

## The European Union and the Challenge of Water Scarcity

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### Abstract

European water policy has recently shifted its focus to water scarcity in the wake of the Commission Communication of July 2007. Furthermore, the need to ease tensions over water resources was a driving force behind the Union for the Mediterranean project, as was made clear at the recent meeting of water ministers in Jordan, on 22 December 2008. Finally, the workshops of the 5th World Water Forum, to be held in Istanbul from 16 to 22 March, will address changes in resources. Water is basically a renewable resource, but it is unevenly distributed. Growing urbanization is the main factor leading to local structural imbalances between the need for water and the resources available. As it is too expensive to transport water, the emphasis must be on better management of locally available resources.

Viewed this way, just as the European Union has embarked on a path to a low-carbon economy in order to mitigate climate change, we must opt for a low-water economy and “dehydrated” growth. In a territory plagued by an imbalance between water demand and the resources available, opting for a “dehydrated” economy means addressing wastage and improving efficiency in the use of all available water resources, including seawater desalination and wastewater re-use.

European water policy is aimed at meeting three challenges:

- the top priority is to ensure access to water for all, because water is a vital necessity. This target is far from reached, even in Europe. The UNECE<sup>1</sup> estimates that 120 million Europeans still do not have a drinking water tap in their home. The London Protocol on Water and Health, adopted on 17 June 1999<sup>2</sup> under the UNECE Water Convention, is the first international agreement adopted specifically to tackle water-related diseases through better access to water. The Europeans are, moreover, actively pursuing the Millennium Development Goals aimed at halving “the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015”<sup>3</sup>. EU institutions, European governments and certain local authorities are doing their share through their development aid policies: at the Johannesburg Summit, in 2002, the Prodi Commission launched the European Water Initiative, which culminated in the signing of the Water for Life EU-Africa partnership. Water and wastewater operators also contribute expertise to help bring about complete attainment of these goals. For example, in April 2008, Veolia entered into a partnership with the Grameen Bank, founded by the Nobel Peace Prize winner Professor Yunus, to supply drinking water to over 500,000 people living in poor regions of Bangladesh.
- The second challenge lies in restoring water quality. The European Union has adopted legislation specifically for this purpose: the Water Framework Directive of 2000<sup>4</sup> set the objective of achieving good water status for Europe’s waters by 2015.
- The third challenge for water policy is to deal with current tensions over resource availability in Europe.

It is this third aspect, the most recent in the development of European water policy<sup>5</sup>, that I would like to discuss in greater detail. My remarks will be based on my experience as a water and wastewater services operator. Operating a water service involves performing a public service mission, in other words, guaranteeing the supply of water in strict compliance with the health and environmental regulations and at a price users can afford, a price that is usually set by the municipal authority<sup>6</sup>.

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<sup>1</sup> United Nations Economic Commission for Europe, with 56 member states.

<sup>2</sup> The Protocol on Water and Health, adopted on 17 June 1999 under the UNECE Water Convention, came into force in 2005.

<sup>3</sup> Target 10 of Millennium Development Goal No. 7, “Ensure environmental sustainability”: The 2008 UN report on the Millennium Development Goals points out that nearly 1 billion people do not have access to safe drinking water and nearly 2.5 billion lack access to sanitation.

<sup>4</sup> Directive 2000/60/CE of 22 December 2000, establishing a framework for Community policy in the field of water.

<sup>5</sup> Communication of 18 July 2007 from the Commission to the European Parliament and the Council addressing the challenge of water scarcity and droughts - COM (2007) 414 final – and resolution of the European Parliament of 22 September 2008 (Seeber Report)

<sup>6</sup> In England, on the “regulated” market, the price of water is set by an independent national regulator.

As the operator of a service of general economic interest, our duty is to address water scarcity by using resources wisely and efficiently.

- This first requires identifying the true causes of tension over water resource availability (I);
- Next, this requires that, just as the European Union has embarked on the path to a low-carbon economy in order to mitigate climate change, we must opt for a low-water economy and “dehydrated” growth (II).

### **I/ The tensions over water resource availability originate in local situations in which there is an imbalance between resources and needs**

Water scarcity differs from drought in that it refers to demand for water that structurally exceeds the water resources that can be exploited under sustainable conditions. According to the European Commission Communication of July 2007, “At least 11% of the European population and 17% of its territory have been affected by water scarcity to date.”

These figures show that the tensions over water availability are not widespread, but rather restricted to geographically distinct areas. For that reason, instances of water scarcity require case-by-case responses adapted to the local context.

