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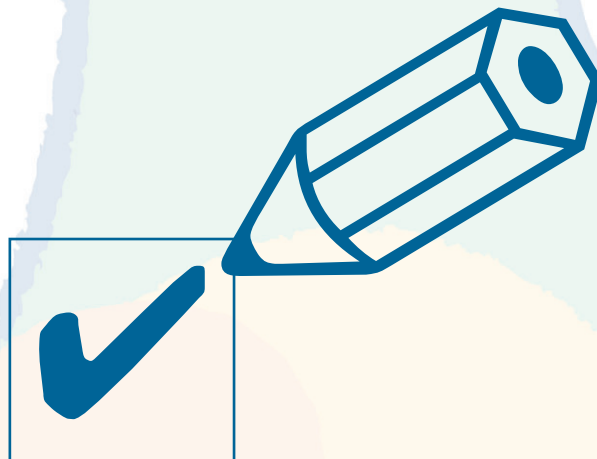


Committee of the Regions

Survey

The role of regional and local authorities in promoting a sustainable water policy

May 2011
Final Report



**The study was written by
Progress Consulting S.r.l. and Living Prospects Ltd
It does not represent the official views of the Committee of the Regions.**

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1. Survey report

1.1 Introduction

Water scarcity and the occurrence of droughts are increasingly becoming a concern in Europe. At its meeting of 11 June 2010, the Environment Council recognised that *‘water scarcity and drought are already a very serious problem in many European regions and the situation is expected to worsen as a consequence of climate change and, if not appropriately addressed, increasing water demand’*. The Council has also stressed the need to *‘promote tools and solutions for Member States to cope with water scarcity and hydrological extreme events, such as drought’*, inviting the European Commission *‘to consider the right mix of measures and financial instruments needed to tackle water scarcity and drought events and to present relevant proposals if appropriate’*.

The European Commission will carry out a review of EU water policy by 2012 as part of the ‘Resource Efficiency’ Flagship Initiative of the Europe 2020 Strategy; a ‘Blueprint to safeguard Europe’s Water Resources’ will comprise an analysis of the implementation of the EU Water Framework Directive, a review of the EU Strategy on Water Scarcity and Droughts, and a review of the vulnerability of environmental resources (water, biodiversity, soil) to climate change and anthropogenic pressures.

Against this background, the Committee of the Regions will adopt an Outlook Opinion on ‘The role of regional and local authorities in promoting a sustainable water policy’ at its plenary session in June 2011. This opinion has been requested by the Hungarian Presidency of the Council of the European Union.

The key objectives of the survey on ‘The role of regional and local authorities in promoting a sustainable water policy’ were: (a) to contribute to the preparation of the Outlook Opinion; (b) to provide information feeding into the second Monitoring Report on Europe 2020 of the Committee of the Regions, to be published in December 2011, and (c) to collect experiences and good practices from EU local and regional authorities (LRAs).

The survey was launched on 25 January 2011 with a final deadline of 4 March 2011, by the Committee of the Regions, through its Europe 2020 Monitoring Platform (www.cor.europa.eu/europe2020). In total, 49 questionnaires were submitted by LRAs and other stakeholders from 17 EU Member States (MS).

1.2 Key findings

A relatively good number of LRAs responded to the survey on ‘The role of regional and local authorities in promoting a sustainable water policy’, providing valuable input and examples of good practices in water management governance and measures, including coping with extreme events, alongside views on how to foster public participation in water policy-making and on the expected EU role in the promotion of water conservation and efficiency.

Management role of LRAs

Subsidiarity and multi-level governance are key principles of EU water policy. As the role of LRAs is growing in line with the principle of subsidiarity, multi-level governance is crucial. Joint action is required, as well as a shared vision and a joint commitment to meeting objectives; the role of local governments in managing natural resources will, in fact, be strengthened in the future.

While some decisions need to be taken at higher governance levels to overcome regional or local interests that may potentially jeopardise the long-term interest of communities and future generations, it needs to be duly and unceasingly recognised that knowledge of the local situation and local needs is primarily available locally. Multi-level governance is ‘conceptually’ the solution, but examples provided by respondents underlined the fact that several multi-level governance ‘models’ exist. Coordination within these models is determined by different factors such as national legislation, institutional settings and existing cooperation frameworks, to mention just a few.

