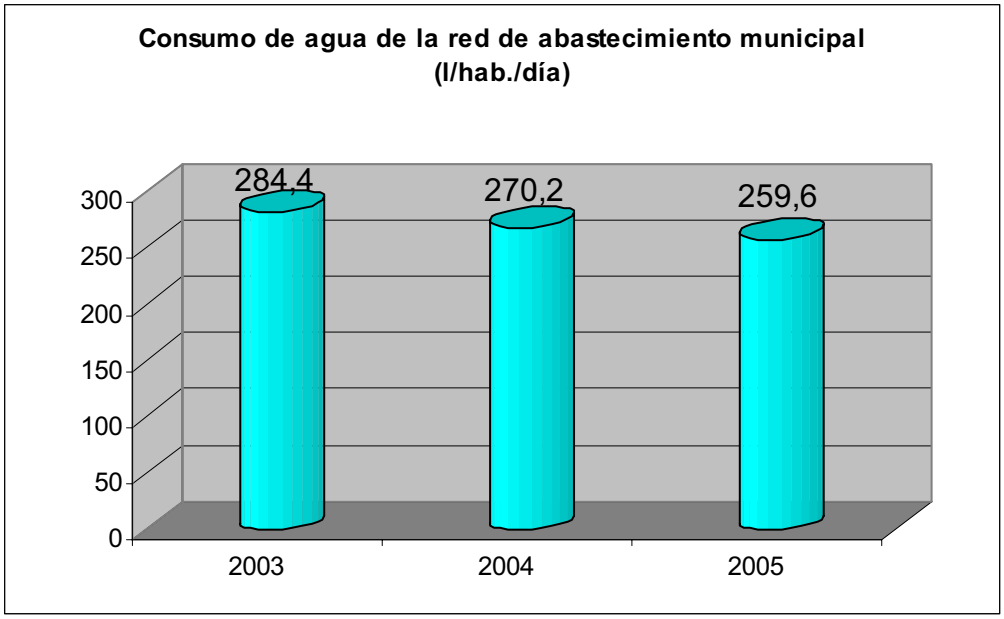


Existe un control de agua potable, y una tarifación por tramos. El volumen de pérdidas no es muy alto y está en descenso. Se cumple con la tendencia.

INDICADOR 28: CONSUMO DE AGUA DE LA RED DE ABASTECIMIENTO MUNICIPAL	
	Metodología
Definición	**Cantidad anual de agua potable suministrada por el sistema de abastecimiento municipal a la red de distribución en relación a la población local.**
Objetivo de sostenibilidad	Adecuar los consumos de agua potable por la población a niveles de sostenibilidad.
Fórmula de cálculo	Consumo anual de agua potable de la red de abastecimiento/habitantes*365 días.
Unidad de Medida	Litros de agua consumidos/habitante y día.
Periodicidad de cálculo	Anual.
Fuentes de información	Ayuntamiento o empresa gestora del sistema de abastecimiento de agua potable a los municipios.
Tendencia deseable	Adecuar los consumos de agua potable por la población a niveles de sostenibilidad. Disminución.
Principios sostenibilidad	Nº 3/11
Compromisos sostenibilidad	Nº 3/Nº 4/ Nº 10
Observaciones	- Indicador específico sobre consumo de agua. Indicador obligatorio de la Red de Ciudades y Pueblos Sostenibles de Castilla-La Mancha. - Cuando los consumos son domésticos y de servicios, éstos no deberían superar 130 l/persona/día. - Tipo de indicador: 1. Presión.

INDICADOR 28: CONSUMO DE AGUA DE LA RED DE ABASTECIMIENTO MUNICIPAL			
	Año 2003	**Año 2004**	**Año 2005**
Cantidad anual de agua potable suministrada por el sistema de abastecimiento municipal a la red de distribución en relación a la población local (lts/habitante-y día)	284,40	270,24	259,60

El consumo bruto es alto, por encima de la media regional y nacional, pero en retroceso. Se cumple con la tendencia deseada.


Consumo de agua de la red de abastecimiento municipal
(l/hab./día)
300
250
200
150
100
50
0
284,4
270,2
259,6
2003
2004
2005

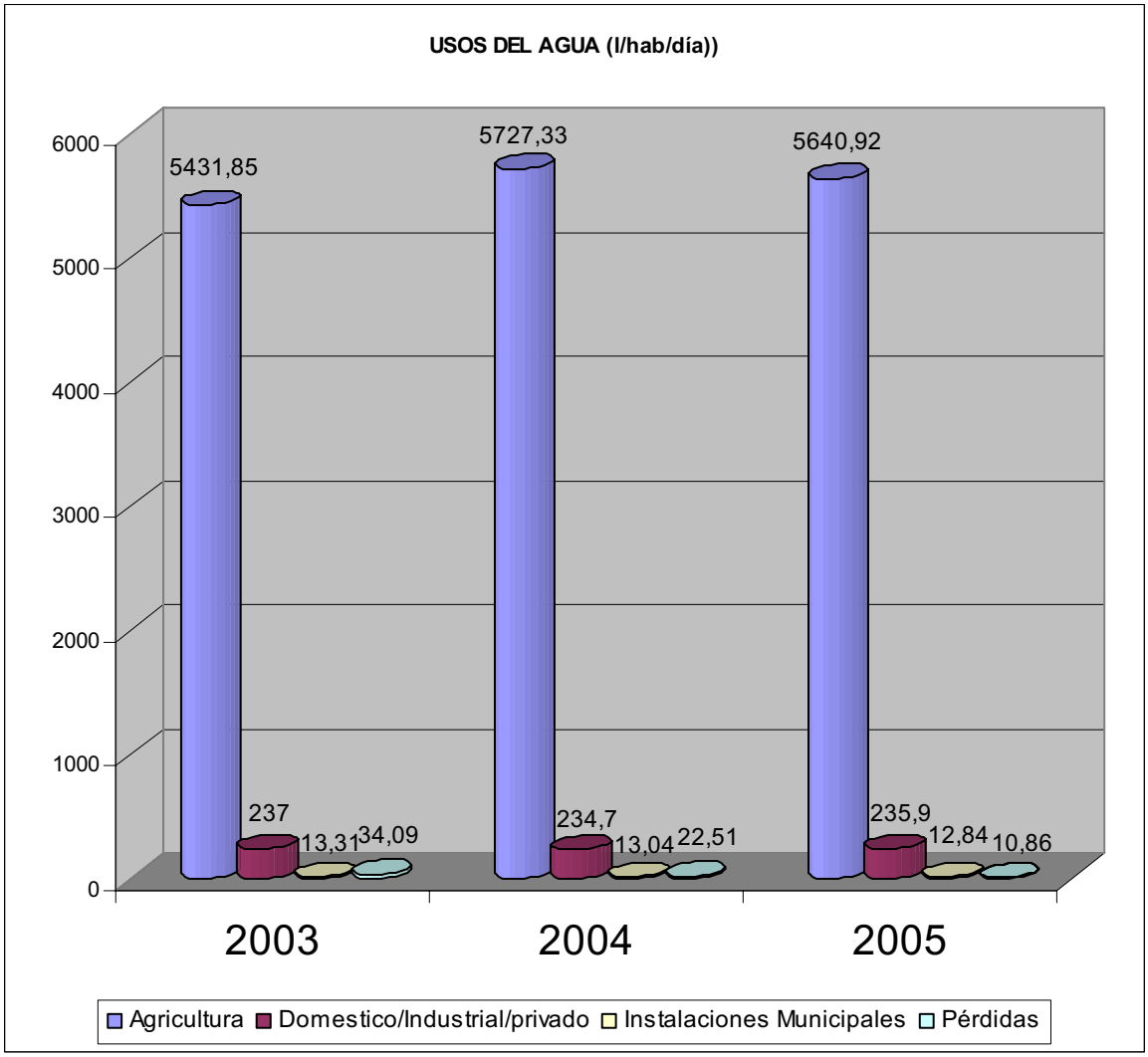
INDICADOR 29: CONSUMO MUNICIPAL DE AGUA: USOS DEL AGUA	
	Metodología
Definición	**Cantidad total de agua consumida (Potable y No Potable) por los distintos usos antrópicos en el municipio.** 1. Cantidad total de agua consumida por los usos domésticos. 2. Cantidad total de agua consumida por usos industriales. 3. Cantidad total de agua consumida por las Instalaciones y usos públicos municipales. 4. Cantidad total de agua consumida por los Servicios Privados. 5. Cantidad total de agua consumida por las actividades agrícolas. 6. Cantidad total de agua consumida por el resto de usos y pérdidas en el suministro de agua de abastecimiento de la red municipal.
Objetivo de sostenibilidad	Adecuar los consumos de los distintos usos a niveles de sostenibilidad.
Fórmula de cálculo	0. (Sumatorio del consumo de agua (potable y no potable) por los distintos usos humanos/ población total del municipio)*365 días. 1. ((Consumo doméstico de agua potable de la red de abastecimiento municipal+consumo doméstico de agua potable de pozos)/(población total del municipio))*365 días. 2. ((Consumo industrial de agua potable de la red de abastecimiento municipal+consumo industrial de agua potable de pozos)/(población total del municipio))*365 días. 3. (Consumo de agua potable de la red de abastecimiento municipal por los usos e instalaciones municipales/población total del municipio)*365 días. 4. (Consumo de agua potable de la red de abastecimiento municipal por los servicios y actividades terciarias privadas +consumo de agua potable de pozos por los servicios y actividades terciarias privadas /población total del municipio)*365 días. 5. (Consumo de agua de riego por las actividades agrícolas y ganaderas +consumo de agua potable de la red de abastecimiento municipal+ consumo de agua potable de pozos por las actividades agrícolas y ganaderas /población total del municipio)*365 días. 6. Sumatorio del resto de consumos de agua (potable y no potable) no incluidos entre las anteriores y las pérdidas de agua de la red de abto. Municipal/ Población total *365 días.
Unidad de Medida	Lts/habitantes y día.
Periodicidad de cálculo	Anual.
Fuentes de información	Ayuntamiento; Empresa gestora del sistema de abastecimiento de agua potable a los municipios: Encuesta/Inventario de consumos de agua suministrada fuera de la red de abastecimiento Municipal; Sindicatos de riegos; Confederaciones Hidrográficas; Empresa Regional del Agua.
Tendencia deseable	Estabilidad/Disminución.
Principios sostenibilidad	Nº 3/11
Compromisos sostenibilidad	Nº 3 /Nº 4 / Nº 10

INDICADOR 29: CONSUMO MUNICIPAL DE AGUA: USOS DEL AGUA	
	Metodología
Observaciones	- Indicador específico sobre consumo de agua. Indicador obligatorio de la Red de Ciudades y Pueblos Sostenibles de Castilla-La Mancha. - Tipo de indicador: 1. Presión.