#### **1/ The tensions over water availability are local, not general.**

##### **a) Water is basically a renewable resource, but it is unevenly distributed.**

The amount of water on the planet is not decreasing. Unlike hydrocarbons, water is a renewable resource. Water abstracted for different uses is later returned to the ecosystem, again becoming part of the natural water cycle.

On the other hand, imbalances undermining biodiversity in the ecosystems and the satisfaction of human needs tend to occur when, after use, water is not returned to the place it was abstracted.

##### **b) Growing urbanization is leading to local structural imbalances between the need for water and the resources available.**

It is primarily in cities that the need for water is increasing. Our needs have doubled in 40 years because of population growth, our higher standard of living and, in some areas, a seasonal influx of tourists. Urbanization heightens pressure on locally available resources. Every month, the increase in the global urban population is the equivalent of a new city the size of Madrid. Worldwide, the proportion of people living in cities rose

above 50% for the first time in 2008, while the proportion of urban dwellers in Africa and Asia is expected to double from 2000 to 2030<sup>7</sup>.

**c) Because it is too expensive to transport water, the emphasis must be on better management of locally available resources.**

Transporting water by ship is prohibitively expensive given the price of water: in 2008, the city of Barcelona paid 8 to 10 euros per cubic metre to have water delivered by tanker from Marseilles<sup>8</sup>, a city where the public water tariff is slightly less than 1 euro per cubic metre. Furthermore, moving water by ship poses risks to its quality, as demonstrated by the health and evaporation problems encountered in Cyprus<sup>9</sup>.

**d) The inevitable effects of climate change on water resource availability are longer term and more difficult to measure today than are the effects of urbanization and human activity, which are immediate.**

The future effects of climate change on water stress will be most visible in the Mediterranean region<sup>10</sup>, where wider variations in rainfall and longer droughts will increase imbalances between the supply and demand for the water that already exists<sup>11</sup>.

**2/ Water scarcity reminds us of water's value as a resource.**

**a) European law stresses a qualitative approach to protecting existing water resources, a step consistent with a quantitative approach to water availability.**

The objective of the Water Framework Directive is to achieve good water status by 2015 through a qualitative approach to the resource<sup>12</sup>. This marks a new stage in European water policy: it is based on integrated river basin management that combines discharge control and quality standards; it covers surface water and groundwater; last, it sets targets, leaving responsibility for defining the appropriate means for achieving them to the member states.

This innovative approach is consistent with the determination to address water scarcity through integrated river basin management: protecting the quality of local resources maintains the amount of resources available.

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<sup>7</sup> Annual report of the UNFPA: *The State of the World Population 2007: Unleashing the Potential of Urban Growth*

<sup>8</sup> Source: *La Provence*, 20 May 2008.

<sup>9</sup> The water resources in Cyprus are estimated to be 650 m<sup>3</sup> per capita per year, while the European Environment Agency considers 500 m<sup>3</sup> per capita per year the water scarcity threshold.

<sup>10</sup>The European GMES programme (Global Monitoring for Environment and Security) has identified more-pronounced consequences of climate change south of the 45th parallel.

<sup>11</sup> *Région méditerranéenne et changement climatique: une nécessaire anticipation* (IPEMed- September 2007)

<sup>12</sup> For example, Whereas-clause 25 of the Water Framework Directive says, "Common definitions of the status of water in terms of quality and, where relevant for the purpose of the environmental protection, quantity should be established."

- This is true for treating municipal wastewater: the construction of wastewater collection systems and treatment plants must be actively pursued in order to increase the number of people with sanitation<sup>13</sup>.
- It is also true for resource preservation in areas of intensive farming because of fertilizer and pesticide use.

That is why implementation of the Framework Directive is crucial for addressing water scarcities. The Commission Communication of 2007 on sustainable water management points out that implementation of the Framework Directive is far from complete in the European Union.

### **b) Water tariffs should reflect the resource's value.**

Article 9 of the Framework Directive imposes on the Member States and municipal authorities the principle of recovering the full costs of water services from the users by 2010 in order to promote efficient use of water resources. This principle follows logically from the Framework Directive's objective of achieving good water status because there is a high correlation between overexploitation of the resource and undercharging for water.

The difficulties in applying the "user-pays" principle must not be ignored. Controlling the price of water is crucial for sustainable management of resources at a time of economic and financial crisis. The Directive in fact concerns all uses of water: "an adequate contribution of the different water uses, disaggregated into at least industry, households and agriculture, to the recovery of the costs of water services (...) taking account of the polluter-pays principle."