⇒ **Key finding 1**

There is no one-size-fits-all multi-level governance model for water management. Mechanisms to establish coordinated cooperation among different governance levels are still called for, especially by local administrations.

⇒ **Key finding 2**

Some local authorities feel the implementation of their role is constrained by the limited power granted them; on the other hand, regional authorities believe that their role is key in adjusting imbalances at the local level and in providing a longer-term vision for development.

⇒ **Key finding 3**

Multi-level governance is obviously influenced by the existing distribution of power and responsibility among national, regional and local authorities within each country. Regional and local authorities in some countries face more problems than others in dealing effectively with water management and use within their territories because of ‘institutionalised’ low levels of decentralisation that, in turn, hinder the full application of the subsidiarity principle.

Both regional and local authorities play a safeguarding role in terms of ensuring adequate and sustainable supply and quality of water resources and fostering the public interest by defending water as a public good. However, this sometimes conflicts with the fact that water is also considered a service of general economic interest.

⇒ **Key finding 4**

It is debated whether water should be considered a service of general economic interest and, as such, be subject to internal market and competition rules, or rather a service of general interest and, as such, be coherent with the assumption that water is an inviolable human right.

Programmes and activities to manage water resources

The most evident conclusion that may be drawn from the wide range of activities highlighted by respondents is that there is already a very diverse set of measures available to public authorities, businesses and individuals to improve water efficiency, from regulations to technological devices and infrastructure interventions. Most of the measures, such as water re-use, are not sector-specific and are applicable to production processes as well as domestic activities, across the public and private spheres.

If measures are known, the problem seems to be mainly related to encouraging their uptake and effective implementation. One of the most self-explanatory examples here is the drinking of bottled water instead of tap water. It has been demonstrated that the use of bottled water is by far: (i) more expensive; (ii) more polluting, as it produces significant amounts of waste and CO₂; and (iii) more energy-consuming. Still, there is evidence that in some countries, such as Italy, the use of bottled water is routinely preferred to the use of tap water. Overall, it does not seem to be only a matter of mindset in the general public: it is also a matter of economic interest, effectiveness of the information provided, and willingness and/or capacities of public authorities to improve the quality of water provided through the network.

⇒ **Key finding 5**

Several activities and measures that can potentially improve water efficiency are well known. Some of these activities are also easily implementable, especially those related to domestic use. However, their uptake remains limited.

Other well-known effective interventions to safeguard the resilience capacities of territories include supply-side measures improving efficiency in the use of existing water infrastructure, fostering the preservation or functioning of natural catchment and aquifers or the creation of mountain hydraulic systems. It should be noted that such infrastructure-related interventions are heavily dependent on funding availability. Drawing from the information gathered, it seems important to link the uptake of good practices to financial considerations.

⇒ **Key finding 6**

If measures to improve water efficiency are economically viable, their uptake and effective implementation is more feasible; water saving needs to be made financially worthwhile. Similarly, investments in water projects need to be done with a view to achieving a return, in the sense that public investment should be considered to be a productive investment. As a consequence, cost-benefit and cost-efficiency analysis might facilitate the rational selection of water supply and demand strategies.

Methods to encourage public participation

Public participation is considered essential to the proper functioning of the policy-making process; it is a way to ensure that policies are adopted by consensus and that they reflect the interests of the citizens. Besides raising public awareness, if the information provided is relevant, objective and transparent, public participation also obliges LRAs to be knowledgeable about problems.

⇒ **Key finding 7**

There are contradictory views on the way awareness-raising campaigns should be run. It is, in fact, recommended that campaigns be targeted to small audiences and be tailored to local circumstances so as to be able to clearly specify targets, benefits and responsibilities; on the other hand, reliance on good examples from other regions/countries is envisaged, as is the role of the EU in encouraging the change of attitude towards water-saving behaviour.