INDICADOR 29: CONSUMO MUNICIPAL DE AGUA: USOS DEL AGUA			
Subindicadores (lts/habitante-y día)	**Año 2003**	**Año 2004**	**Año 2005**
1. Cantidad total de agua consumida por los usos domésticos, industriales y servicios privado(*)	237	234,70	235,90
2. Cantidad total de agua consumida por las Instalaciones y usos públicos municipales (*)	13,30	13,03	12,84
3. Cantidad total de agua consumida por las actividades agrícolas	5.431,85	5.727,33	5640,92
4. Cantidad total de agua consumida por el resto de usos y pérdidas en el suministro de agua de abastecimiento de la red municipal	34,09	22,51	10,85

Notas:

(*) Calculada en base al consumo exclusivo de agua potable de la red de abastecimiento municipal, dada la inexistencia de control informativo sobre los consumos de agua de otras fuentes distintas de abastecimiento.

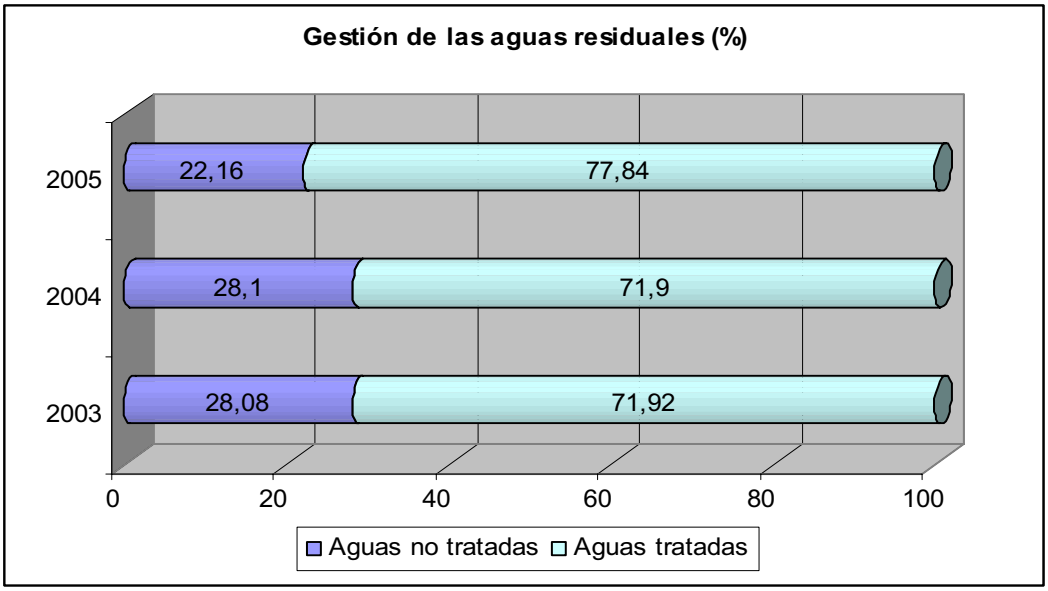


El mayor consumo con mucha diferencia es el de la agricultura. Este además no presenta una tendencia descendente como sería deseable. El resto de consumos se mantienen más o menos estables, algunos incluso disminuyen.

INDICADOR 30: GESTIÓN DE LAS AGUAS RESIDUALES	
	Metodología
Definición	1. **Proporción de aguas residuales que es objeto de tratamiento antes de su devolución al ciclo natural, bien por sistemas públicos de tratamiento bien por sistemas privados.** 2. Porcentaje de aguas residuales depuradas que se reutilizan.
Objetivo de sostenibilidad	Minimizar el impacto de las aguas residuales urbanas sobre el medio ambiente a través de la mejora en de la eficiencia del sistema de saneamiento y disminuir el consumo de agua a través de la reutilización de las mismas.
Fórmula de cálculo	1. **[Volumen de aguas residuales que entran a la EDAR + volumen de aguas tratada por otros medios (sistemas de depuración propios de empresas que luego no vierten a la red y tomen agua del sistema de abastecimiento)/(consumo bruto de sistema de abastecimiento + consumo de pozos)]*100.** 2. **Volumen de aguas residuales reutilizadas/Volumen de aguas residuales que entran a la EDAR + volumen tratada por otros medios (sistemas de depuración propios de empresas que luego no vierten a la red y tomen agua del sistema de abastecimiento) *100.**
Unidad de Medida	1. **% agua tratada sobre volumen bruto.** 2. **% de agua reutilizada sobre el volumen total depurado.**
Periodicidad de cálculo	**Anual.**
Fuentes de información	Ayuntamiento o empresa gestora del sistema de abastecimiento, empresa gestora de la EDAR, empresas industriales del municipio.
Tendencia deseable	Aumento.
Principios sostenibilidad	Nº 3/Nº 8
Compromisos sostenibilidad	Nº 3/Nº 4 /Nº 10
Observaciones	- Indicador específico sobre vectores ambientales (Agua). Indicador obligatorio de la Red de Ciudades y Pueblos Sostenibles de Castilla-La Mancha. - Este indicador requiere el cumplimiento de los requisitos legales establecidos para los parámetros de calidad de las aguas de depuración previo a su vertido al medio. - Tipo de indicador (1) 3. Respuesta; Tipo de Indicador (2): 3. Respuesta.

INDICADOR 30: GESTIÓN DE LAS AGUAS RESIDUALES			
	Año 2003	**Año 2004**	**Año 2005**
1. % Aguas residuales urbanas objeto de tratamiento	71,92	71,90	77,84

2. % Aguas residuales reutilizadas	100	100	100



El agua tratada no es muy alta, pero al menos se encuentra en aumento. Por su parte el 100% del agua tratada es reutilizada, por lo que no se puede mejorar el indicador.

