

Integrated approach to water demand management in Zaragoza, Spain

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Introduction to the Study

A serious drought experienced in Spain during the period 1991-1995 prompted Ayuntamiento De Zaragoza (AYTO), the water service provider in Zaragoza to impose a variety of water restrictions. Consumers were unhappy about the restrictions, as evidenced by numerous public demonstrations.



Fig 1: Location of Zaragoza

This was one of the drivers for AYTO and other local partner organisations in 1996 to start integrated programmes to promote water demand management (WDM) at the utility and end-use levels.

Various types of stakeholders were involved: The City Council, the regional government, non-government organisations, universities, financial institutions, private firms, hotels, manufacturing industries, retail outlets, schools and households.

At the end-use level, a combination of economic, regulatory and communicative instruments was used to improve water use efficiency. A large contribution to the water conservation was achieved through a programme implemented during 1997-2008, codenamed 'Zaragoza, the water saving city', which was coordinated by Fundación Ecología y Desarrollo (FED), a Spanish environmental Non-Governmental Organisation (NGO).



Fig 2: R. Ebro passes thru' Zaragoza

At the utility level, with the involvement of Zaragoza University and Loughborough University, respectively, AYTO redesigned the tariff, to make it more water conserving; provided economic incentives to encourage water conservation; and introduced active leakage management



Fig 3: Stakeholders' meeting in Zaragoza

WDM at end use – 'Zaragoza, the water saving city' programme

Phase 1: 'Small steps, big solutions', aimed at making changes on all aspects that individually and collectively affect the water-using culture in homes, public buildings, large consumers and the general public.

Phase 2: '50 good practices' focussed at reducing water consumption of large consumers of water such as public buildings, industries, parks and gardens.

Phase 3: 'School for efficient water use', whose objective was to extend the good practices resulting from the first two phases, and for Zaragoza to become a role model city for efficient water use.

Phase 4: '100,000 Zaragoza commitments', whose objective was to collect, verify and document 100,000 public commitments for efficient water use.

Redesigning the tariff for water conservation

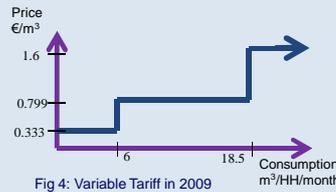


Fig 4: Variable Tariff in 2009

Fixed charges became dependant on pipe diameter; e.g. 3.8 €/month for 20mm pipe, rather than on street type.

Variable charges based on water consumption per household per month

Economic incentives for water conservation

From 2002, houses which reduced their consumption by 40% benefitted from a 10% reduction in the water bill.

In subsequent years, a 10% reduction in water consumption attracted a 10% reduction in the water bill.

Table 1: No. of households benefitting from economic incentives

Start Year	Households with new commitments	Further subsequent savings of at least 10% in the Year			
		2003	2004	2005	2006
2002	1,708	375	66	2	1
2003	27,741		5,331	487	123
2004	24,331			2,956	721
2005	27,929				4,635
2006	33,274				

Implementing Active Leakage Mgmt



Fig. 5: Leak detection & repair in Zaragoza

DMAs were set up in Actur Supply Area, and active leakage piloted. This activity has been scaled up in other supply areas.

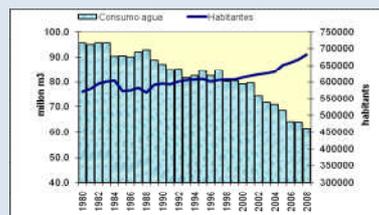


Fig. 6: Water consumption trends in Zaragoza

Key Results and Conclusion

Zaragoza City's population increased from 606,069 to 682,283 between 1997 and 2008 (an increase of over 12%);

Yet, the city's overall water consumption reduced from 84.8 to 61.5 million m³, respectively, which was a reduction in consumption of 27% in the same period.

This case study demonstrates how a city-wide multi-sectoral, integrated and participatory approach can make WDM a reality.

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