Incentives for the adoption of good water management practices

Respondents focused on economic incentives, with unstructured information provided on social and environmental incentives. Different forms of financial support, from subsidies to public co-funding and soft loans, are suggested for the uptake of advanced technologies, improved infrastructures and changes in consumption behaviours. Fiscal measures and pricing mechanisms are considered effective instruments to stimulate adoption of good practices. Penalisation through fines, higher taxation and proportional rise in prices are seen as appropriate to discourage excessive consumption, pollution and environmental damage. Some respondents put the emphasis on the use of encouraging and rewarding mechanisms, such as tax reduction for adoption of environmentally-friendly technologies, in order to promote virtuous behaviours. Most frequently quoted social incentives range from rewards, increased media visibility, training, awareness-raising and increased public participation in decision-making. Environmental incentives were mentioned marginally and include market instruments such as labelling and certification to state efficient water use, legislative measures and compensatory schemes to encourage sustainable use.

⇒ **Key finding 8**

In general, the uptake of good practices is considered to be feasible if it is economically viable and/or commercially competitive.

⇒ **Key finding 9**

Taxation and pricing can be used as instruments to guide changes in water consumption patterns, with a preference for measures that encourage and reward good practices and water saving behaviour with respect to 'penalties'.

EU role

Respondents reiterated that water quantity and quality should reflect local geographical and environmental conditions, as is generally the case for natural resources. This introduces an important element for consideration when developing legislation and binding measures at EU level: while general objectives can be identified and proposed at broad EU scale, the specific targets to be addressed at national and regional/local scale and the related binding instruments, if deemed appropriate, should reflect the physical, demographic, climatic and environmental characteristics of the territory. To this end, consultation and participation of LRAs throughout the EU law creation and decision-making process are essential.

Regulatory measures would need financial support for effective implementation. There is encouragement for the creation of EU guidelines and recommendations on the measures identified for achieving water savings and on the development or transfer of environmental technologies. Binding targets at EU level should be seen as an incentive not only to adopt and transfer improved technologies but also to stimulate innovative research and development, as well as to attract private investment. High water-demanding sectors, such as industry and agriculture, should be the focal areas of EU intervention.

⇒ **Key finding 10**

The EU role in promoting water conservation and efficiency is recognised as being crucial to the regulation of water resource management at supranational level, i.e. water catchment-based approach. In line with the subsidiarity principle, LRAs are on the front line in managing the ‘demand side’ and consumption level of different stakeholders, i.e. civil society and economic operators (industry, agriculture, services). Hence, the role of the EU is complementary to the role of LRAs in regulating and managing water resources at different territorial scales.

⇒ **Key finding 11**

Binding targets and instruments should be identified in consultation and coordination with LRAs.

Coping with extreme events

The need to invest more in prevention is stressed. Such a need is already stipulated in Directive 2007/60/EC on the assessment and management of flood risks (EU Floods Directive). However, prevention needs to be implemented across all relevant sectors, including for example sectors with an impact on land use, such as agriculture, coastal area development, energy, industry and urban development. In this regard, one respondent called for a common EU forestry policy. Prevention requires strengthened planning and programming but also needs enforcement of relevant laws, the use of sanctions, inspection and monitoring.

Extreme weather conditions should be considered to be a global and regional (supra-national) issue, even if the impact is local. Thus, for example, the maintenance of green spaces in southern Europe plays a key role in absorbing CO₂.

⇒ **Key finding 12**

New policies at EU level should not ignore the fact that some regions have water deficits and/or suffer from drought conditions, while others face neither. This implies the need to balance and harmonise regional and sectoral development according to a fair distribution of the water resources available, avoiding bottlenecks that constrain social and economic development.

Other issues

⇒ **Key finding 13**

The relevance of water management for socio-economic development should receive greater attention. In particular, achieving territorial cohesion between water supplying areas (i.e. upstream catchments) and water consumers (i.e. coastal areas, cities) should be a policy target.

⇒ **Key finding 14**

A pre-condition for effective water management is a clear governance structure with well defined responsibilities among the different administrative levels.

⇒ **Key finding 15**

Optimal solutions are those containing a mix of instruments; similarly, a combination of improved and water-saving technologies should be promoted to maximise efficiency and minimise the impact on water resources.

2. Survey results analysis

2.1 Basic information

In total, 49 questionnaires were submitted by LRAs and other stakeholders from 17 EU Member States: 23 from municipalities, 1 from a province, 16 from regions, 4 from associations of cities and/or regions, 2 from other types of associations and 3 from other stakeholders. The list of respondents is set out in Appendix I.

