

# Management and promotion of water infrastructures



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# MANAGEMENT AND PROMOTION OF WATER INFRASTRUCTURES

## REPORT

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Consell de Treball,  
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**Catalan Labour, Economic and Social Affairs Council (CTESC)**

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# 1. EXECUTIVE SUMMARY

## 1.1. Introduction

The following Report on the management and promotion of water infrastructures is the second report of the Catalan Labour, Economic and Social Affairs Council (CTESC) in the field of environmental infrastructures and it forms part of the necessary revision of the water planning in Catalonia.

The aim of the study is to analyze the value that the infrastructures for the integral water cycle provide to Catalonia, to show the planning challenges which arise from the adoption of the Water Framework Directive (WFD) as well as the possible improvements in the management model, the investment and cost recovery.

The final considerations and recommendations of this Report are the result of the analysis of the legal framework, the planning objectives, the data on investment, the existing infrastructures, and the water costs, price and financing, and they gather many elements of the debate around these points in the current socio-economic context.

## 1.2. Legal framework

In the WFD context, the legal framework sets out first the distribution of water responsibilities according to territorial criteria: internal watershed (CIC), intercomunal watershed formed by the Catalan part of the Ebre, Garona and Júcar river basins (CHE) and, depending on the water cycle stage: water supply and clean-up.

This Report also reviews water planning on a Spanish and Catalan scale, and describes the rules regarding the use of public water goods: the concession system and other related uses. It also describes the regulation of hydraulic works, both the one relating the works of general interest and the specific standards on irrigation and other issues.

Finally, the Report deals with the cost recovery principle of services related to water and established by the WFD on a European, Spanish and Catalan scale (CIC) and, therefore, with the price of water and with the rates, the water cannon, the user fee, the fee regulation, the referral fee, the use fee and the rates.

## 1.3. The planning future challenges

In the EU framework and the Water Framework Directive, the section concerning the planning future challenges looks over, first, the elements that any water sector planning should consider: demography, demand, climate change, alert and emergency situations, as well as the fulfillment of the quantity objectives, the water availability and the environmental objectives contained in the Water Management Plan, specifically in the 2006-2015 Measures Program of the internal Catalonia basins (CIC).

Planning in the field of water has several constraints:

- First, those which are concerned with the water policy designed from the European Union, namely the Water Framework Directive, coordinated from the Spanish State by the National Hydrological Plan.
- Secondly, the division of the territory into basins (CIC and CHE) and uses (domestic, industrial and agricultural use) and the overlapping of institutions and powers.
- And thirdly, the difficulty of projecting the future water demand, the lack of verifiable and reliable data, the diversity in the clean-up management and in the infrastructures already built, as well as the difficulty of building new clean-up infrastructures, due to the little marginal benefit, especially in municipalities with less than 2,000 inhabitants. In addition, we must take into account the recurrent droughts affecting Catalonia, since the volume of water available is reduced after a drought.