INDICADORES DE LA DIPUTACIÓN DE ALBACETE

INDICADOR D1: CONSUMO DE AGUA DOMÉSTICO
VER INDICADOR 29.1

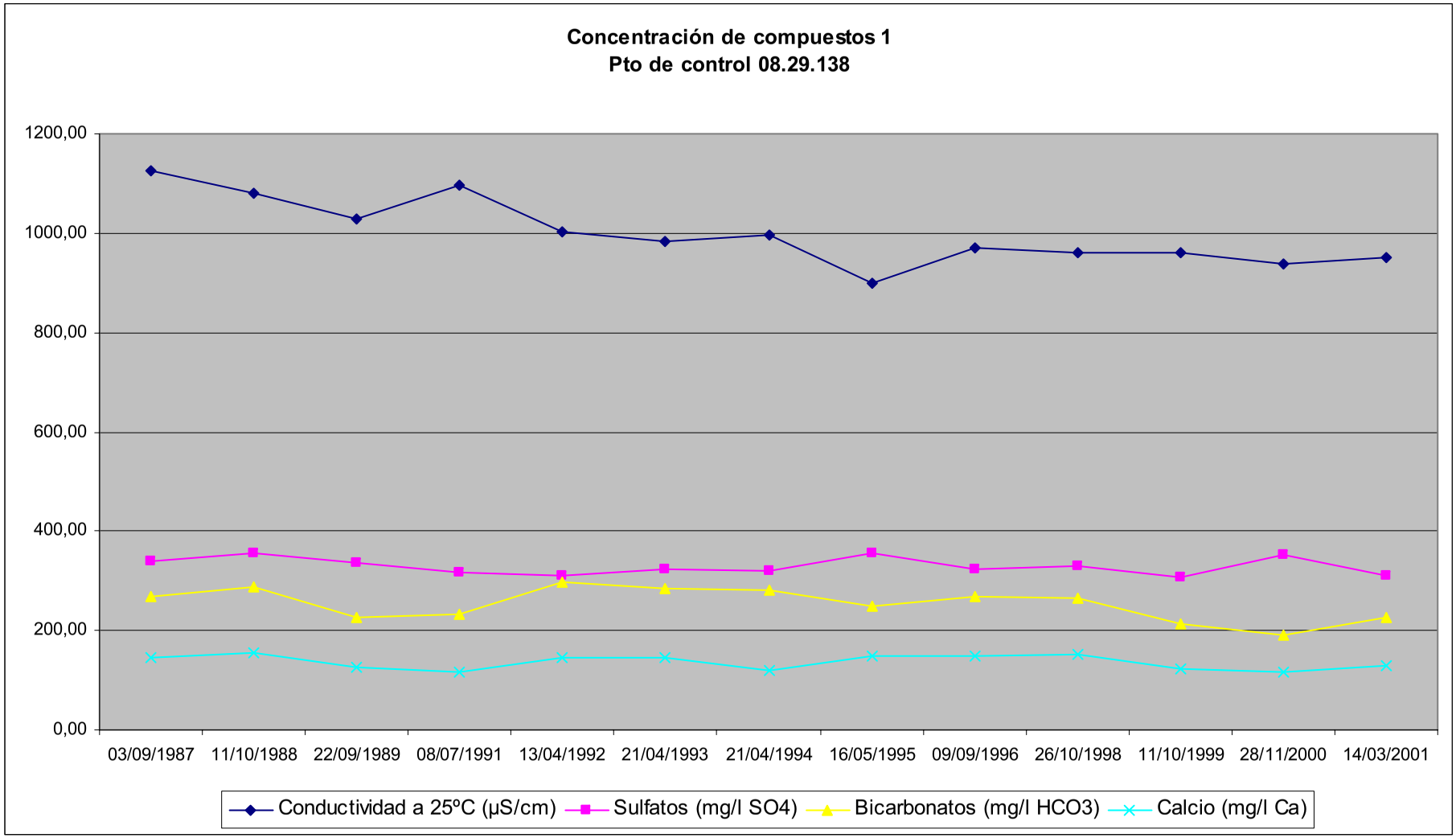
INDICADOR D2: ABASTECIMIENTO DE AGUA MUNICIPAL
VER INDICADOR 28

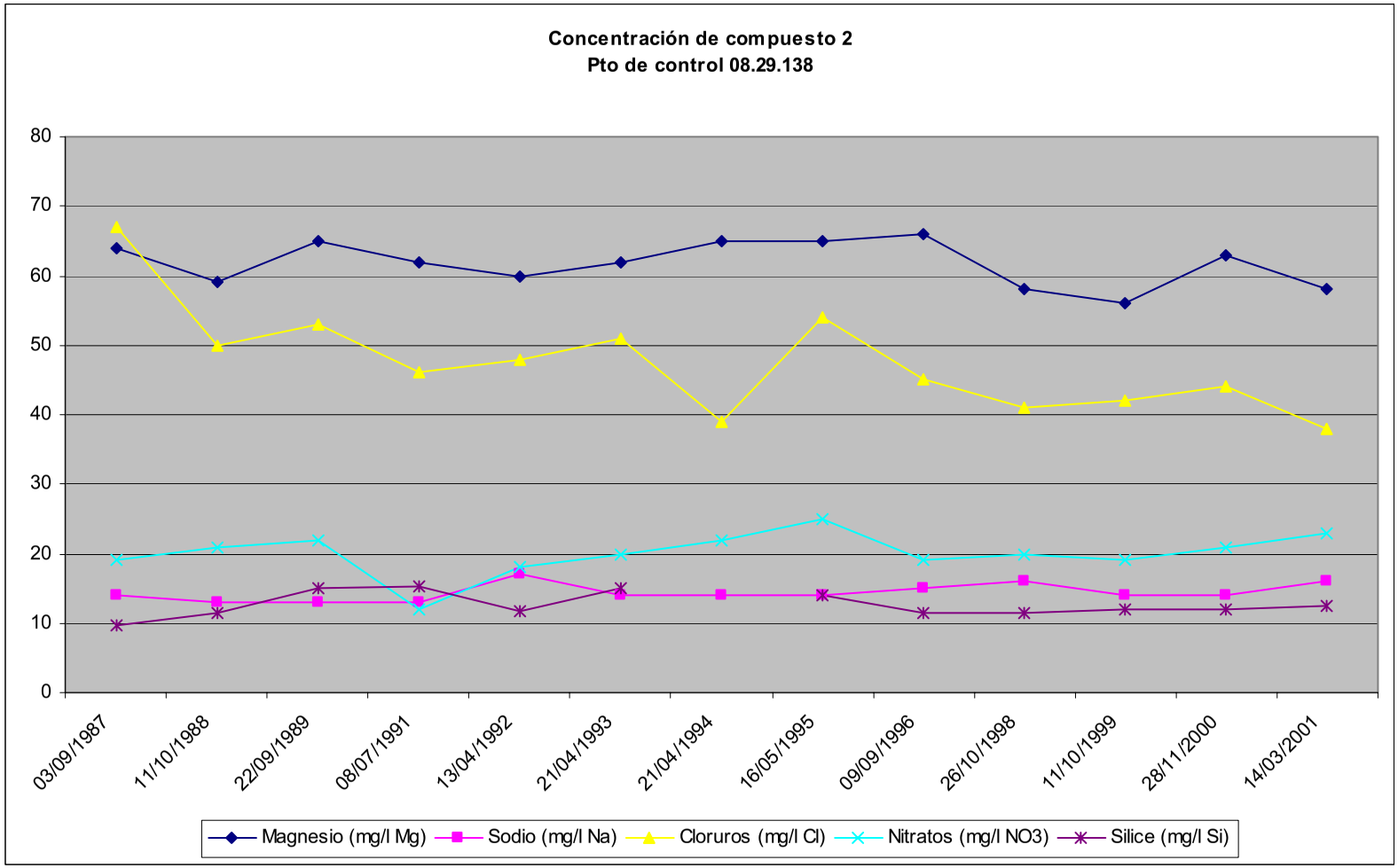
INDICADOR D3: PORCENTAJE DE PÉRDIDAS DE AGUA EN LA RED MUNICIPAL
VER INDICADOR 27.3

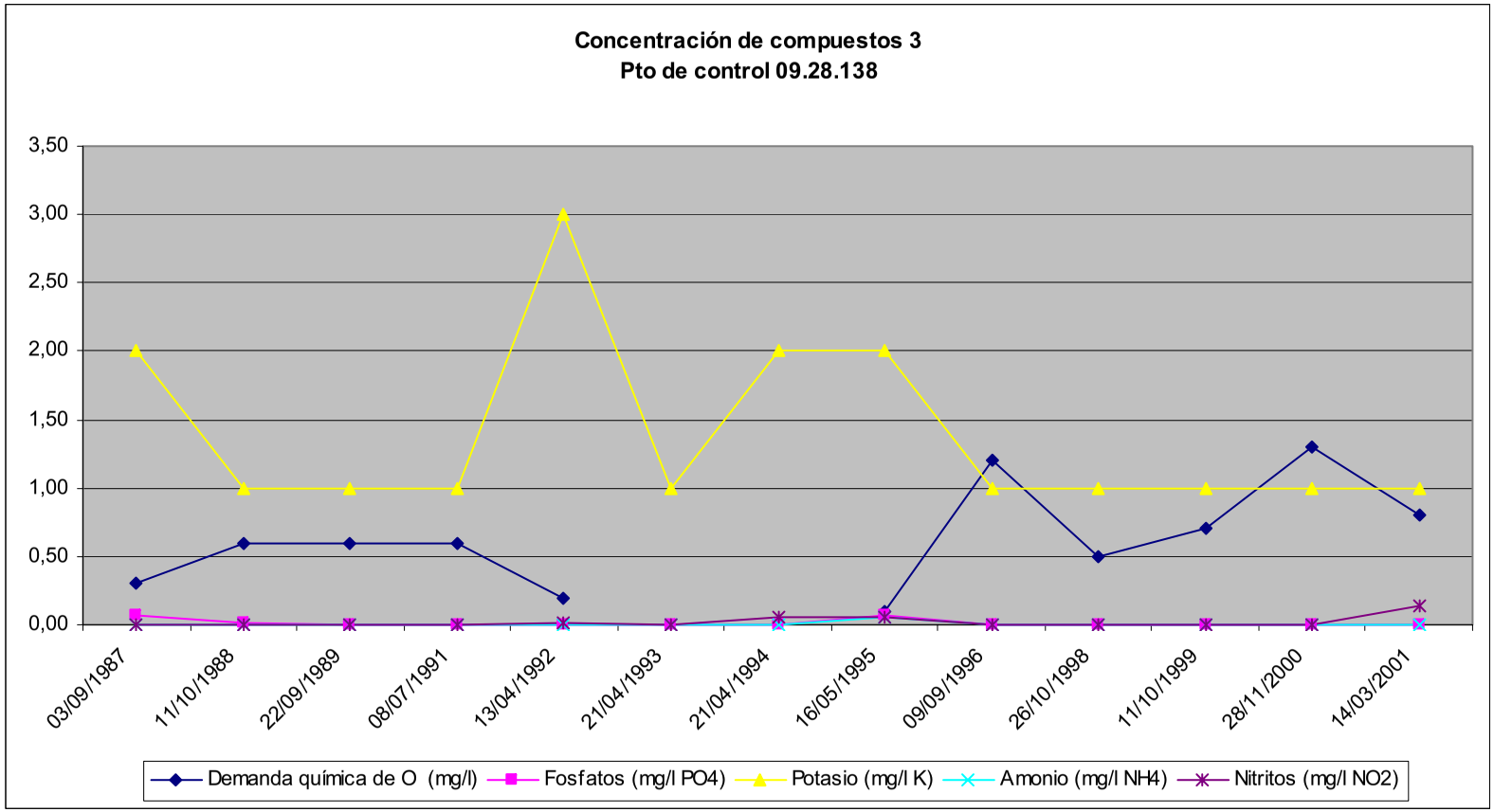
INDICADOR D4: REUTILIZACIÓN DE LAS AGUAS DEPURADAS
VER INDICADOR 30.2

INDICADOR D5: EVALUACIÓN DE LA CALIDAD DEL AGUA DE LOS ACUÍFEROS	
	Metodología
Definición	**1. Concentración de compuestos en el agua subterránea.** **2. Superación de los niveles máximos de Nitratos establecidos por el RD 261/1996 sobre la Contaminación producida por los Nitratos procedentes de Fuentes Agrarias (50 mg/l)**
Objetivo de sostenibilidad	Minimizar la concentración de los compuestos en el agua subterránea, especialmente los que sobrepasan los niveles máximos establecidos por la legislación. La superación de los niveles establecidos de nitratos supone que el agua no es apta para el consumo humano.
Fórmula de cálculo	1. **(Peso de compuesto en el agua subterránea/Volumen de agua subterránea)** 2. **Concentración de Nitratos > 50 mg /l.**
Unidad de Medida	1. **mg/l.** 2. **Si/No**
Periodicidad de cálculo	**Anual.**
Fuentes de información	Confederación Hidrológica
Tendencia deseable	Descenso.
Principios sostenibilidad	Nº 3/Nº 8
Compromisos sostenibilidad	Nº 3/Nº 4 /Nº 10
Observaciones	- Indicador que afecta tanto a vectores ambientales (Agua), como a aspectos estructurales (Hidrologeología). Indicador obligatorio de la Diputación de Albacete - Este indicador requiere el cumplimiento de los requisitos legales establecidos para los parámetros de calidad de las aguas subterráneas. - Tipo de indicador (1) 3. Respuesta; Tipo de Indicador (2): 3. Respuesta.