The questionnaire encompasses eight questions on: (i) roles in water management; (ii) water management programmes and activities; (iii) public participation in water-related policy-making; (iv) adoption of good water management practices; (v) EU role in the promotion of water conservation and efficiency; (vi) measures for coping with extreme events; (vii) sharing of examples and good practices; and (viii) any other relevant matter. The content of this report is structured around these eight questions¹.

Chart 1 - Membership of the EUROPE 2020 Monitoring Platform

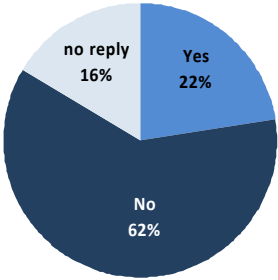
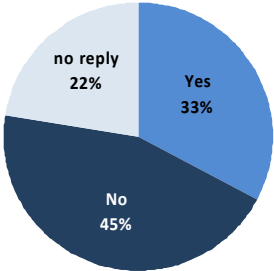


Chart 2 - Signatory to the Covenant of Mayors



Some of the respondents (representing 22% of the submitted questionnaires) are members of the Europe 2020 Monitoring Platform (formerly Lisbon Monitoring Platform) and almost one-third of them (33% of the total) have signed the Covenant of Mayors².

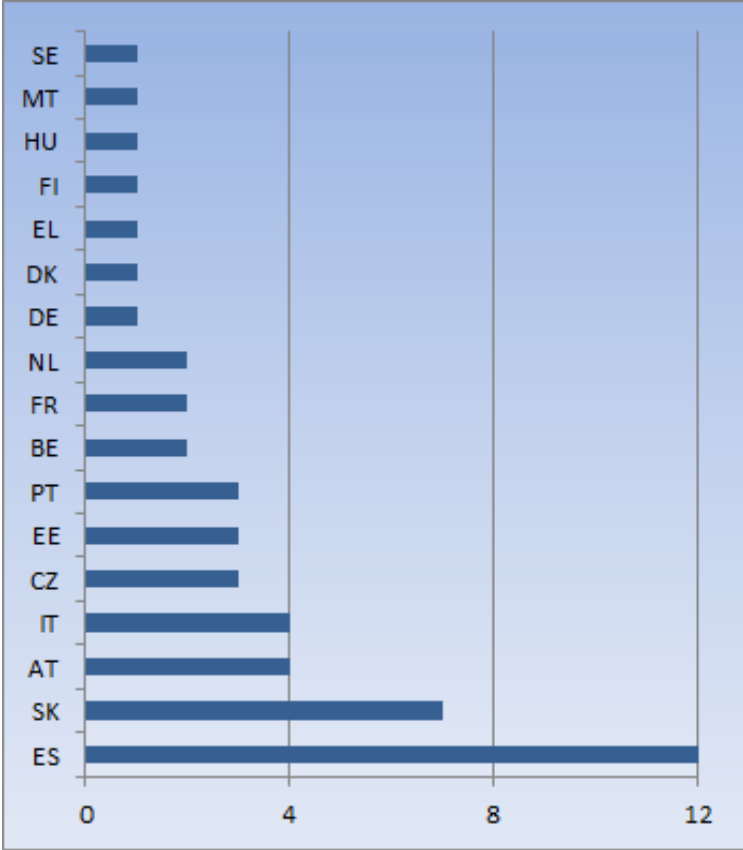
Despite the fact that LRAs from ten EU Member States did not participate in the survey and that an overwhelming number of replies were received from some countries, the geographical distribution of contributors is adequately balanced, covering regions and cities from Western Europe (e.g. Lisbon City Council, Generalitat de Catalunya), Central Europe (e.g. Provincie Zuid-

¹ Throughout the text, ‘boxes’ include examples from the contributions. Blue boxes include examples from replies to questions (i) to (vi) and (viii), while the most comprehensive replies provided by respondents under question (vii) and referring to the sharing of examples and good practices are presented in green boxes.

² The Covenant of Mayors is a commitment by signatory towns and cities to go beyond the objectives of EU energy policy in terms of reduction in CO₂ emissions through enhanced energy efficiency and cleaner energy production and use (http://www.eumayors.eu/index_en.html).

Holland, Vorarlberger Landesregierung), Eastern Europe (e.g. Košice City, Budapest representation to the EU), Northern (e.g. Tõrva Municipality, Gothenburg Municipality) and Southern Europe (e.g. Xaghra (Gozo) Local Council, Marche Region) and including five new Member States.