For example, if farmers do not pay a price high enough to cover their consumption or their contribution to resource pollution, it is because, unlike manufacturers, they do not have the option of recovering their water costs in their product prices. The user-pays principle cannot be imposed on them in an authoritarian manner. The solution lies in a gradual and coordinated change in farming practices: better protection of water abstraction areas; better fertilizer dosing so that fertilizer is completely absorbed by the crops, with no residue spilling into the water; and use of pesticides less harmful to the environment. In this respect, by making environmental compliance a condition for direct support payment, the Common Agricultural Policy can have a decisive influence on implementation of the Framework Directive by financing changes to farming practices with no loss of yield nor of competitiveness.

It is up to the operator to reconcile sustainable water management with economic balance in water and wastewater service provision at prices users can afford, even

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13 The 22 March 2007 Commission Communication on sustainable water management estimated 80% EU15 compliance in 2003 with the Urban Waste Water Treatment Directive.

though it is the municipal authority alone that sets the price of water, not the operator. For low-income households, subsidized tariffs can be established.

**c) Operators of water and wastewater services contribute to resource value by virtue of their general interest service obligations.**

There are two aspects to this contribution:

- limiting water abstraction and protecting resources;
- utilising all available water resources: wastewater, seawater and rainwater.

**II/ The European Union must opt for a “dehydrated” economy in order to address water scarcity**

The European Union has made the wise decision to embark on a path to a low-carbon economy in order to mitigate climate change. Its decision on greenhouse gas emissions can also apply in the water sector: the EU should take a stand in favour of a low -water economy and for “dehydrated” growth.

Since 2002, a number of researchers have been working on the “water footprint”<sup>14</sup> concept. This indicator is used to measure the real and virtual consumption of water resulting from its direct and indirect use by a consumer, a product, a business sector or a country. One kilogramme of beef, for example, has a footprint of 16,000 litres of water<sup>15</sup>. The water footprint of a country or a product highlights the existence of flows of virtual water imports associated with the international trade of products and raw materials. In a local case of water scarcity, it encourages consideration of the production chain, and not just watershed management.

Our water footprint can be reduced with no rationing of the demand for water, which would be detrimental to public health and economic growth. To do this, our commitment to a low-water economy calls for a two-pronged approach:

- combat wastage;
- improve the efficiency of the various uses and increase our capacity to exploit alternative water resources if required by the local conditions.

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14 Cf. *Water footprint of nations: water use by people as a function of their consumption pattern* (Hoekstra – Chapagain 2007)  
15 Waterfootprint.org

## **1/ Combating wastage is the first step toward a low-water economy.**

### **a) Efficient water use above all requires that we exploit all possibilities for improvement in combating water wastage and network losses.**

Network efficiency is a valuable indicator of water loss between the outlet of the water production plant and the user's tap. Public-private partnership contracts for the management of water supply frequently include targets for network leak reduction. The losses in the Bucharest water supply network have, for example, been reduced from 326m<sup>3</sup>/day/km to 176m<sup>3</sup>/day/km since 2000. The efficiency gains were made possible by large-scale installation of the most recent electronic technologies, which significantly improve leak detection.

Besides network management, irrigation in agriculture, which represents 70% of the water used in human activities<sup>16</sup>, is another area with potential for considerable savings, through, for example, drip irrigation.

Finally, water usage by domestic and industrial customers can be better controlled with electronic devices that enable remote monitoring of on-site changes in consumption and prevent wastage due to leaks. A simple leak in a bathroom fixture will double a household's water usage.

### **b) Yet reducing wastage is not always enough to correct an imbalance between water demand and available resources in a particular area.**

It would be a mistake to try to solve the problem of local scarcity by a general strategy of reducing the volumes of water consumed. In fact, water consumption in Europe is already falling. Water usage has dropped by 16.5% in Berlin and 11% in Paris over the 10-year period between 1995 and 2005<sup>17</sup>. This reduction is due to tertiarisation of the economy and technological innovations reducing water usage in homes. Falling volumes in the large European cities suggest that considerable progress has already been made in efficient water use. It also shows that the overall decrease in Europe will not be enough to make up for local scarcities. In those areas of water stress, awareness campaigns are needed, but they will not bring about a long-term adjustment of demand to resources.

This has proven to be the case in countries on the Mediterranean that have been particularly prone to tensions over water availability: the Union for the Mediterranean Ministerial Conference on Water held in Jordan on 22 December 2008 underlined in its conclusions, "The necessity to design (...) integrated approaches comprising all kinds of

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<sup>16</sup> *Water for Food, Water for Life*, IWMI 2007

<sup>17</sup> CREDOC No. 192 –April 2006: "Water consumption is falling in large European cities".

water and all its uses,” and “that water supply measures (traditional or alternatives) might be considered once the projected impact of water savings prove insufficient”.