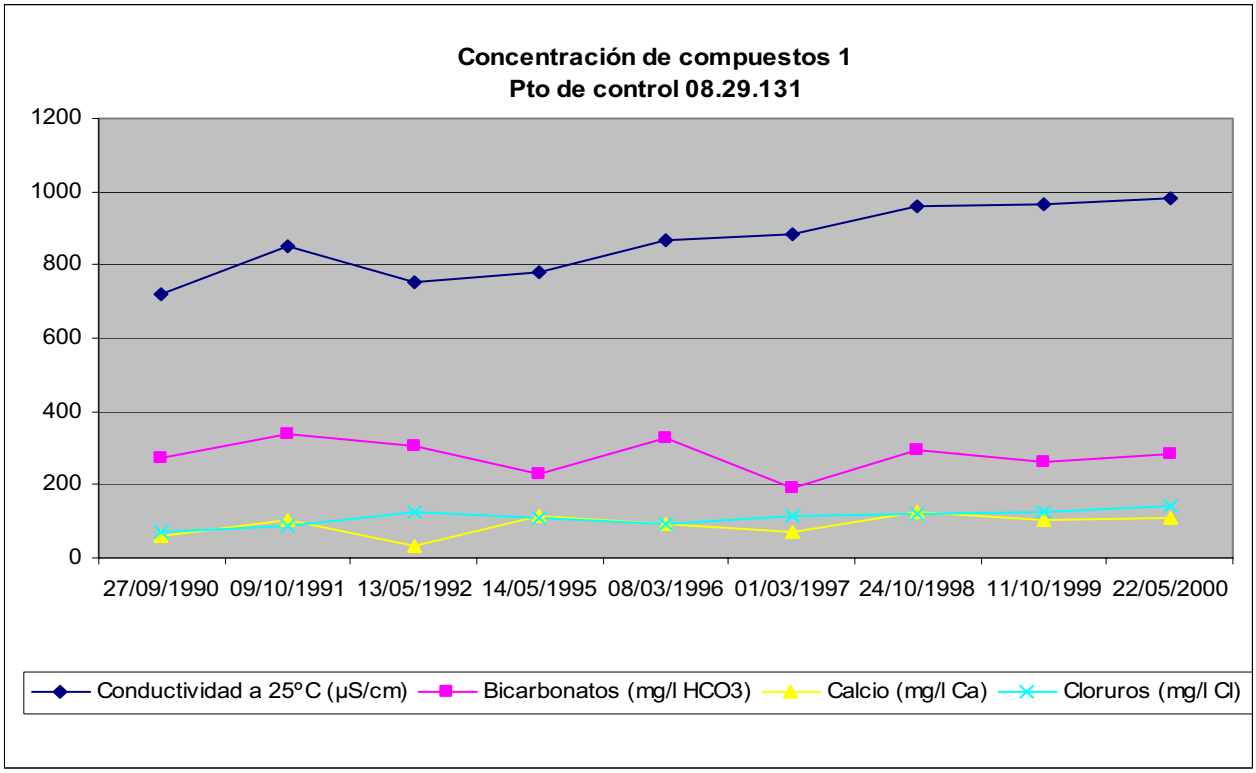
INDICADOR D5.1: Concentración de Compuestos en el Agua Subterránea													
Punto de control 08.29. 138			**Coordenadas: X: 573.293; Y: 4.340.822; Z: 721**										
	03/09/1987	11/10/1988	22/09/1989	08/07/1991	13/04/1992	21/04/1993	21/04/1994	16/05/1995	09/09/1996	26/10/1998	11/10/1999	28/11/2000	14/03/2001
Conductividad a 25ºC (µS/cm)	1124,00	1080,00	1027,00	1095	1004	983	995	900	971	962	960	938	950
Demanda química de O (mg/l)	0,30	0,60	0,6	0,6	0,2			0,1	1,2	0,5	0,7	1,3	0,8
Cloruros (mg/l Cl)	67	50	53	46	48	51	39	54	45	41	42	44	38
Sulfatos (mg/l SO4)	340	357	338	317	309	325	320	355	325	330	308	352	312
Silice (mg/l Si)	9,7	11,4	15,1	15,3	11,8	15	0	14	11,5	11,5	12,1	12	12,4
Bicarbonatos (mg/l HCO3)	267	289	228	233	298	284	283	249	269	265	215	190	225
Fosfatos (mg/l PO4)	0,0669	0,02007	0,00669	0	0	0	0	0,0669	0	0	0	0	0
Calcio (mg/l Ca)	146	154	127	117	147	144	121	148	149	152	122	116	130
Magnesio (mg/l Mg)	64	59	65	62	60	62	65	65	66	58	56	63	58
Sodio (mg/l Na)	14	13	13	13	17	14	14	14	15	16	14	14	16
Potasio (mg/l K)	2	1	1	1	3	1	2	2	1	1	1	1	1
Amonio (mg/l NH4)	0	0	0	0	0	0	0	0,05	0	0	0	0	0
Nitritos (mg/l NO2)	0	0	0	0	0,01	0	0,06	0,05	0	0	0	0	0,14
Nitratos (mg/l NO3)	19	21	22	12	18	20	22	25	19	20	19	21	23

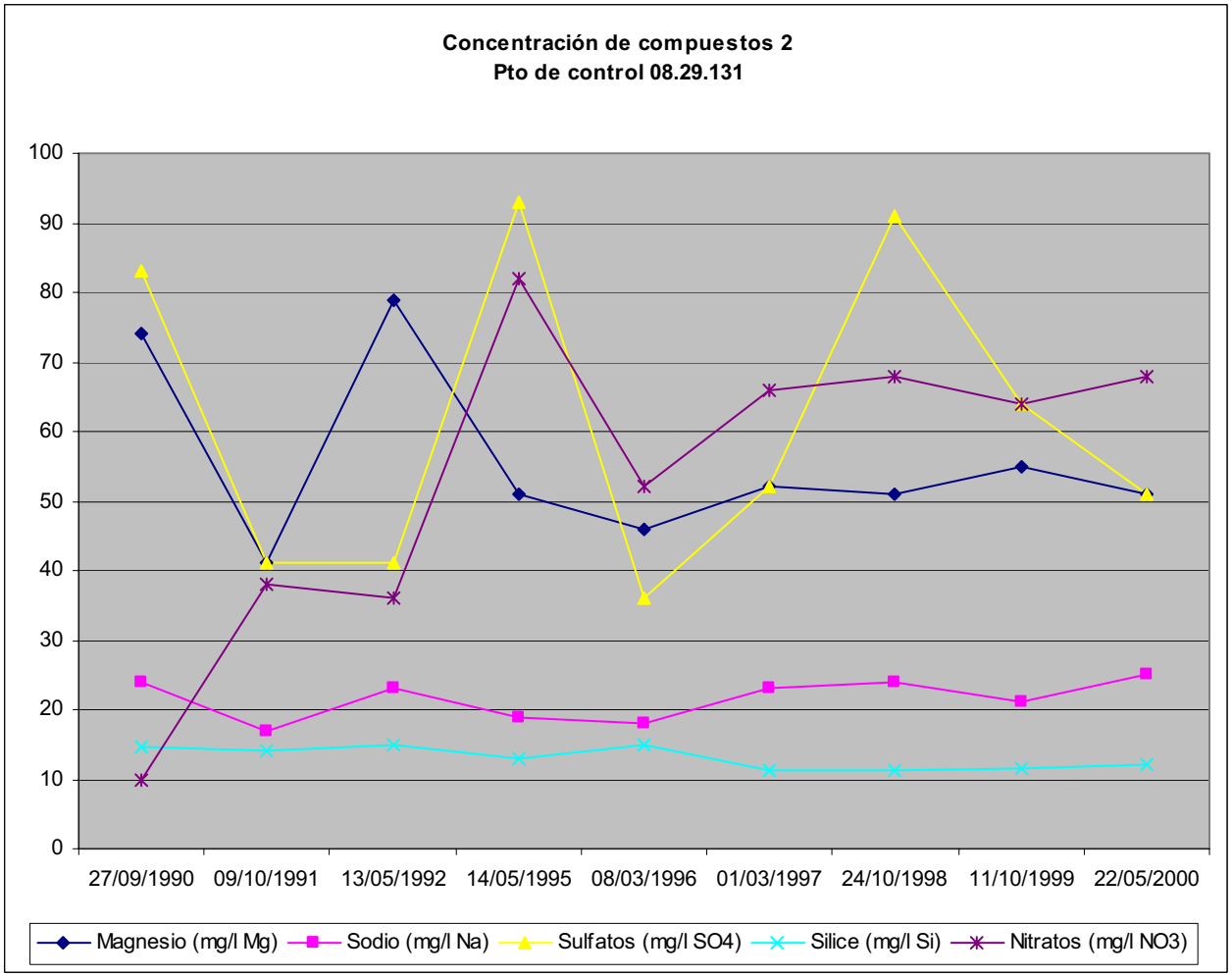

Concentración de compuestos 1
Pto de control 08.29.138
1200,00
1000,00
800,00
600,00
400,00
200,00
0,00
03/09/1987
11/10/1988
22/09/1989
08/07/1991
13/04/1992
21/04/1993
21/04/1994
16/05/1995
09/09/1996
26/10/1998
11/10/1999
28/11/2000
14/03/2001
Conductividad a 25ºC (µS/cm)
Sulfatos (mg/l SO4)
Bicarbonatos (mg/l HCO3)
Calcio (mg/l Ca)

