European Environment Agency

Indicator Fact Sheet

(WQ2) Water use by sectors

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Indicator code / ID	WQ2
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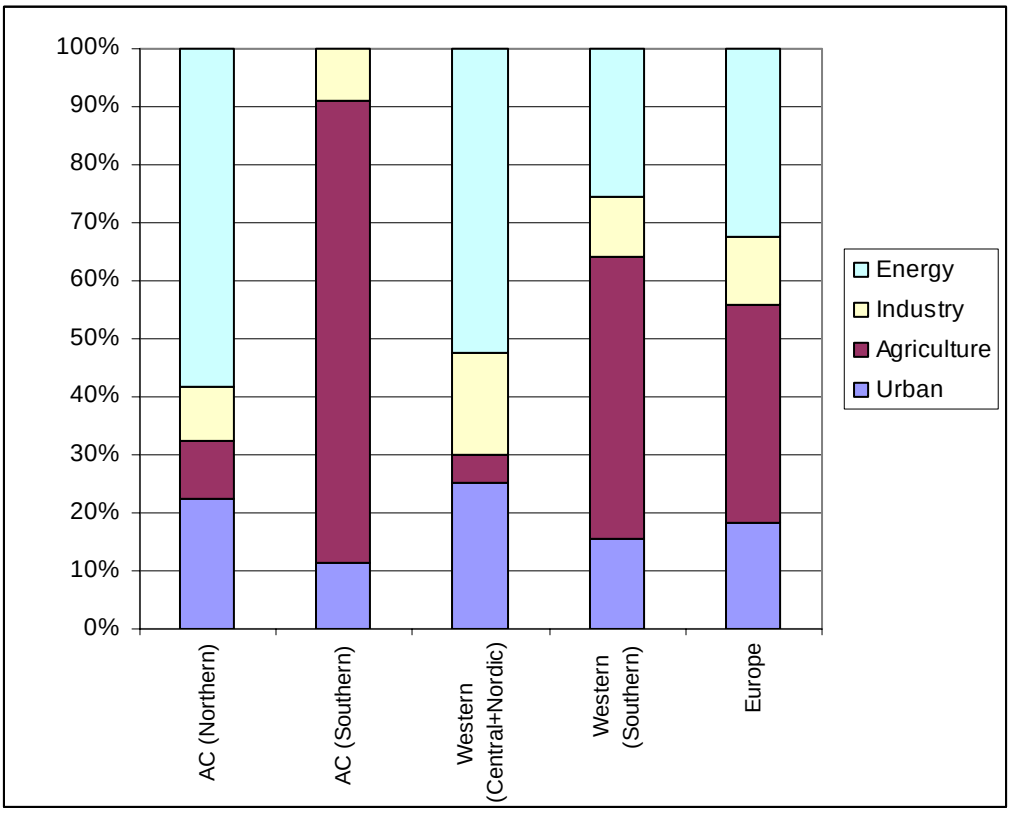
Key message

☺ During the 1990s, there was a general decrease in total water abstracted, but with differences depending on the economic sectors and European regions.

Sectoral use of water in regions of Europe



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Source: New Cronos (Eurostat-OECD JQ2002)

Results and assessment

Policy relevance:

There are no policy targets, at European level, directly related to the evolution of this indicator. Nevertheless, one of the purposes of the Water Framework Directive is to *promote sustainable use based on a long-term protection of available water resources*. Also, one of the environmental objectives of the same directive is to *ensure a balance between abstraction and recharge of groundwater, with the aim to achieve good groundwater status.* In terms of the efficiency of water uses, an economic analysis of water use has to be undertaken at river basin level and Member States have to take into account the principle of cost recovery for water services, including environmental and resource cost.

An aim of the Sixth Environment Action Programme for the EU (2001-2010), is to provide products and services using fewer resources, such as water, and encouraging resource efficiency through more sustainable consumption patterns. One of its objectives related to water is to ensure that *rates of extraction from our water resources are sustainable over the long term.* To achieve this objective, measures to improve the efficiency of water use in different economic sectors have to be implemented at national, regional and local level.