Chart 3 – Geographical distribution of contributors, number of replies per country



2.1.1 Role of LRAs in the management of natural resources and water

A diversity of focus in replies is noted depending on whether the respondent is a local or regional authority, although some tasks are common to the management role of both levels of governance. At the regional level, roles range from the drafting of legislation to the planning and supporting of information sharing; at the local level, the focus is on interacting with end-users and safeguarding basic rights. Both levels are involved in implementation and monitoring. Multi-level governance is frequently referred to in the replies.

On the role LRAs should/will have at management level, most respondents made specific reference to water, rather than to natural resources in general. Since a certain level of differentiation was noted among replies depending on whether respondents were local or regional authorities or corresponding associations, the analysis has been kept separated for the two governance levels.

2.1.1.1 Regional level

Replies from regional authorities mostly focused on the following aspects:

- (i) Legislative and regulatory role.
 - Drafting legislation on water use and conservation.
 - Ensuring the effective application of framework laws such as the Water Framework Directive (FWD).
 - Establishing regulations for competition, in line with provisions at national and EU level.
 - Setting achievable targets and establishing the institutional framework for the implementation of necessary measures.

- (ii) Planning and strategy development.
 - Achieving long-term, rational and sustainable management of natural resources, also taking into account trends in the supply of and demand for fresh water in land use policies, i.e. clarifying the prevailing situation.
 - Drafting strategies towards the optimisation of water use.
 - Taking into account trends in the supply of and demand for fresh water in land use and urban planning policies.
 - Acting in accordance with EU environmental policy frameworks for sustainable development and the EU principles of an integrated approach, prevention and precaution, rectification at source and ‘polluter pays’.

In particular, in some replies it was emphasised that regional authorities have an important role in adjusting imbalances at the local level and in fostering the interest of the broader community; it was noted that, locally, decisions may be bound to short-term (e.g. five years, in the example mentioned) planning processes and local interests, and thus be driven more by political considerations than by longer-term vision and development for future generations. Similarly, it was recognised that with regard to important concerns such as the scarcity of water, decisions need to be made at higher levels – above regional and local interests. For example, it was mentioned that the identification of a network of retention basins and multifunctional river corridors for collection (in a territory) and distribution (in territories needing water) should be a supra-territorial responsibility to be taken at EU/state level.

The need to overcome local ‘particularities’

The management of natural resources by territorial entities seems ideal but in several cases situations need to be analysed at higher levels, as local particularities must be avoided. A small country like Belgium also has to act in cooperation with other countries. For instance, the protection of a cross-border groundwater system has required a change of behaviour in three regions and two countries, and a common approach offering advantages to all in order to save a situation that would have had dramatic consequences if nothing had been done. However, this higher-level approach should not overlook the fact that the information and the knowledge of the local situation and needs are available locally.

Source: Société wallonne des Eaux SWDE, Belgium.

- (iii) Monitoring role.
 - Ensuring compliance with rules and regulations on the use of natural resources in general, and of water in particular.
 - Advising on compliance matters.

- (iv) Safeguarding role.
 - Ensuring the adequacy of water resources (for example by recharging depleted aquifers).
 - Ensuring supply, distribution and treatment of water.
 - Preventing pollution of groundwater or in water abstraction sites.
 - Ensuring the public interest.

A few respondents highlighted that securing supply both in quantitative and qualitative terms should be tackled independently of the fact that water services have been privatised or are managed through public-private partnerships (PPP).

- (v) Proposing and implementing role.
 - On measures aimed: at improving water quality and treatment in order to allow water to be returned to the environment after use; at preventing and mitigating the occurrence of extreme events; at encouraging more efficient and responsible use of water.
 - Introducing water technologies for water treatment aimed both at public and private use, fostering the re-use of water resources (of grey water in buildings, for irrigation, etc.) through the closure of the water cycle.

- (vi) Information sharing.
 - Raising awareness.
 - Fostering networking and exchange of best practices, possibly after having identified areas/regions with similar patterns/problems to facilitate replication.
 - Acting as ‘interface’. Local and regional authorities are, in fact, the last link in the chain connecting individuals and water users to laws and policies governing water, where these laws and policies have been outlined at European, state or supra-regional levels. As such, LRAs work as efficient ‘interfaces’ by facilitating water and water management-related flows of information, education, and awareness towards the users; and, simultaneously, by picking up on users’ needs and suggestions so that laws and plans can be adopted by wide consensus and respond to users’ needs.