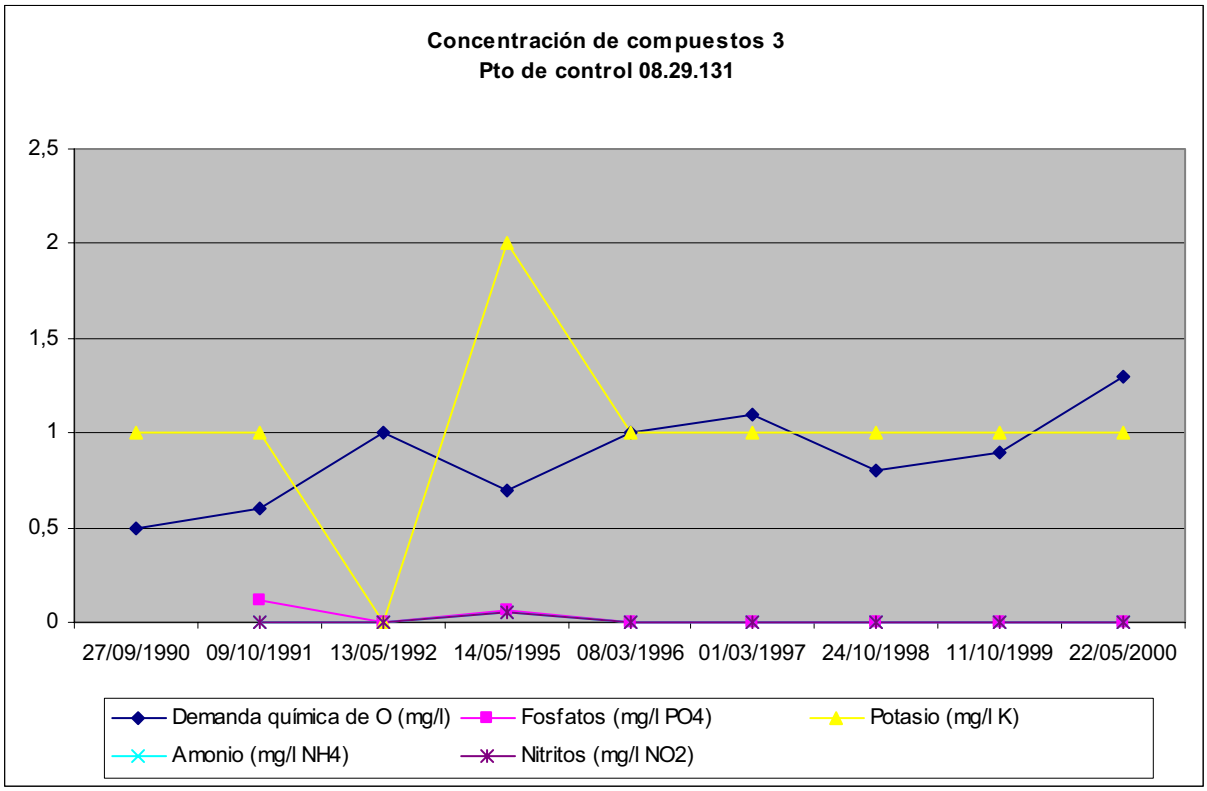

Concentración de compuesto 2
Pto de control 08.29.138
80
70
60
50
40
30
20
10
0
03/09/1987
11/10/1988
22/09/1989
08/07/1991
13/04/1992
21/04/1993
21/04/1994
16/05/1995
09/09/1996
26/10/1998
11/10/1999
28/11/2000
14/03/2001
Magnesio (mg/l Mg)
Sodio (mg/l Na)
Cloruros (mg/l Cl)
Nitratos (mg/l NO3)
Silice (mg/l Si)


Concentración de compuestos 3
Pto de control 09.28.138
3,50
3,00
2,50
2,00
1,50
1,00
0,50
0,00
03/09/1987
11/10/1988
22/09/1989
08/07/1991
13/04/1992
21/04/1993
21/04/1994
16/05/1995
09/09/1996
26/10/1998
11/10/1999
28/11/2000
14/03/2001
Demanda química de O (mg/l)
Fosfatos (mg/l PO4)
Potasio (mg/l K)
Amonio (mg/l NH4)
Nitritos (mg/l NO2)

INDICADOR D5.1: Concentración de Compuestos en el Agua Subterránea									
Punto de control 08.29. 131			**Coordenadas: X: 559.419; Y: 4.335.540; Z: 731.72**						
	27/09/1990	09/10/1991	13/05/1992	14/05/1995	08/03/1996	01/03/1997	24/10/1998	11/10/1999	22/05/2000
Conductividad a 25ºC (µS/cm)	720	850	752	780	869	881	961	965	983
Demanda química de O (mg/l)	0,5	0,6	1	0,7	1	1,1	0,8	0,9	1,3
Cloruros (mg/l Cl)	72	90	128	109	94	115	121	127	143
Sulfatos (mg/l SO4)	83	41	41	93	36	52	91	64	51
Silice (mg/l Si)	14,7	14,1	14,9	13	14,9	11,2	11,3	11,6	12,1
Bicarbonatos (mg/l HCO3)	274	338	307	231	328	190	292	262	282
Fosfatos (mg/l PO4)		0,11373	0	0,0669	0	0	0	0	0
Calcio (mg/l Ca)	60	102	35	112	94	73	126	102	107
Magnesio (mg/l Mg)	24	41	79	51	46	52	51	55	51
Sodio (mg/l Na)	74	17	23	19	18	23	24	21	25
Potasio (mg/l K)	1	1	0	2	1	1	1	1	1
Amonio (mg/l NH4)		0	0	0,05	0	0	0	0	0
Nitritos (mg/l NO2)		0	0	0,05	0	0	0	0	0
Nitratos (mg/l NO3)	10	38	36	82	52	66	68	64	68


Concentración de compuestos 1
Pto de control 08.29.131
1200
1000
800
600
400
200
0
27/09/1990
09/10/1991
13/05/1992
14/05/1995
08/03/1996
01/03/1997
24/10/1998
11/10/1999
22/05/2000
Conductividad a 25ºC (µS/cm)
Bicarbonatos (mg/l HCO3)
Calcio (mg/l Ca)
Cloruros (mg/l Cl)


Concentración de compuestos 2
Pto de control 08.29.131
100
90
80
70
60
50
40
30
20
10
0
27/09/1990
09/10/1991
13/05/1992
14/05/1995
08/03/1996
01/03/1997
24/10/1998
11/10/1999
22/05/2000
Magnesio (mg/l Mg)
Sodio (mg/l Na)
Sulfatos (mg/l SO4)
Silice (mg/l Si)
Nitratos (mg/l NO3)



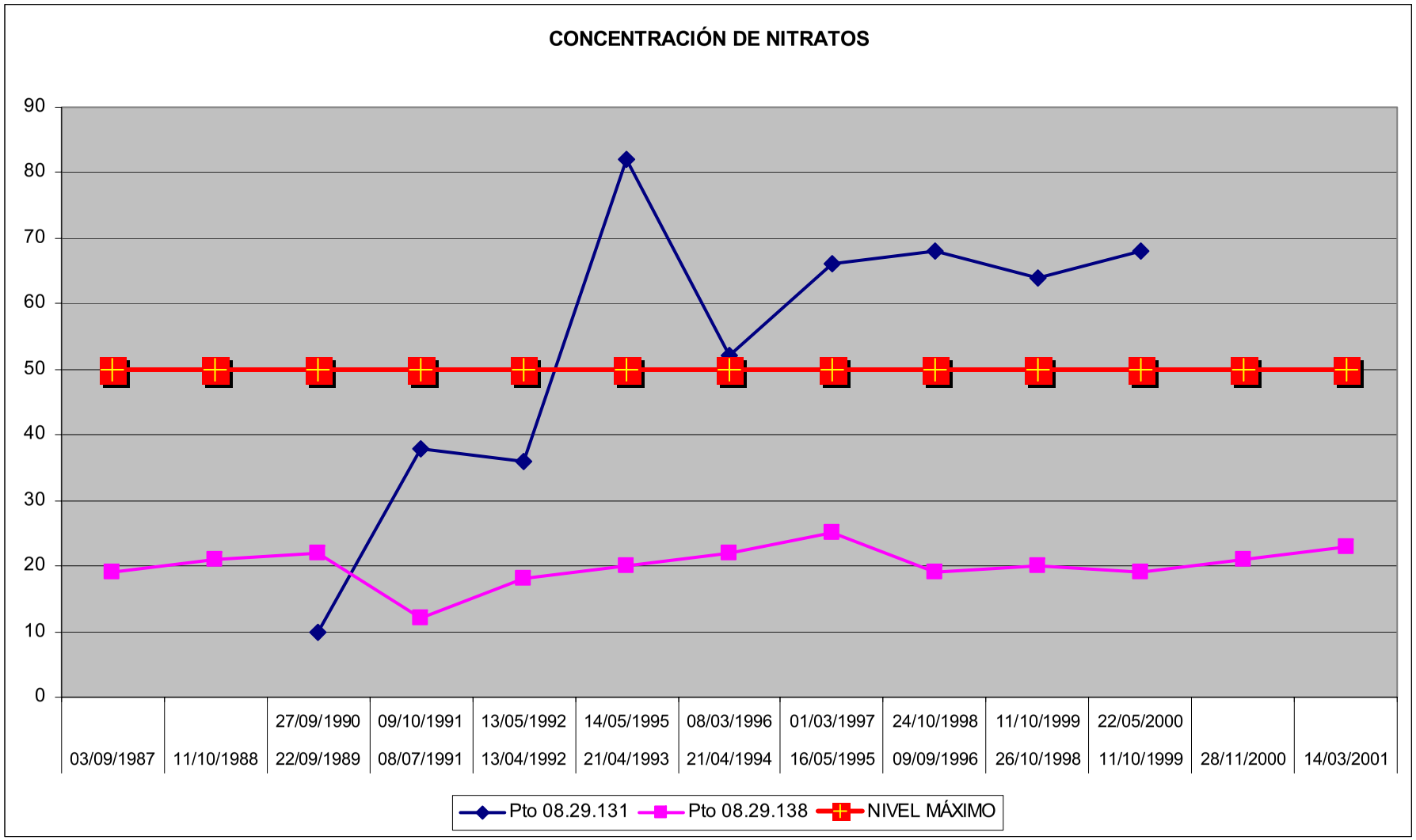
La tendencia de la concentración de los compuestos es variable en función de cada compuesto. La mayor parte tiene una tendencia fluctuante, con subidas y bajadas pero manteniendo en general un nivel constante. Algunos en cambio tienen una tendencia marcadamente ascendente o descendente.

Así por ejemplo, en el punto de control 08.29.138 se produce un descenso significativo de los valores de Conductividad y de Cloruros, y una pequeña subida de los de la Demanda Química de Oxigeno. Por su parte en el punto 08.29.138 se produce un aumento significativo de los valores de Conductividad y Cloruros, y especialmente de Nitratos (superando el límite establecido, debiendo considerarse no apta para el consumo humano, debido a esta concentración). Se produce en este punto un pequeño descenso de la concentración de Magnesio y de Sílice y un pequeño aumento de la Demanda Química de Oxigeno.

Por lo tanto, la tendencia general es a mantenerse o bien a aumentar y no cumple con la tendencia deseada del indicador. Especial cuidado hay que poner con la concentración por Nitrato, que provienen generalmente de la contaminación agraria, máxime si consideramos que esta zona este incluida como potencialmente vulnerable por este tipo de contaminación.