**FIGURE 1. Assessment of the planned objectives achievement concerning water**

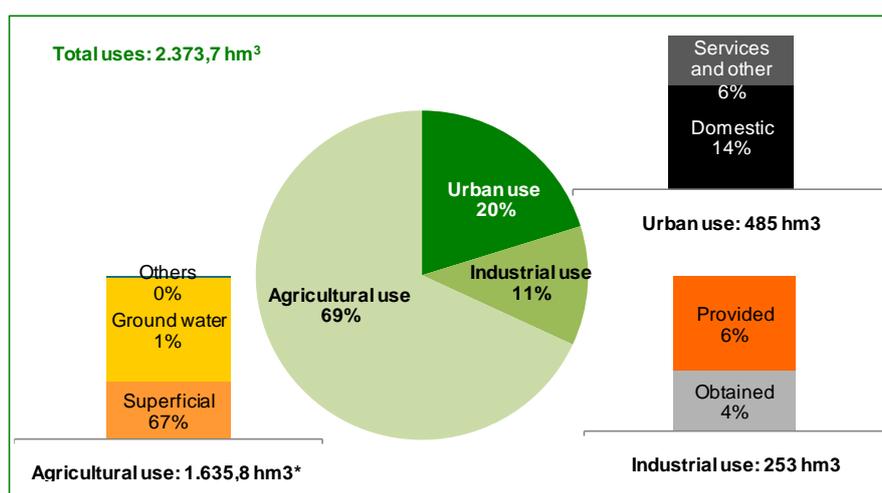
Quantity and availability targets				Environmental quality objectives			
Demand savings (2005-2011)		New resource (2012)		Water quality		Environmental quality	
↓20%	Domestic water demand	25%	Actual desalination capacity of 80 hm <sup>3</sup> (2 plants)	100%	Rating of purification sludge	78%	Surface water in good condition ( <b>a CIC them 42%</b> )
↓9%	Water demand in services	16%	Target 2015 water reuse	56%	Groundwater in a good chemical status	51%	Groundwater in good condition ( <b>a CIC them 36%</b> )
↓14%	Industrial water demand	10%	2015 Target water source recharge	94%	Good groundwater in a good quantitative status	1/2	Minimum flow required in the Ebre
↓3%	Agricultural demand			439	Treatment plants (28% 2014 target)	↑	Zebra mussels expansion and other species
57%	Municipalities with a supply plan			↑	Control of agricultural pollution		

Source: own elaboration from INE, ACA and the Water Management Plan of Catalonia. .

### 1.4. Importance of water infrastructures in Catalonia

In this section the supply and demand of water in Catalonia are evaluated from their various uses: urban, industrial and agricultural. Water policies have been developed in recent years and have been aimed at achieving an integrated water management from an ecological, social and economic point of view. Water infrastructures are just one of the elements of water management. The territorial division into two zones of Catalonia complicates the internal management of the water cycle as well as the water management between autonomous regions. Moreover, water stored in the Ebro basin has increased fivefold in relation to the water stored in the CIC in the last decade. At CHE water is used to irrigate and CIC water is for drinking purposes and economic activity.

**CHART 1. Approach to the various uses of water. Catalonia**



Units: cubic hectometers (hm<sup>3</sup>) and total or subtotal percentages.

Note: The Supplier Entities Census (ACA, 2011) has been employed for urban use. For industrial use, we have employed municipal data on billed volumes and discharged pollutant load, according to the canon of water, obtained from the returns filed by industrial establishments and supplier entities (ACA, 2011); they do not include data on agriculture, livestock, hydroelectric, thermal, nuclear or fish farm sectors. For agricultural use we have employed the survey on the water use in agriculture, but the most recent data are from 2010. (IDESCAT, INE, 2010).

Source: own elaboration from INE, Idescat and ACA.

As for **urban use**, 54% of the catchment in Catalonia is from the underground, above the Spanish average (29%). Surface water accounts for 46% of the catchment, and the provision from desalination is very low. It is necessary to keep in mind that data come from the Survey on water supply and sanitation from INE and they do not present the analysis by watersheds but by regions and that, according to the ACA, desalination contributed with 15.2 hm<sup>3</sup> of water (2011), the 2.9% of household and industrial uses of this year in the CIC (521 hm<sup>3</sup>).

Moreover, water consumption for urban use has declined in recent years (2005-2011), both among home users (-20%) and among service companies and other economic activities. Investment made by the water collection, purification and distribution companies increased 10% during the years 2005-2010. However, an improvement in efficiency is not observed, since the volume of water which is not recorded is over 20% and it has not been significantly reduced, and there is also room for improvement in terms of planning policy, tariff and water reuse.

**Industrial water use** is concentrated in the Barcelona metropolitan area and in the inland basins of Catalonia, as well as in the field of chemistry and food, followed by textiles and paper, and has been disconnected from the evolution of industrial GDP. In fact, the billed water consumption in the industry has fallen 35% over the last decade (2003-2012). Industrial uses that get the supply from own deposits have declined, and those which get it from municipal supply networks have increased.