Maintaining the integrity of ecosystems through the efficient management of natural resources is the first objective of the OECD Environmental Strategy for the first decade of the 21st century which establishes that freshwater resources and associated watersheds should be managed in order to maintain adequate supply of freshwater of suitable quality for human use and to support aquatic and other ecosystems.

The Common Agricultural Policy (CAP), has been a policy instrument over the last 35 years that has contributed to increase the productivity of agriculture, ensure a fair standard of living to the farming population and to stabilise markets. A new reform was made in June 2003 (to come into force by 2004) taking into account the enlargement of the European Union including countries of Central and Eastern Europe. The aim of this reform is to decouple subsidies from volume of production, encouraging a more competitive production system that is more market orientated.

The European network of Natura 2000 sites will cover more than 10 % of the EU territory. This directive aims at protecting nature through better management of specific sites. Many of those are managed by agriculture.

Environmental context:

All the economic sectors require water for their development. Agriculture, industry and energy productions are not feasible if water is not available. Navigation and a variety of recreational activities also depend on water. The most important uses of water, in terms of total water abstractions, have been identified as urban use (households and industry connected to the public water supply system), industry, agriculture and energy production (hydropower and cooling of power plants). Sectoral use of water does not always reflect the relative importance of the sectors in the economy of one country. It is rather an indicator of on which sectors the environmental measures need to focus in order to enhance the protection of the environment.

Assessment:

Southern European countries use the largest percentages of abstracted water for agriculture (80 % in AC countries, and 65 % in Western countries). Irrigation is the most significant use of

water in agriculture in these countries, being almost 100 %. Western central plus Nordic and northern Accession Countries use the largest percentages of abstracted water for urban needs and energy production.

The decrease of agricultural and industrial activities in central Accession Countries during the transition process led to decreases of about 70 % in water abstracted for agricultural and industrial uses in most of the countries. Agricultural activities reached their minima around the mid-1990s but more recently countries are increasing crop and livestock production (EC, 2002).

Water for agriculture, mainly irrigation, decreased during the 1990s in the southern western countries. The reform of the CAP in 1992 reduced production: the introduction of set-aside, putting in place of agri-environmental measures and the use of more efficient irrigation methods influenced this trend.

The increasing trend in southern Accession Countries is mainly due to the increase of irrigated land in Turkey and is expected to continue to increase with new irrigation projects. Data show a decreasing trend in water use for urban purposes in most of the European countries. This trend is more pronounced in central Accession Countries. In most, the new economic conditions led to water supply companies increasing the price of water and installing water meters in houses. This resulted in people using less water. Industries connected to the public systems also reduced their industrial production and hence water use. Nevertheless in most countries the supply network is obsolete and losses in distribution systems require high abstraction volumes to maintain supply.

Water abstracted for energy production is considered a non-consumptive use and it accounts for around 30 % of all the uses in Europe. Western central and western Accession Countries are the largest users of water for energy production; in particular Belgium, Germany and Estonia where more than half of the abstracted water is used for energy production.