The Delta Programme in the Netherlands

The Delta programme is a provision of the Delta Act intended to ‘*guarantee the safety of the Netherlands against high water and ensure a good freshwater supply*’. The programme, submitted in 2010 to the Lower House, is based on the collaboration of the national government, provinces, municipalities and water boards with social organisations, the business community and knowledge institutes, under the direction of a government commissioner (the Delta Commissioner). Within the programme, a decision at the national level is being prepared on the way the country is to manage fresh water in the future, according to changing supply and demand, also further to climate change impact and consequent rising sea level, reduced discharge of water via the rivers, and increasing inland intrusion of salt. Provinces are involved in this process and, additionally, several studies are under way at both national and regional/province level. *Sources: Province of South-Holland, the Netherlands, and Delta Programme Commissioner. www.deltacommissaris.nl*

2.1.1.2 Local level

Replies from local authorities are structured around four main arguments:

(i) Interacting with end-users to foster the sustainable use of water.

Several replies emphasise the informative role of local authorities towards end-users with a view to promoting the sustainable use of water. Awareness-raising campaigns are amongst the tools most frequently mentioned here, along with education and ‘lead by example’ initiatives such as the re-use of municipal water or showing sustainable uses through the implementation of best practices, including with regard to climate change adaptation measures. The use of incentives/rewards to promote appropriate consumption patterns is also considered, as well as the application of ‘penalties’.

(ii) Planning and implementing interventions on the territory and monitoring progress/impact.

Local authorities are aware of their key/crucial role in planning and management, as well as in ensuring implementation and assessment in line with legislation, especially for consumption patterns. The interventions mentioned include: protection of natural streams, maintenance of water courses, water conservation, treatment of wastewater, reduction of water wastage and leaks and optimisation of water use, water supply infrastructure development and flood prevention. Finally, support should be given to private and public consumer organisations helping to promote the sustainable use of water and to reduce its environmental costs.

(iii) Being in the position to effectively manage their territories.

Local authorities perceive their participation in higher-level processes as necessary in order to optimise the potential of their territories and reconcile local interests with river basin management. Some highlight the need to develop tools allowing them to have a participatory role in regional planning, for example by carrying out studies whose information could concretely contribute to regional sustainable development processes.

(iv) Safeguarding water resources, water supply and the right to water as a public good.

Ensuring access to drinking water, guaranteeing water supply and quality of drinking water, defending water as a public good and protecting the interests of future generations are among the

roles mentioned for local authorities. Municipal by-laws recognising water as a public good not subject to a logic of profit, are mentioned by few respondents; nevertheless, it is also highlighted by one of these respondents that if the right to water is not enshrined through mandatory rules adopted at higher administrative levels, local authorities do not have sovereignty over their territory and, for example, cannot impede the development of some economic activities that over-use water resources to the detriment of the general public.

Multi-level working and discussion group

The working and discussion group includes representatives of the Ebro Hydrographic Confederation, the Regional Government of Aragon (Departments of Agriculture, the Environment, Public Works, Regional Policy), the Municipalities and Social Stakeholders (Chambers of Agriculture, Ecologists, the University of Zaragoza) whose primary aim is to study any measures that need to be adopted. *Source: Federation of Aragonese Municipalities, Districts and Provinces, Spain.*

Can an inviolable human right be a service of general economic interest?

Modalities for water management as well as reference legislative frameworks should reflect the assumption that water is an inviolable human right and that each individual should have access to water. However, the fact that water has been included by the European Commission (COM(2007) 725) among the services of general economic interest (SGEI) has left Member States free to decide the management model to be used for the provision of water services, creating very different situations across Europe and difficulties in the application of Community law at national level since, being a SGEI, water has become subject to internal market and competition rules. Considering water a service of general interest would: (i) be coherent with the assumption that water is an inviolable human right; (ii) simplify the transposition of Community law into national law; (iii) is a precondition for giving regional and local authorities a role in water management (iv) make the application of the principle of subsidiarity more realistic as the service will not need to go through the process of adapting to Community law; *Source: Marche Region, Italy.*

2.1.1.3 Stakeholders other than public authorities

In the replies provided by stakeholders other than public authorities, LRAs are expected to play a role in managing water as a public asset by keeping control of this resource even in the presence of privatisation processes, possibly through minority share in PPP involved in managing and maintaining distribution facilities. Besides being providers of public goods, LRAs are also seen as investors and protectors of the resource, empowered to take action if these resources are being polluted. Finally, strengthening the knowledge base through data and information systems supportive of the planning process was suggested.