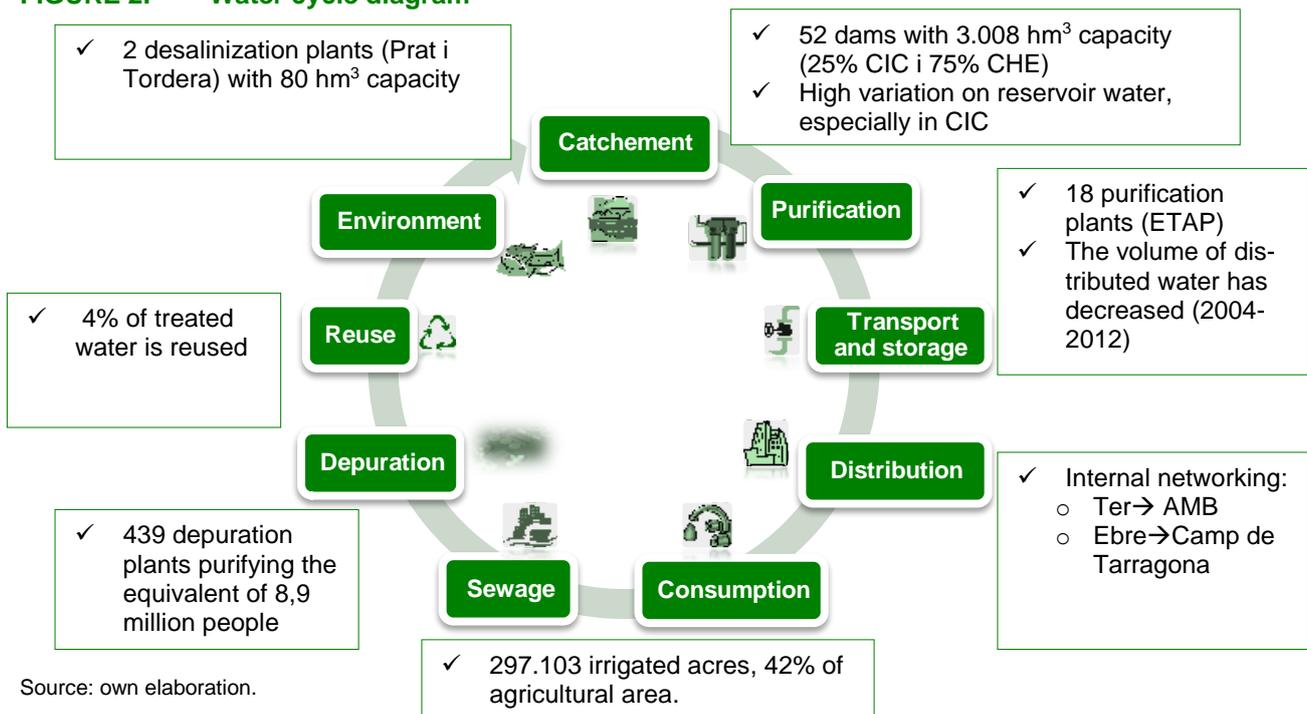
As for **agricultural water use**, the surface intended for agricultural irrigation has increased, although it became stabilized in recent years. A decrease in the volume of used irrigation water can be observed, as well as some stability in the water consumed by irrigated hectare. No disconnection is observed between water availability and the evolution of agricultural GDP. Gravity irrigation accounts for 72% of the total one and sprinkler and drip, for the 28%, so there is an important room for improvement in the modernization of the existing irrigation, the irrigation efficiency and the reuse of recycled water for agricultural use.

### 1.5. Diagnosis of the current situation and needs

This section reviews the evolution of investment in water infrastructures and makes a diagnosis of the existing infrastructures: dams, irrigation canals, water transfers, water treatment plants, desalination plants, clean-up facilities (sewerage and treatment plants) and regeneration and reuse facilities.

It is noted that the capital in infrastructures per capita has increased during the last decade (1999-2008) and Catalonia ranks third behind Andalusia and Valencia. But Catalonia, with 9.8% of the actual hydraulic productive capital, has lost weight in the whole Spanish State. The most important data are described here.

**FIGURE 2. Water cycle diagram**



Source: own elaboration.