Sub-indicator

(WQ3b) Water use by agriculture

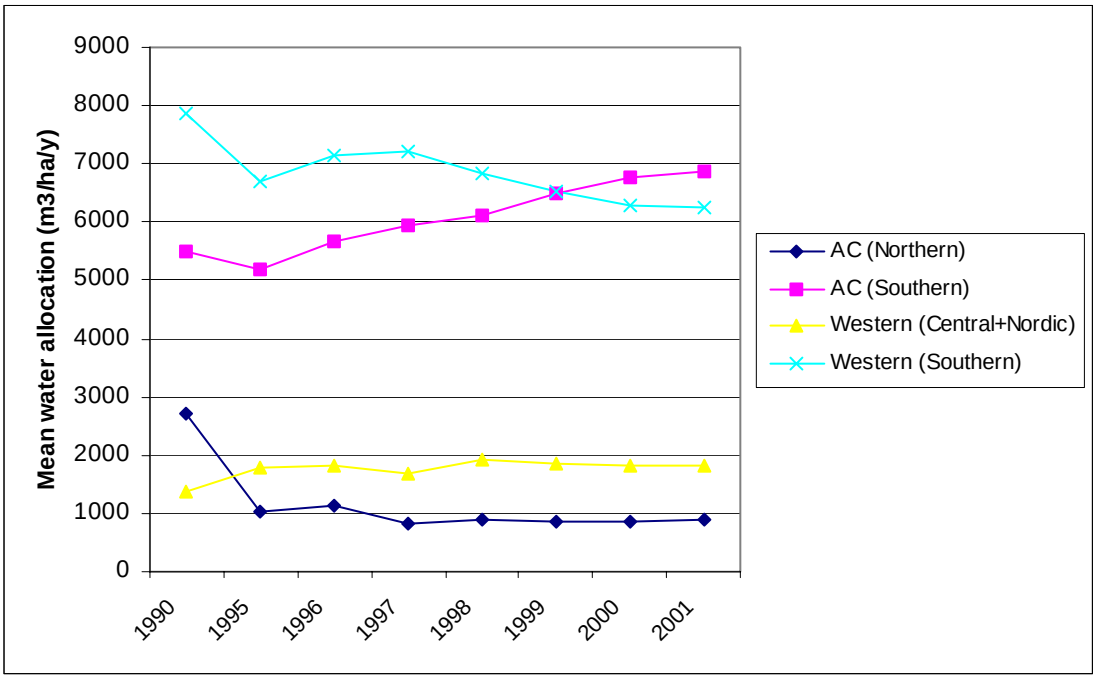
Key message

☹ The amount of water used for irrigation has increased in the southern Accession Countries.

☺ In the southern countries of Western Europe, the amount of water use for irrigation decreased during the late 1990s, reflecting the use of more water efficient irrigation practices.

☺ In the northern Accession Countries the amount of water use for irrigation decreased in this period largely because of the deterioration of, and non-use of, irrigation systems.

Trends in water use for irrigation



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Sources:
Faostat and Aquastat (FAO) ,
New Cronos (Eurostat-OECD JQ2002)

Assessment

The total water abstraction for irrigation in Europe is around 105 068 Hm^3/year or 38 % of total abstraction and more than half of its consumptive uses. The mean water allocation for agriculture decreased from around 5 499 to 5 170 m^3/ha/year between 1990-2001. Great variations can be found between regions and countries.

Southern European countries have the highest water use for irrigation. It represents around 78 % of the total abstraction in southern Accession Countries and 80 % of their consumptive uses, and 51 % of the total abstraction in southern western European countries which represents around 65 % of their consumptive uses.

However, the trend across the region is quite different. In southern western European countries a decreasing trend is observed during the considered period (from 7880 to 6267 m^3/ha/year), largely due to the use of more efficient irrigation practices. In southern Accession Countries there is an increasing trend (from 5 505 to 6 854 m^3/ha/year) because of the increase in Turkey. Portugal had the largest per unit use in these southern countries in 2001. France showed a 50 % reduction over this period even though the irrigated area increased thus implying more efficiency in the use of irrigation water and/or changes in the crops being irrigated.

In most western (central and Nordic) countries, the mean water allocation has decreased with the exception of UK, were water used per irrigated area has increased steadily from 1990 to 1998 and appears to have decreased again in the last couple of years to similar levels than 1996. This trend is the result of a shift towards more water-dependent crops such as potatoes,

vegetables and sugar beet. To meet the demand there is an increase in the number of irrigation reservoirs.

The mean per unit water use in northern Accession Countries decreased steadily from 2 708 in 1990 to 904 m^3/ha/year in 2001. This is because even though large areas may be equipped for irrigation, they are not necessarily irrigated due to economic changes and difficulties in these countries.

Environmental impacts from irrigation can be of different types: aquifer exhaustion from over-abstraction, salinisation of groundwater, increased erosion of cultivated soils on slopes and water pollution from nutrients and pesticides.