2.1.1.4 Multi-level water governance

The issue of multi-level governance was raised, though in different terms, by both regional and local authorities. This is a natural consequence of the increasingly important role these levels of governance have in managing natural resources. Multi-level governance is considered by the Committee of the Regions to mean *'coordinated action by the European Union, the Member States and local and regional authorities, based on partnership and aimed at drawing up and implementing EU policies. It leads to responsibility being shared between the different tiers of government concerned and is underpinned by all*

*sources of democratic legitimacy and the representative nature of the different players involved*³, and this has been taken into due account in EU policy-making but arrangements for participation in the decision-making process still depend on national, regional and local circumstances. The feedback received through the respondents to the survey provides some evidence that mechanisms for multi-level governance, or management structures involving multi-level governance, are still undefined in some cases.

Governance model in the Alps

Environmental issues in general, and water in particular, make cross-border cooperation compulsory and territorial cohesion often more relevant than administrative boundaries. The WFD reflects this approach well as it recommends management systems based on basins. Within this context, local authorities should play a major role in the management of natural resources on the basis of multi-level governance and systematic consultation. The conference on water in mountain areas, organised in Megève in September 2010, drew attention to the conditions required for effective governance dealing with issues brought about by climate change or economic change. The conference concluded that the model for governance in the Alps, while not perfect, is probably one of the most advanced. The model is based on the 'Alpine Space' programme backed up by a wealth of local experience and a network of observers of the Alpine Convention. Still, an operational system of governance by theme and sector, and an operational system for the local valleys need to be created as the alpine communities should develop their valleys and contribute to the integration of policies between municipalities in order to consolidate solidarity between upstream and downstream areas. Thus, water policies should be developed on a territorial basis and since River Basin Management Plans foster coordinated water management across borders where necessary, they should also be considered within the framework of other sectoral policies. *Source: Association Européenne des élus de Montagne, France.*

2.2.1 Water resources management programmes and activities

Replies were categorised along the three building blocks of the water scarcity and drought policy review currently being undertaken by the EC, namely water efficiency, planning and implementation instruments. In each of these blocks a wide range of initiatives was reported by respondents, from sectoral interventions to regulatory measures, technology and infrastructure development, adoption of long-term visions and short-term operative plans, modelling and forecasting, pricing mechanisms and research support.

The respondents indicated a wide range of initiatives, not necessarily making a distinction between programmes and activities as suggested by the question. Furthermore, there was often no specific sectoral reference for such initiatives and the social and economic impact of climate change as a framing condition was not referred to. This is possibly a consequence of the fact that effective water management requires the implementation of a mixture of measures, from both the demand and the supply side.

An effort has been made to categorise the initiatives mentioned by the respondents against the main building blocks of the water scarcity and drought policy review currently being undertaken by the Commission, namely: (i) water efficiency; (ii) better planning; and (iii) adequate

³ The Committee of the Regions' White Paper on Multilevel Governance, adopted by the CoR Plenary Session on 17-18 June 2009.

implementation instruments. Nonetheless, the specification of topics under each main heading is a reflection of the feedback received through the questionnaires and does not necessarily correspond to the topics identified by the Commission.

2.2.1.1 *Water efficiency*

Water efficiency should be fostered across various sectors and through various means, from water recycling and use of alternative and sustainable water supply sources for private, public and domestic purposes, to increased savings of water use, reduced wastage and use/consumption through regulatory measures, infrastructure or technology development. Further, efficiency needs to be considered as a way to reduce environmental impact but also to achieve economic gains by reducing costs.