- The budgeted investment in water infrastructures has increased during the 2006-2009 years to return in 2011 to levels which are below those of 2007.
- The integrated management of the water cycle does not optimize the Segarra-Garrigues canal management nor the Prat desalination facilities.
- The works of the Segarra-Garrigues canal are not yet finished and in some of the existing canals, such as the Urgell one, watering should be modernized to pressure.
- The total volume of water supplied to the public grid from treatment plants and service reservoirs of Catalonia (252 l/inhab./day) is one of the lowest in Spain (273 l/inhab./day).
- Although leakage on supply network has declined, some supply networks are 30 years old and should be well maintained.
- There are municipalities that are not yet connected to supramunicipal supply networks, and new pipelines are required.
- The number of treatment plants has increased year after year. There are 439 built, 1,544 treatment plants planned by 2014, many aimed at the purification of municipalities with less than 2,000 inhabitants. Investment represented 49% of the sum of the budgets in 2009-2012. The percentage related to the use of sewage treatment plant has remained more or less stable in recent years.
- Reuse is difficult because the population is concentrated on the coast, and water transport to upper bounds for reuse is expensive.

## 1.6. Water integrated cycle recovery costs

In this section the sector structure is described and issues related to water infrastructures financing and water price setting are discussed.

In the **water sector** the administrative boundaries do not coincide with jurisdictional boundaries, which complicates the management model.

- Municipalities have powers on: low supply, sewerage, wastewater treatment, sanitary control and river area.
- The ACA in CIC and CHE in intercommunity basins are involved in water resource availability, management and dam regulation, water transport in discharge, water treatment, clean-up and sewage management and environment preservation.
- Finally, there are other actors in the water sector: irrigation communities, irrigation canals managers, operators in high, operators in low and so on.

Regarding the financing of the integrated water cycle, we must take into account that it focuses on the management and service provision and it needs some infrastructure with an investment and operation cost that should be recovered. Funding difficulties in providing this service are derived from the difference between income and expenditure. Deficits are more concentrated in sewage and in upstream supply functions depending on the ACA (availability, clean-up and environment).

Deficits in financing the water cycle are, in order from most to least, the following ones: drainage (49%), upstream supply (24.2%), clean-up (22.5%), availability (2, 5 %) and environment (1.9%).

Thus, the price of water determines the fit between supply and demand and it conditions the sustainable water management. We should keep in mind that the price of water in Catalonia is one of the highest in Spain, and that there is disparity in unit prices depending on the demarcation (in Barcelona, water is more expensive). The price of water does not quite reflect its actual cost, including environmental and resource costs. In determining this price we must take into account:

- The water allocation for agriculture depends on concessions; there is a fixed price up to a maximum of consumption and the fee for use of public water assets and the fee for water regulation and use are added to it.
- Industrial and urban water price is fixed in a progressive way according to the amount of water consumed. In this sense, the average household consumption is 130 l/person/day (2011), according to the INE, and domestic consumption is 8 m<sup>3</sup>/subscriber/month (2011), according to the Supplier Entities Census, to which the consumption charges by sections are added (there are four sections).
- Municipalities regulate rates and the ACA, the water canon which in theory incorporates the clean-up and the water cycle costs. The weight of the water rate on the ACA budget, following the 2002-2012 reports, has ranged from 43% in 2002 to 30% in 2011 and 59.3% in 2012.

## 1.7. Framing the discussion

This section describes the items for discussion that are set with regard to the adequacy of existing water infrastructure, to the model management, planning, built infrastructures and cost recovery.

The infrastructures of the integrated water cycle allow to manage water resources to promote regional development, and the management model should consider the changes introduced by the WFD in terms of ecosystem protection, cost recovery and democratization of management by participation.

In this regard, it should be noted that the WFD puts on the same level the environmental uses and the urban uses and puts them before industrial and agricultural uses, and Catalonia has been a pioneer in adopting the tools according to the WFD.