INDICADOR D5.2: Superación de los niveles de Nitratos.													
Punto de control 08.29. 138			**Coordenadas: X: 573.293; Y: 4.340.822; Z: 721**										
	03/09/1987	11/10/1988	22/09/1989	08/07/1991	13/04/1992	21/04/1993	21/04/1994	16/05/1995	09/09/1996	26/10/1998	11/10/1999	28/11/2000	14/03/2001
Nitratos > 50 mg/l	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

INDICADOR D5.1: Concentración de Compuestos en el Agua Subterránea									
Punto de control 08.29. 131			**Coordenadas: X: 559.419; Y: 4.335.540; Z: 731.72**						
	27/09/1990	09/10/1991	13/05/1992	14/05/1995	08/03/1996	01/03/1997	24/10/1998	11/10/1999	22/05/2000
Nitratos > 50 mg/l	NO	NO	NO	SI	SI	SI	SI	SI	SI


CONCENTRACIÓN DE NITRATOS
90
80
70
60
50
40
30
20
10
0
03/09/1987
11/10/1988
27/09/1990
22/09/1989
09/10/1991
08/07/1991
13/05/1992
13/04/1992
14/05/1995
21/04/1993
08/03/1996
21/04/1994
01/03/1997
16/05/1995
24/10/1998
09/09/1996
11/10/1999
26/10/1998
22/05/2000
11/10/1999
28/11/2000
14/03/2001
Pto 08.29.131
Pto 08.29.138
NIVEL MÁXIMO

Annex 10: Membrane bioreactor. Industrial water recycling

Biorreactor de membranas, una solución para el tratamiento y el reciclado de las aguas industriales usadas.

El reactor biológico de membranas conlleva dos unidades de tratamiento:

- El reactor biológico aerobio
- El bloque de membranas

En el reactor biológico, permanentemente ventilado y agitado, se lleva a cabo la degradación de la materia orgánica mediante microorganismos varios, presentes en grandes cantidades y de forma dispersa.

El efluente que ha sido degradado pasa a continuación al bloque de membranas, donde se somete a una ultrafiltración en membranas de cerámica, logrando separar la biomasa y el agua depurada. Los resultados de este tratamiento son excelentes en cuanto a reducción de la contaminación química y biológica (>99% en ciertos casos); lo cual permite la posible reutilización de los desechos en el proceso de los industriales.

La instalación puede presentarse en forma de kit, en un container, lo cual significa que es fácilmente transportable, pero también se presenta en forma de instalación de hormigón con una parte de ingeniería civil realizada in situ.

Filtro automático

Fluides et Automation trabaja en otras instalaciones de tratamiento de aguas industriales, con filtro automático. La característica más destacable de este filtro se encuentra en su eficacia a la hora de procesar líquidos muy cargados y de carácter obturador, gracias a su microtamizado de malla inferior a 100mm. Permite una amplia gama de reciclado y genera grandes ahorros de agua (la materia filtrada puede eventualmente reutilizarse).

R E S U M E N

A principios de los años 90, el municipio de Calvià se dio cuenta de que el modelo de crecimiento turístico ilimitado ya no era viable, así que decide innovarse profundamente a través de un plan de políticas turísticas y de desarrollo local, diseñando, primero de todo, un Plan de Excelencia, y en 1995 la Agenda Local 21, siguiendo las orientaciones de la Cumbre de Río de Janeiro y del 5. Programa de la Unión Europea.

Desde 1997 se ha venido desarrollando el Plan de Acción, con mayor o menor intensidad, en la mayoría de sus frentes. Se ha finalizado la elaboración de un nuevo Plan General desclasificador de más de 1.600 Ha de suelo urbanizado; se ha preservado el patrimonio cultural y los sistemas naturales y humanizados del municipio; han sido adoptadas medidas de contención del crecimiento limitando el número de licencias anuales de construcción, y se han redactado nuevas ordenanzas de edificación ecorresponsable; se han recuperado espacios clave demoliendo hoteles obsoletos, y se ha iniciado el Paseo Calvià.

En Calvià existen nuevos programas de viviendas, de equipamientos, y de otras acciones sociales; se han desarrollado nuevos programas de gestión sostenible del agua y de los residuos; se ha renovado la acción del Instituto de Formación de Calvià; se ha iniciado la reorganización del Ayuntamiento.

En 1998 esta práctica fue presentada al Segundo Concurso Internacional de Buenas Prácticas obteniendo la calificación de Good, calificación que ha superado en esta edición 2002 del Concurso quedando situada entre las 100 mejores prácticas internacionales.

Fechas clave

1990: Plan de Excelencia Turística.

1994: Agenda 21 Local, siguiendo con las directrices de la Cumbre de la Tierra y el Quinto Programa de la Unión Europea.

1997: Creación del Plan de Acción, de la Comisión del Foro de Ciudadanos y del Observatorio de Calvià Agenda 21 Local.

1998: Plan General de Planificación Urbanística de Calvià, un desarrollo local y turístico más sostenible.

2001: Revisión del Observatorio de la Sostenibilidad y la Calidad de Vida.

D E S C R I P C I Ó N

Situación de partida

La isla de Mallorca se encuentra en el Mediterráneo Occidental, y en su costa sur se encuentra el municipio de Calvià, con una superficie de 145 km2, 55 km de costa, 40.000 habitantes de derecho, y más de 1,6 millones de turistas anuales.

El desarrollo turístico de Calvià comenzó con el primer "boom" turístico internacional español de los años sesenta. Durante treinta años el modelo de desarrollo turístico se basó en visiones de corto plazo, una construcción masiva e inarmónica con las condiciones locales, y una explotación insostenible de unos recursos naturales excepcionales, pero frágiles.

La presión humana se multiplicó por cien en Calvià, desbordando la capacidad de carga de su litoral. A finales de los ochenta se percibió un proceso de deterioro general en la zona: degradación ambiental y paisajística, congestión de las zonas turísticas, pérdida de atractivo para innovar las instalaciones existentes, decadencia del entorno insular y la amenaza de un declive para el futuro turístico y el desarrollo local de Calvià.

Objetivos

En 1994 el Ayuntamiento de Calvià aprobó una nueva estrategia a través de la cual el desarrollo turístico y local podía ser guiada con este apoyo como principal herramienta. Con esta opción se establece la de desarrollar una Agenda 21 Local en Calvià, que es una nueva estrategia que propone el balance medioambiental, social y económico como la clave de futuro.

Después de cuatro años de estudio, búsqueda, participación y una importante reforma, el 1 de julio de 1998 se llevó a cabo una sesión especial del Foro Asesor de Ciudadanos, donde se elaboraron un conjunto de diez líneas de acción y cuarenta iniciativas que cada tres años se revisan y evalúan con el objetivo de controlar los avances.

Las diez líneas de acción, que pueden considerarse como los objetivos de la actuación, son las siguientes:

1. Contener la presión humana, limitar el crecimiento y favorecer la rehabilitación integral del territorio y su litoral.
2. Favorecer la integración, la convivencia y la calidad de vida de la población residente.
3. Preservar el patrimonio natural terrestre y marítimo e impulsar la creación de una ecotasa turístico-regional con destino ambiental.
4. Recuperar el patrimonio histórico, cultural y natural.
5. Impulsar la rehabilitación integral de los núcleos de población residenciales y turísticos.
6. Mejorar Calvià como destino turístico: sustituir crecimiento por calidad sostenible, buscar la elevación del gasto por visitante y tender a equilibrar la temporada turística.
7. Mejorar el transporte público y favorecer los desplazamientos peatonales y en bicicleta entre y en el interior de los núcleos de población.
8. Introducir una gestión sostenible en los sectores ambientales clave: agua, energía y residuos.
9. Invertir en recursos humanos y del conocimiento, dinamizar y diversificar el sistema económico.
10. Innovar el gobierno municipal y ampliar la capacidad de inversión público-privada concertada.

Todo este proceso se centra alrededor del Foro Asesor de Ciudadanos de la Agenda 21 Local, en un centro de sesión para la participación y colaboración. Todos los ciudadanos están invitados a participar, al igual que empresarios, hoteleros, etc. por el hecho de que el futuro del municipio está siendo siempre reevaluado.

Las 40 iniciativas y más de 270 indicadores fueron evaluados por primera vez en 1997 y ahora, por segunda vez en 2001, en lo que se llama "Observatorio".

Descripción de la actuación

Los análisis y propuestas en Calvià se han elaborado a partir de una representación del Sistema Local de Calvià basado en seis Áreas Temáticas Clave, 27 Campos de Referencia, y más de 750 Indicadores, lo que ha permitido evaluar de forma bastante completa y comparativa tanto la situación actual como distintos escenarios de futuro.

Para avanzar hacia un desarrollo revitalizador y más sostenible en Calvià es imprescindible conseguir dos objetivos muy difíciles, que requieren dedicación, método y tiempo: renovar algunos valores sociales sobre el significado y objetivos del desarrollo y alcanzar un amplio acuerdo social en torno a las nuevas ideas y proyectos. A tal efecto la Agenda 21 Local dedicó dos años para diseñar y debatir el contenido del documento de debate.

Desde 1995 hasta la evaluación del plan de acción en el 2001, se ha desarrollado un proceso ininterrumpido de trabajo, participación, y acción dirigido a desarrollar el concepto integral del desarrollo local, la visualización de las diferentes estrategias de futuro; el trabajo con indicadores relativos a sostenibilidad y calidad de vida local, la importancia del convenio con el sector privado y la participación ciudadana y la finalidad de conseguir la totalidad de una serie de programas a corto, medio y largo plazo.

Sus hitos principales son: el documento inicial de 1995, el documento para el debate y el correspondiente plan de acción de 1997, presentado en el Segundo Concurso Internacional de Buenas Prácticas en 1998, y la revisión del observatorio y del plan realizadas en el año 2001.