## **2/ Opting for a “dehydrated” economy implies increasing efficiency in available water resource use.**

This orientation assumes increased capacity for sustainable exploitation of alternative water resources if appropriate to and required by the local context.

### **a) Rainwater is an alternative resource of limited application.**

Utilizing rainwater can be an appropriate solution in certain cases, particularly for industrial applications. In contrast, for domestic use, the rainwater network must be completely and reliably separate from the drinking water network because of the possibility of serious risk to users’ health. Without duplicate and watertight networks, rainwater utilization does not appear to be an efficient and sufficient response to water scarcity, nor, given the size of the investments needed<sup>18</sup>, does it represent a good use of public money.

### **b) Seawater desalination is a promising technology, but it consumes large amounts of energy.**

Drinking water production by desalination is a promising technology: while only 1% of water requirements are currently met by desalination plants, 40% of the world’s people live less than 70 km from a coast. Thus, consideration should be given to building and operating desalination plants in areas where water resources are scarce:

- The world’s biggest desalination plant in service, which has been operated by Veolia since 2005, is located in the eastern Mediterranean region, in Ashkelon, Israel. It produces enough drinking water annually to satisfy the needs of 1.4 million people.
- Spain has also invested heavily in producing water by desalination, and it now owns 8% of worldwide installed capacity.
- Lastly, independent desalination systems are becoming more common in coastal tourist areas, in hotels, for example.

Worldwide desalination capacity more than tripled between 1990 and 2007<sup>19</sup>. Future growth will depend on the capacity of industrial companies and operators in the sector to desalinate brackish water and seawater at a competitive price while meeting sustainable

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<sup>18</sup> From this perspective, the cost-effectiveness of the tax credit for rainwater harvesting by individuals that was introduced in France by the 30 December 2006 law on water and aquatic environments should be carefully assessed.

<sup>19</sup> Global installed capacity rose from 14,800,583 m<sup>3</sup>/day in 1990 to 47,606,094 m<sup>3</sup>/day in 2007 (www.idadesal.org).



development objectives. That will necessitate further improvement over recent efficiency levels in order to:

- reduce the energy intensity and carbon footprint of desalination plants;
- limit brackish disposal in the sea, because elevated concentrations can upset the ecosystem's equilibrium;
- control costs, since desalination is the most expensive process for producing drinking water.

### **c) Re-using wastewater is an option with a future.**

Wastewater is the best alternative source of water in water-stressed regions. Global wastewater recycling capacity is expected to double by 2015. Raw wastewater is harmful to human health, but when collected and treated appropriately, it can be re-used. In other words, re-using wastewater translates into increased efficiency in water use, because the same water can be used several times before being discharged into the natural environment. The process results in a multiplication of water cycles and accelerates a natural phenomenon: in Rouen, an estimated 80% of the water withdrawn from the Seine has already been withdrawn, used, treated and discharged before.

Re-using wastewater has two advantages for remedying water scarcity:

- wastewater is available at the very place where demand is high: downstream of cities;
- wastewater constitutes a new resource whose volume increases proportionally with water consumption and needs.

Wastewater is mainly re-used in agricultural irrigation. It also has an application in industry, for example, in producing ultrapure water for use in microelectronics manufacturing.

In addition, depending on the retreatment process employed, wastewater can be re-used to satisfy other needs, thereby offering a wide response to water stress:

- groundwater recharging (for example, in Berlin) for storage, for resource replenishing or for preventing saltwater intrusion in coastal areas (the Var region, on the French Mediterranean coast);
- production of drinking water, as is now the case at our wastewater treatment plant in Windhoek, Namibia.

While it is now possible to produce drinking water complying with the prevailing standards by re-using wastewater, the spontaneous unease on the part of the public

must be taken into consideration. Before making wastewater re-use the centrepiece of its policy for addressing water scarcity, municipal authorities must show conviction and educate their constituents.

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Remedying water scarcities in Europe by embarking on a low-water economy with “dehydrated” growth will definitely require public policy decisions with regard to both reducing wastage and exploiting alternative resources.

To be successful, this public policy in favour of sustainable resource management must be appropriate for the local context. The technical solutions exist, the operators’ know-how is well established and the expertise is available, but together they will not solve the problems associated with water scarcity without involvement by the stakeholders and strong political involvement from the local authorities.

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