These impacts are not well documented in many EU member states but different case studies show that over-abstraction and salinisation of aquifers occur in many parts of the Mediterranean coastline (Portugal, Spain, Italy and Greece) and some localised areas in northern Europe (Netherlands). Soil erosion is particularly severe in Spain, Portugal and Greece. The desiccation of former wetlands and the destruction of former high nature value habitats are significant in different regions of both southern and northern Europe (west France, inland Spain, Hungary and southeast England) (EC, 2000).

Technical measures to reduce water abstraction and soil erosion, adoption of less damaging agricultural practices and changes in water management can mitigate the impacts of irrigation. Examples of aquifer recovery, once the over-abstraction has ceased, can be found in Europe (e.g. Hungary, Latvia, Spain) (EEA, 2003).

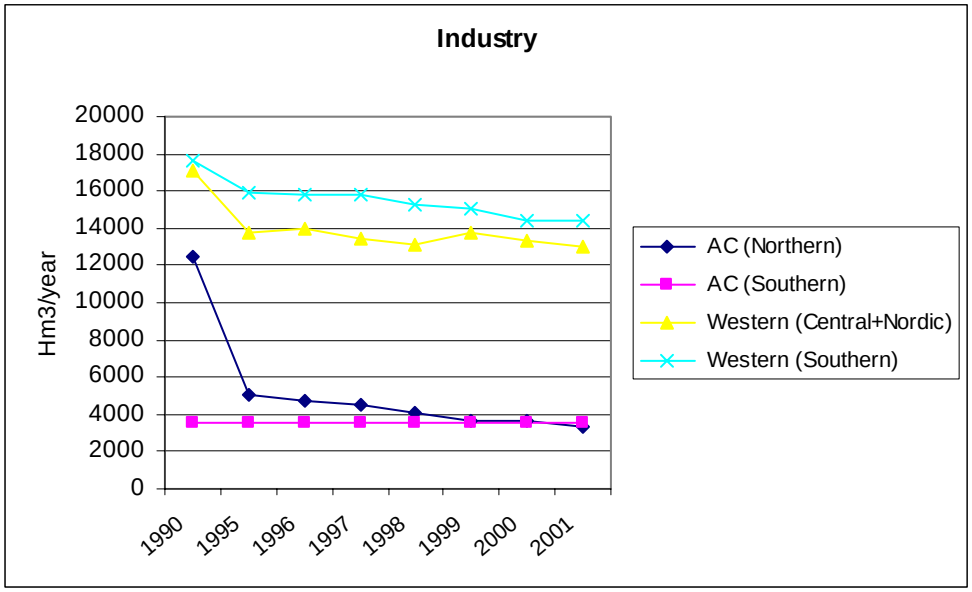
Sub-indicator

(WQ3c) Water use by industry

Key message

☺ The amount of water used by industry has decreased in all the European regions during the 1990s as a result of measures to reduce demand and due to economic restructuring.

Trends in water use for industry



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Source:
New Cronos (Eurostat-OECD JQ2002)

Assessment

The total water use for industry in Europe is 34 194 Hm^3 /year which amounts for 18 % of its consumptive uses. Between the period 1990 -2001 the industrial use has decreased consistently.

Industrial water use represents 37 % of the consumptive uses in western Europe (central and Nordic), and just 13 % of the consumptive uses in southern Europe.

Over the period considered, different changes have occurred which have influenced the industrial water use: decline of industrial production, use of more efficient technologies with lower water requirements and the use of economic instruments (charges on abstractions and effluents).

In the Accession Countries, water use by industry has decreased from 12 457 Hm^3 /year in 1990 to 3 292 Hm^3 /year in 2001, essentially because of the decline of industrial production due to institutional and socio-economic changes.

In western Europe, in addition to the changes of the patterns of industrial production, the introduction of water saving technologies and the use of economic instruments have had a higher influence in the decreasing trend.