La participación social ha constituido desde el principio una de las apuestas fundamentales de la Agenda 21 Local y a lo largo del proceso se ha producido una constante interacción entre los siguientes actores sociales:

- El Comité de Dirección del Ayuntamiento presidido por su alcaldesa, expresando la voluntad política de llevar adelante la Agenda 21 como el eje central de la actuación.
- Los diferentes grupos de expertos elaboraron una metodología integrada y realizaron seis informes sobre cada una de las áreas temáticas clave. Dichos informes han evaluado la situación inicial de cada ATC, la han contrastado con los escenarios tendenciales y la rehabilitación integral y han establecido recomendaciones, líneas de acción e iniciativas a desarrollar en cada uno de sus campos. El grupo de expertos internos y externos han aportado metodologías y rigor científico a los informes y debates temáticos, con los agentes sociales. El cruce expertos-ciudadanos ha ofrecido un juego dialéctico y unos resultados muy interesantes a lo largo de todo el proceso, incluida la revisión del observatorio y el balance 1997-2001.

- Foro de Ciudadanos, en los que han participado más de 150 ciudadanos en diversas sesiones de trabajo. Además de la exposición y debate abierto, los participantes han podido evaluar individualmente tres aspectos concretos en cada área temática clave: la adecuación de los campos de referencia seleccionados para definir cada área temática clave; la valoración de su situación inicial y tendencial de futuro; y la adecuación de las actuaciones propuestas hacia el futuro.
- La elaboración de un documento para el debate que integra y sintetiza las propuestas fundamentales de la Agenda 21 Local de Calvià. Este documento se ha discutido durante el primer semestre de 1998 y actualmente tiene el visto bueno del Gobierno Municipal y del Foro de Ciudadanos, como pasos previos para su presentación ante el resto de la sociedad local e insular, así como ante las instituciones internacionales relacionadas con el tema.
- La información y la opinión de la población contenida en el documento para el debate está siendo divulgada por los distintos medios y se ha previsto la distribución de documentación y la recogida personalizada en todos los domicilios de Calvià en una encuesta de opinión abierta. Ello permitirá evaluar el grado de identificación y las preferencias de la población sobre las líneas de acción e iniciativas propuestas por dicho documento. Las consultas populares han complementado la acción participativa del Foro y sus Comisiones Temáticas. La consulta popular de 1997 bajo el slogan "Misión Posible" supuso la visita y entrega de documentación informativa a todas las familias de Calvià y la posterior recogida de una encuesta de evaluación sobre las diez líneas de acción y las cuarenta iniciativas del plan de acción y el compromiso personal del 30% de la población adulta.
- Cooperación regional, nacional e internacional con las correspondientes instituciones y competencias de los temas referentes a la Agenda.
- El documento final. Tras el período de información y consulta descrito, se redactó el documento final que sintetiza el conjunto de las sugerencias recibidas y en el que se incluye los programas de actuación municipal a desarrollar.

La Agenda Local ha traducido toda una serie de objetivos en un conjunto de diez líneas de acción y cuarenta iniciativas que, concertadas con la sociedad civil, permiten alcanzar objetivos significativos en tales campos a lo largo de la próxima década.

Las diez grandes líneas de acción representan las "ideas fuerza" para avanzar hacia el escenario propuesto desde la Agenda Local. Sintetizan conceptos clave y de fácil comprensión que facilitan una amplia asimilación y colaboración social.

A la vez, estos grandes ejes de actuación se han instrumentado a través de cuarenta iniciativas concretas, entendidas como definición de proyectos realizables.

Todas ellas, líneas e iniciativas, han surgido en el seno de las Comisiones Temáticas del Foro Asesor de Ciudadanos como resultado del debate conjunto entre representantes municipales, expertos, agentes económicos y ciudadanos. Todas ellas tienen también el visto bueno del Ayuntamiento y del plenario del foro y su nivel de definición permite que, una vez cubierta la fase de consulta popular, se transformen en programas de actuación Municipal para las próximas legislaturas.

Resultados alcanzados

Impacto

Tres años después de la aprobación del plan de acción de 1997, Calvià ha procedido a evaluar nuevamente, a través del observatorio de la Agenda Local, el conjunto de las transformaciones acontecidas en el municipio, y el grado de ejecución alcanzado por las 40 iniciativas.

El método utilizado ha sido similar al realizado en 1997 para definir el plan de acción:

- Informes previos de expertos independientes.
- Presentación, debate y evaluación de dichos informes en las correspondientes Comisiones Temáticas.
- Sesión general final en el Foro Ciudadano.

Las principales conclusiones del balance se establecen en los siguientes apartados:

- Un crecimiento de la presión humana difícilmente asimilable.

  Esta ha sido una de las principales conclusiones del balance. El crecimiento de la presión humana se ha producido a pesar de todos los esfuerzos municipales desplegados para contener el crecimiento, comprometiendo el rendimiento del plan de acción. El buen clima económico, la buena marcha del turismo en Baleares, así como el retraso y la dificultad en la aprobación de las medidas estableciendo límites máximos anuales en la concesión de licencias de obras, han propiciado un crecimiento desbordante de la población residente y de los turistas que diariamente visitan la localidad.

  Para comprender la incidencia de este aumento de la presión humana sobre el entorno, basta tomar como referencia a una serie de cuestiones clave, como el consumo de agua, energía, residuos, movilidad y emisiones de C02 en donde se han producido incrementos.

  Las conclusiones de estos datos son evidentes: la adecuación de la presión humana a niveles asimilables se convierte en una cuestión de primera magnitud.

  Hay que tratar por todos los medios de reducir los ritmos de crecimiento de la oferta de plazas turísticas y residenciales, y, a la vez, avanzar en paralelo en la reducción de la carga generada por habitante o turista.

- Una acción municipal muy intensa en todos los frentes.

  Una visión de conjunto sobre la puesta en marcha del plan de acción permite hacer una doble afirmación:

  - La acción municipal ha sido muy intensa, se ha orientado por el plan de acción, y ha conseguido resultados significativos en diversos temas. Un primer dato significativo es que se está trabajando activamente en más del setenta por ciento de las iniciativas del plan.

- Complementariamente a lo anterior, también hay que decir que los métodos y sistemas de trabajo son sensiblemente mejorables, y que sólo el 25% de las iniciativas cuenta con una sistemática de trabajo adecuada. Ello quiere decir que el desarrollo de las iniciativas de la Agenda Local 21 deben sustentarse en planes de trabajo sistemáticos, con objetivos Parqueiales, y claramente evaluables.

- Los claroscuros de la sostenibilidad y la calidad de vida local. El balance general.

  Un primer balance general de la situación permite afirmar que si bien la situación general de Calvià ha mejorado (la evaluación global de referencia ha pasado del 4.9 al 5.3 sobre 10), también subsisten problemas significativos en temas importantes hacia el futuro.

- La cohesión social y cultural.

  La buena coyuntura turística y la mejora de la competitividad de Calvià han favorecido en estos años la inversión, el empleo, y el nivel de vida, pero, a la vez, persiste la fragilidad de la integración social en tres aspectos muy importantes: la precariedad del empleo por la estacionalidad y la expulsión de los mayores de 50 años; la cohesión cultural de una población extraordinariamente compleja por la disparidad de sus procedencias y niveles socioeconómicos y la falta de una identidad colectiva asentada; y el fracaso en la formación de las jóvenes generaciones. Ello ha llevado a lanzar con fuerza el nuevo programa "impulso ciudadano" que trata de afrontar los retos mencionados.

- El entorno urbano y los sistemas naturales.

  Sigue mejorando la calidad del entorno urbano, entre otras actuaciones el Paseo de Calvià se valora como una actuación de gran potencial integrador, y se han producido avances muy significativos en la recuperación del patrimonio cultural, muy especialmente con relación a los trabajos desarrollados en el parque arqueológico del Puig de sa Morisca. Sin embargo no se ha conseguido detener el sostenido deterioro de los sistemas naturales, especialmente con relación a tres cuestiones clave: el litoral, la erosión del suelo, y la situación del los recursos hídricos naturales y sus acuíferos. Ello ha dado lugar también a lanzar nuevos planes de trabajo en los tres frentes comentados.

- El metabolismo urbano y el transporte.

  La importante mejora en la gestión de los residuos, contrasta con la dificultad por contener el consumo de energía y la demanda de agua ya que no se consigue desplegar la depuración en terciario con la consiguiente reutilización del recurso.

Sostenibilidad

La Agenda 21 Local ha planteado desde el principio la necesidad de considerar el municipio como un sistema integrado. La Agenda Local ha tratado de superar la visión parcelada, limitada al corto plazo, o "localista" de la realidad. Por el contrario, ha trabajado con enfoques integrados que incorporan la variable económica (turística), además de las

socioculturales y ecológicas, compartiendo así un requisito fundamental cuando se opera en términos de sostenibilidad.

Así, los análisis y propuestas en Calvià se han elaborado a partir de una representación del Sistema Local de Calvià (SLC), lo que ha permitido evaluar de forma bastante completa y comparativa tanto la situación actual como distintos escenarios de futuro, basados en:

- Delimitación de seis áreas temáticas clave (ATC) como componentes esenciales del SLC: población, integración social y calidad de vida; patrimonio histórico y cultural; economía y turismo; sistema urbanístico; y sectores ambientales clave (agua, energía, residuos y transporte). En su interrelación, se ha considerado como un componente determinante del conjunto la presión humana originada por las dinámicas poblacionales turísticas y residenciales.
- Delimitación de 27 campos de referencia y 775 indicadores, que permiten abordar el estudio y valoración de la situación actual de dichas ATC y del SLC. Estas valoraciones se plantean considerando tres puntos de vista: la situación actual, los riesgos tendenciales y las acciones correctoras en curso.

El Sistema Local de Calvià así definido facilita un análisis bastante completo de la situación actual y también permite establecer aproximaciones y comparaciones cualitativas entre posibles escenarios alternativos de futuro.

Intercambio de experiencias

Calvià, durante los últimos siete años, ha realizado un inmenso esfuerzo de transformación interna para reformular su política turística y local hacia patrones más sostenibles. En estos años, ha fortalecido el discurso, ha mantenido la apuesta por un cambio integral de los procesos, ha desarrollado una línea seria de participación social y ha realizado un extraordinario esfuerzo innovador para llevar a la practica las nuevas políticas.