## 1.8. CTESC considerations and recommendations

As for **the value of water infrastructures**, the CTESC considers that

1. The entire water cycle in Catalonia has a set of infrastructures to be put in value, as they have made possible significant advances in recent years in the quality of life, the economic development and the improvement of the ecosystems state.
2. Likewise, water policies and planning have improved saving and efficiency very significantly, particularly in industrial and urban uses. Thus, despite the economic crisis, the evolution of population and of the industrial GDP have got disconnected from the water consumption in these areas.

The reduction in water consumption in the industry can be explained by the adaptation that has occurred in intensive industrial processes in its consumption, improving business efficiency as a result of increases in the water cannon, increased reuse and the impact of the economic crisis.

3. However, there has not been any disconnection in agricultural uses, since the evolution of agricultural GDP and agricultural water consumption is cyclical and depends on the actual availability of water. Therefore, specific policies should be designed to correct it.
4. The droughts of 2005, 2007 and 2008 brought into focus the risk of reaching deficits of the system with the existing infrastructures. With the start of the Prat desalination plant and the interconnection in high between the tanks of Trinitat and Font Santa the ability to deal with situations of extreme drought as in 2007-2008 has significantly improved, but delivery is not yet sufficiently guaranteed anywhere in the country, regardless the location of the basin.

As for the **bussines model and the infrastructures**, the CTESC considers that

5. It is necessary to reduce the distortion existing in practice in the roles distribution and functions in water, so that the distribution of powers follows a clearer and effective scheme that avoids duplications.
6. Efforts should be made to give the Council for Sustainable Water Use adequate and sufficient instruments to guarantee the exercise of the advising, participation and deliberation functions assigned to it.

7. It is necessary to foster social participation, information and awareness towards the issues related to the water cycle and the necessary infrastructures to manage it, taking into account the environmental, social and economic triple dimension.
8. We need to open the possibility of exchanges between different water uses (urban, agricultural and industrial ones) and territories to maintain the quality of life and the quality of a more strategic economic activity. It is necessary to deepen the implementation of the transfer figure related to water uses for better resource allocation in each moment and in each territory.
9. It is necessary to create a regulatory framework about the use of recycled water, not to be linked only to droughts, that strengthens the legal security for the ones that have chosen this alternative, considering the economic costs and the environmental benefits.
10. Efforts should be made to connect supply to all municipalities and urban areas that are not yet connected.
11. It is necessary to seek economic and environmental balance as for the uses of water from desalination plants, integrating their management evenly with the rest of infrastructures between the operating cost and the risk of assets depreciation and also to reduce pressure on water bodies.

As for the **regulation and planning in the field of water**, the CTESC considers that

12. Water policies should be formulated taking into account the triple environmental, social and economic dimension.
13. The investment needed to maintain water infrastructures should be proportional to the improvement of water and environmental quality. In this sense, we must review the planning objectives of water management to adapt them to the economic situation, optimizing the existing infrastructures.
14. It is needed to reflect on how the proposed reforms, the ones that are already in progress and especially the ones fostered by the Public Administration can have a bearing on municipal powers in water and affect planning in this area.

In terms of **costs, financing and water prices**, the CTESC considers that

15. It is necessary to raise social awareness about the costs generated by management and water infrastructures as well as about the service they offer.
16. It is necessary to make visible the contribution of each economic sector to comply with the principle of cost recovery, as indicated in the Water Framework Directive. Consequently, the hydraulic taxation should be rearranged according to this principle.
17. The question is whether the design of the canon created in 1999 is still in force to support the current model. The CTESC proposes to consider the following points:
  - a. The various reform proposals that have failed even to be discussed with the required depth.
  - b. As for the water uses, it is necessary to define more clearly the consumptive and non-consumptive uses, since the border between the two concepts is very permeable and criteria to discern what is and what is not are not much understandable, given the consequences regarding the implementation of the water rate.

Regarding the policy financing derived from social demands and situations of need, the involvement of the competent authority in the social welfare field is necessary.

18. The mechanism for setting rates should be reviewed, providing the maximum legal security to the operator to ensure the coverage of agreed costs and, therefore, the quality of supply and working conditions.
19. Catalonia is the autonomous region with less State investment in water infrastructure. A higher degree of implementation in budgeted water investments is necessary.