Sub-indicator

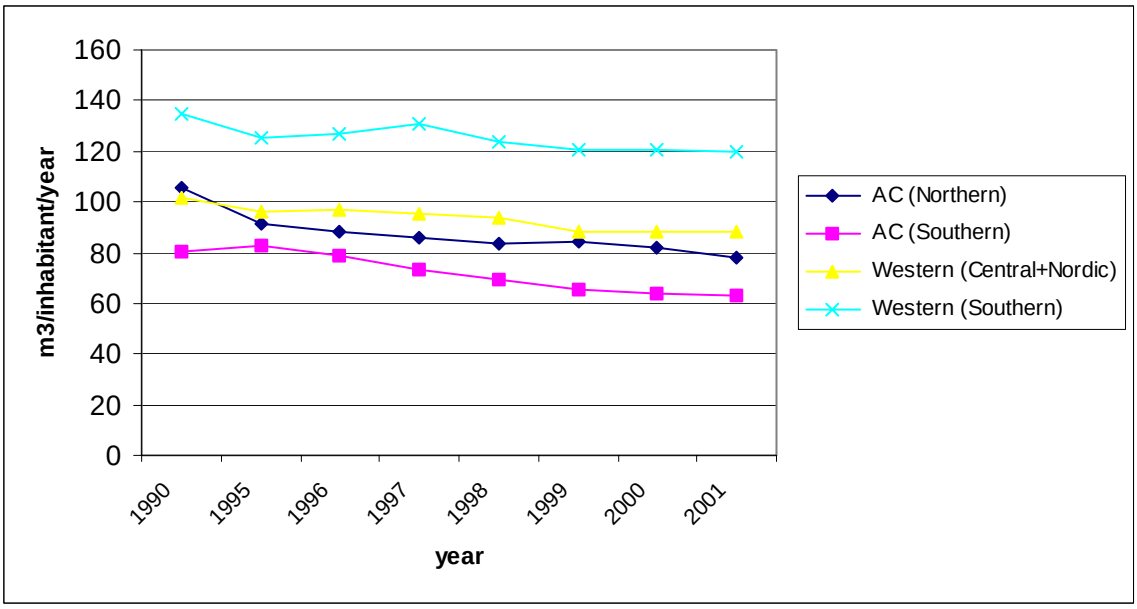
(WQ3d) Urban water use

Key message

☺ Urban water use decreased in the 1990s in many European countries as result of measures to reduce demand and because of economic restructuring.

🔴 Urban water use is highest in western southern countries largely reflecting the warmer climate in this part of Europe.

Trends in urban water use



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Data sources:
Eurostat, New Cronos Database (Eurostat-OECD JQ2002)
World Bank

Assessment

The total water use for urban purposes in Europe is 53 294 Hm^3/year which amounts for 18 % of its total abstraction and 27 % of its consumptive uses. Between the period 1990 -2001 urban use per capita has decreased from 111 to 95 m^3/inhabitant/y.

Over this period, many changes have occurred which have influenced the patterns of urban water use: increasing urbanisation, changes of population habits, use of more efficient technologies and water saving devices, use of alternative sources of water (desalination, wastewater direct re-use), increasing metering, and the use of economic instruments (water charges and tariffs). Connection of population to water supply systems had also increased, especially in Mediterranean countries.

Nevertheless there are important variations between regions and countries. The share of urban water use in total abstractions in western Europe (central and Nordic countries) is 22 % and accounts for 53 % of its consumptive uses.

The water use per capita in the Nordic countries is higher than in central Europe, varying between 104 m^3/inhabitant/y in Sweden to 262 m^3/inhabitant/y in Iceland. Some studies suggest that this high use is related to personal washing and dishwasher use. In central Europe, variations are between 68 m^3/inhabitant/y in Germany to 147, 122 and 106 m^3/inhabitant/y in Switzerland, Ireland and UK respectively. These variations reflect differences between the structure of water supply systems and water saving measures applied.