Al ser un municipio en el Mediterráneo, desde el principio Calvià ha ido aprendiendo de otros municipios similares para implementar en Calvià iniciativas. En este período (1994-2001) Calvià ha estado trabajando muy duro con el objetivo de implementar su Agenda 21 Local y muchos municipios, escuelas, universidades, instituciones, etc. locales, nacionales e internacionales se han mostrado interesados en aprender de nuestras experiencias. Un ejemplo es la declaración de Calvià sobre Turismo y Desarrollo Sostenible en el Mediterráneo.

Todo ese esfuerzo se ha visto premiado con la mejora de la viabilidad del desarrollo turístico y local, y, a la vez, ha tenido un reconocimiento exterior muy importante. En estos años Calvià ha recibido numerosos premios y menciones y, lo que es más interesante, ha sido invitada a contrastar su experiencia en foros tan dispares como la Comisión de Desarrollo Sostenible de Naciones Unidas, o toda una multitud de pequeñas reuniones de trabajo con otros municipios y destinos turísticos en el mundo. Es más, la página web de Calvià está extraordinariamente concurrida, y existe un significativo flujo permanente de visitantes exteriores que se acercan a Calvià interesados por conocer de cerca la experiencia.

Entre los premios recibidos por Calvià Agenda 21 Local destacan: Ciudad Europea Sostenible '97, Buenas prácticas para la mejora de la calidad de vida urbana, Premio Green Globe, Premio a la mejor Iniciativa, Labor y Esfuerzo Municipal en apoyo al Medio Ambiente, Proyecto del Mundi, EXPO 2000 Hannover.

Calvià también toma parte por un lado como socio del Comité Mediterráneo y del Desarrollo Sostenible (MCSD), la Iniciativa Sostenible de los Tour Operadores del UNEP; y por el otro lado Calvià colabora en la Organización Mundial del Turismo (OMT), al igual que en la difusión de las Buenas Prácticas.

Además, Calvià está trabajando en proyectos europeos, esto quiere decir que el municipio de Calvià trabaja con instituciones locales, nacionales e internacionales con el objetivo principal de intercambiar experiencias. Por el momento, Calvià, tanto como socio como coordinador, ha intervenido en 62 proyectos europeos con diferentes organizaciones.

Todo ello no hace sino indicar la existencia de una serie de hechos y circunstancias concurrentes: las políticas sobre la sostenibilidad del desarrollo avanzan en el mundo; el reto actual en la aplicación de la nueva política en el ámbito local se sitúa en el binomio voluntad política-instrumentación de las nuevas orientaciones del desarrollo; y en ese contexto la experiencia de Calvià resulta extremadamente interesante para muchas localidades.

Para facilitar la difusión y la participación con los ciudadanos de Calvià y otras instituciones interesadas, se han publicado varios documentos de apoyo y de información sobre las diferentes fases de la Agenda Local 21, la mayoría de estos documentos están traducidos al castellano, catalán, inglés y alemán.

Hasta la fecha Calvià ha venido cubriendo estas demandas de forma voluntarista, improvisada, e insuficientemente eficiente. El trabajo hacia el futuro en este campo, exige plantearse con ambición sistematizar el trabajo en redes de "cooperación y transferencia de conocimiento" con otras localidades que pudieran estar interesadas en aprovechar la experiencia de Calvià.

La experiencia en cifras

Resultados

- 24% de crecimiento de la población residente desde 1995 hasta el 2000.
- 9% de crecimiento de los turistas para el mismo espacio de tiempo.
- Del 15% al 20% se considera que se ha incrementado la presión humana sobre el entorno para el periodo de 1997 al año 2000.
- De los 46 indicadores del observatorio, 9 mejoran y sólo 1 empeora con relación a la situación de 1997, y el balance global en el año 2000 refleja que 17 indicadores (37%) mejoran, 13 (28%) no varían, y 16 (35%) siguen evolucionando negativamente.
- Se ha conseguido pasar del 1,90% al 12,65% en la recogida selectiva de residuos urbanos.
- Se está trabajando activamente en 30 de las 40 iniciativas del plan.
- En 20 de ellas se ha cubierto el porcentaje de programa de trabajo previsto para un escenario de 10 años.

Financiación

Inversión total 1998-2001: 1.346.000 euros.

- Ayuntamiento de Calvià: 90%.
- Otros: 10%.

Annex 11: Growth Rate GDP since 1990

Spain	Population	Female Population	Female Population (as % of male)	Population Growth (in %)	GDP pc, US$ (2004)	GDP pc, PPP US$ (2004)	Avg. annual growth rate GDP pc, 1990-2004 (in %)
	40 397 842	20 651 697	51.1	0.13	24 360	25 047	2.3

Spain	ACCESS TO RESOURCES	Share of women in wage employment in the non-agricultural sector (in % of total)	Male Contributing Family Workers (in % of total, 1995-2004)	Human Development Index (Rank)	Gender Empowerment Measure (Rank)	Gender-related Development Index (Rank)	Gender, Institutions and Develpment Index (Rank)
	..	42	36	19	15	19	13

Annex 12: Public Development Assistance dedicated to Resources Access

PUBLIC DEVELOPMENT ASSITANCE DEDICATED TO RESOURCES ACCESS

Variable		Population	Female Population	Female Population (as % of male)	Population Growth (in %)	GDP pc, US$ (2004)	GDP pc, PPP US$ (2004)	Avg. annual growth rate GDP pc, 1990-2004 (in %)	ACCESS TO RESOURCES	Share of women in wage employment in the non-agricultural sector (in % of total)	Male Contributing Family Workers (in % of total, 1995-2004)	Human Development Index (Rank)	Gender Empowerment Measure (Rank)
Country													
Spain		40 397 842	20 651 697	51.1	0.13	24 360	25 047	2.3	..	42	36	19	15

Annex 13: Voluntary Contributions to International Organisations 2007

APORTACIONES VOLUNTARIAS A ORGANIZACIONES INTERNACIONALES 2007

APORTACIÓN	PROGRAMA OPERATIVO	Importe
Contribución voluntaria del Ministerio de Medio Ambiente de España a la Comisión Económica para Europa de Naciones Unidas (CEPE)		**45.090,00 €**
Cuota a la Red Internacional de Organismos de Cuenca (RIOC)		**1.000,00 €**
Contribución a la Red Mediterránea de Organismos de Cuenca (REMOC)		**30.000,00 €**

Contribución voluntaria de España a la Global Water Partnerships Organizations (GWPO)		**33.023,75 €**
UNESCO (Experto asociado en la División de Ciencias Ecológicas)		**65.000,00 €**
Consejo Mundial del Agua		**1.976,25 €**
Contribución a Organismos Internacionales (PNUMA). Apoyo técnico en el Lago Titicaca	ARAUCARIAXXI	**600.000,00 €**
Contribución a Organismos Internacionales (PNUMA). Capacitación en gestión integrada de cuencas	ARAUCARIAXXI	**150.000,00 €**

PROGRAMAS / CONVENIOS DE COOPERACIÓN 2007

ACTUACIÓN	**PROGRAMA OPERATIVO**	Importe	Convenio / Acuerdo Bilateral
Cruz Roja Española. Cooperación internacional y sensibilización ambiental en el área SubSahariana	AZAHAR	**300.000,00 €**	Convenio
Cruz Roja Española. Cooperación internacional y sensibilización ambiental	AZAHAR	**100.000,00 €**	Convenio
Apoyo y cooperación institucional en el sector del agua en Marruecos	AZAHAR	**200.000,00 €**	Convenio con CENTA
Cooperación y formación	ARAUCARIAXXI	**550.000,00 €**	Encomienda de gestión DGA-CEDEX
Mantenimiento y actualización del Sistema Iberoamericano de Información sobre el Agua SIAGUA	ARAUCARIAXXI	**127.600,00 €**	Encomienda de gestión DGA-CEDEX

Participación en el Sistema Euro- Mediterráneo de Información del Agua SEMIDE	AZAHAR	**348.000,00 €**	Encomienda de gestión DGA-CEDEX
Cooperación en Bolivia y Perú	ARAUCARIAXXI	**200.000,00 €**	Convenio con CENTA
Fortalecimiento institucional en Iberoamérica	ARAUCARIAXXI	**100.000,00 €**	Convenio con CENTA
Cumbre "Agua, desarrollo y cooperación"	ARAUCARIAXXI	**1.000.000,00 €**	Multiples
Estudio de la situación normativa, competencial	ARAUCARIAXXI	**30.000,00 €**	Pliego en trámite
Foro Mundial de sequías	ARAUCARIAXXI	**400.000,00 €**	Pliego Tragsatec
Foro Mundial de sequías	AZAHAR	**400.000,00 €**	Pliego Tragsatec
Labores de Asistencia Técnica en proyectos internacionales de la Dirección General del Agua	ARAUCARIAXXI	**50.000,00 €**	Multiples
Labores de Asistencia Técnica en proyectos internacionales de la	AZAHAR	**80.000,00 €**	Multiples y REMOC
Asistencia Técnica a la Conferencia d eDirectores Generales Iberoamericanos del Agua	ARAUCARIAXXI	**147.500,00 €**	Pliego INFRAECO
Fundación Ecología y Desarrollo. Alianza por el Agua	ARAUCARIAXXI	**400.000,00 €**	Convenio con ECODES

Annex 14: Water required for ecosystems

WAT_C08

As there were not available data for Spain, an approximation for the calculation of this index is as follows:

According to data from the draft Hydrological National Plan, the following values can be established for the hypothesis "without interbasin diversion" of the water resources utilisation of Spanish river basins for the temporary horizon of the Plan: 1992, 2002 y 2012

	Total Discharge (A)	Demands (D)	Returns (R)	Balance (A+R-D)	% of the detracted resources 100*(A-B)/A
1992	111	36.3	8	82.7	25.5
2002	111	39.7	9	80.3	27.6
2012	111	42.7	9.5	77.8	30

Data in Km^3

Of the above information, it can be observed that currently, as an average, 75% of the flows of Spanish River basins discharge to the sea. This percentage is reduced to 70% in the deadline horizon year of the Plan (2012).

It is obvious that this average utilisation of Spanish water resources in consumptive uses cannot be considered high, reason why the current and foreseeable situation as a whole can be qualified as reassuring.

Within this 70-75% of flow discharged to the sea, there is more than enough margin to attend environmental flows, both as circulating minimum as minimum hydrographs.