The northern Accession Countries use 21 % of their abstraction for urban purposes which accounts for 54 % of their consumptive uses. This group of countries follow the general pattern

described above: a decreasing trend mainly due to the general increase of water prices and technological changes. In many urban areas, water use has reduced by around 40 %. In some rural areas, may be a future increase because the actual water service level is very low. Baltic countries have the lowest water use per capita, together with Czech Republic, Slovak Republic, Poland and Hungary, reflecting the restructuring of the economy and the institutional framework in these countries. Bulgaria, Romania and Slovenia, with 136, 110 and 110 m^3/inhabitant/y respectively, have the highest urban water use per capita. The high levels of use in Romania and Bulgaria can be explained by the number of breakdowns in water-supply networks, lack of water metering, water losses and water wastage. Structural reforms are taking place slowly.

The southern Accession Countries use 11 % of their abstraction for urban purposes and the same percentage of their consumptive uses. Urban water use, from freshwater resources has declined sharply in the last two years. Desalination plants provide water to main cities and the coastal tourist areas to avoid water shortages and rationing water to population.

The share of urban water in southern Europe is 16 % of its total abstraction and 21 % of its consumptive uses, the lowest in Europe together with the southern Accession Countries. The relative high use per capita in Mediterranean countries, around 120 m^3/inhabitant/y in 2001, reflects their hot climate (increase in water for showering, garden use, public services), and the trend reflects changes in lifestyle derived from increasing urbanisation.

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SoE and other country reports (Austria, Baltic countries, Belgium (Wallonia), Cyprus, Czech Rep., France, Germany, Iceland Italy, Malta, Poland, Romania, Slovenia, Sweden, Turkey, U.K.)

Shiklomanov. Summary of the monograph “World water resources at the beginningof the 21st century” prepared in the framework of IHP Unesco.

UN, Environmental Performance Reviews (Romania, Bulgaria, Estonia)

Data

Spreadsheets:

WQ2_TotalAbst_update03.xls

WQ2_WatAgric_update03.xls

WQ2_WatUrban_update 03.xls

WQ2_WatIndustry_update03.xls

Meta data

Web presentation information

1. Abstract / description / teaser:

Describes the use of water by sectors in total and in particular, in different parts of Europe.

2. Policy issue / question:

Is the use of water by sectors sustainable?

3. EEA dissemination themes:

Water

4. DPSIR:

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Technical information

5. Data source: New Cronos (Eurostat JQ2002), FAO Statistical Databases (FAO web page http://www.fao.org
6. Description of data: Total abstractions data and abstractions by sectors in Hm^3/ year. Data are compiled every two years. Irrigated land (1000 ha) Data are compiled annually on food and agriculture.
7. Geographical coverage: Data from European countries for water use, data world-wide for irrigation.
8. Temporal coverage: From 1990 onwards
9. Methodology and frequency of data collection: Annual updates.
10. Methodology of data manipulation, including making ‘early estimates’: Data estimation has been done by linear interpolation. If the graphic is for on year only, it can be filled with the nearest value. For the indicator, the value for the last available year up to 1999 has been accounted for the sectoral use of water. Total water abstractions follows the same criterion.

Quality information

11. Strength and weakness (at data level): The data need to be considered with reservations due to the lack of a common European definitions and procedure to estimate water demands. In addition, data from 1997, 1998 and 1999 are not available for all the countries considered and data series from 1980 are not completed. Data at national level could not reflect water stress situations at local level. Current work is being carried out between EUROSTAT and EEA to standardise definitions and methodologies for data estimation. Some data from New Cronos database had to be checked/substituted by national data.
12. Reliability, accuracy, robustness, uncertainty (at data level): Some cautions should be taken when comparing countries due to different definitions and procedures to estimate water demand (e.g. some including cooling water other do not) and freshwater resources,.

13. Overall scoring (give 1 to 3 points: 1=no major problems, 3=major reservations):

Relevancy: 1

Accuracy: 2 (Some sectoral abstractions do not correspond to the specified uses, such as cooling water for hydropower included in the industrial abstraction data)

Comparability over time: 3

Comparability over space: 2

Further work required

At data level: There are gaps in some years and for some countries in water uses, particularly in the Nordic and AC Southern. Where enough data are available, there are still some gaps, thus some interpolation is required in order to fill them in and show consistent trends.

It would be necessary to use more disaggregated data at spatial and geographical level, to make accurate assessments taking into account climatic conditions.