Across sectors, the activities commonly mentioned by respondents include:

- *Agriculture*: making use of wastewater; increasing the efficiency of irrigation methods (e.g. drip irrigation); modernising irrigation systems (e.g. through remote control, moisture detectors); fostering sustainable agriculture, thus improving qualitative aspects of water through the reduction of chemicals (pesticides, fertilisers) to increase re-use; selecting crops on the basis of water requirements and climate; increasing rainfall capture for irrigation purposes (and possibly, for livestock), including from hard surface areas such as roofs; increase soil water retention capacities.
- *Industry*: using water in closed circuits.
- *Urban areas*: using rainwater for irrigation or street cleaning; fostering the spreading of green roofs; maintaining or planting greenery, especially where large asphalt or concrete surfaces are present.
- *Public sector*: water re-use and rainwater use in public buildings; using water-saving equipment, for example in health care facilities.
- *Households*: using low flush toilets; using saline or rainwater for flush toilets; using water-saving appliances for garden irrigation.

Several suggestions on the use of *regulatory measures* to tackle water efficiency have been provided, including:

- Imposing a water ‘quota’ on businesses in terms of quantity of water to be recycled;
- Requiring the preparation of ‘consumption plans’ to verify environmental efficiency and the sustainability of water use or ‘sustainable water management plans’ for the industry, indicating: projected levels of use; potential areas where reductions may be achieved; potential recycling, re-use or supply from rainwater; measures to achieve savings and efficiency; targets and timetable;
- Building water retention measures into tax rules or applications for funding/subsidies.
- Allowing water to be used only if the public interest has been met;
- Making the use of water in closed circuits binding to the release of the licence for specific industry activities, or running a water audit for companies when applying for permits.

Water management guidelines of the Flemish Environment Agency

The following are considered essential by the VMM:

- (i) Safeguarding or setting aside of a 'space for water', not limited to the designation or laying out of flood plains but extending, for example, to the maintenance or restoration of canal systems or ponds.
- (ii) Focus on 'multifunctional use' of space, which is crucial in view of the limited space available in Flanders.
- (iii) Concept of 'capture - store – dispose', key to all aspects of the water cycle.
- (iv) Supply based on the capacity of groundwater and surface water.
- (v) Rational water use, i.e. with as little wastage as possible, as much recycling as possible and based on the required quality.
- (vi) Fostering further improvement of water quality.
- (vii) Re-evaluation of existing regulations and charges in view of the greater seasonal fluctuations expected, i.e. drier summers, heavier showers and wet winters, protection of water quality and costs of water purification. The charge needs to evolve into a 'regulatory charge', minimising the discharge of polluted wastewater, and a 'financing charge', matching the cost of discharging into the sewage system with that of recycling wastewater. Further, the costs of transport and recycling of rainwater and wastewater needs to be passed on to the target groups.
- (viii) Optimal solutions will always contain a mix of instruments and will always be tailor-made.
- (ix) Coordination and cooperation across all policy areas and levels, implying: the need for flexibility; sufficient capacity, knowledge and skills of those involved; combining and communicating all available knowledge and information (important role played by the Coordination Commission for Integrated Water Policy or CIW).
- (x) Drawing up 'no regret measures', possibly delivering profit under all scenarios. A socio-economic foundation is therefore important, but a (partial) lack of this should not be an argument for not taking measures.
- (xi) Robustness of solutions (certainly true for infrastructure solutions), i.e. able to function within a wide range of situations, offer stable ways out and remain manageable in terms of cost. In many cases this will be an argument in favour of low-technology, low-maintenance, energy saving, and simple systems aimed at protection and prevention.

Source: The Flemish Environment Agency (VMM), Belgium.

Technology development is acknowledged to be a way to increase efficiency of water management. In particular, the use of low energy and efficient techniques or technologies for water treatment and water retention through the implementation of specific programmes is suggested.

Infrastructure-related measures are mainly intended for the upgrading of water pipeline networks; reduction of water wastage through leakages; creation of dual systems allowing the use of alternative water sources such as recycled water, grey water, industrial water, and rainwater; building of wastewater treatment plants or urban water drainage systems; and construction of multifunctional water courses or river corridors.

Improving efficiency in the use of existing water infrastructure is one category of supply-side measures, the other being measures fostering the creation of mountain hydraulic systems (low-head dams, terraces), the preservation of the functioning of natural catchments and aquifers, and the recharging of aquifers, such as: maintenance of river beds, protection of wetlands or of areas

where water sources are located, protection of soil from erosion, establishment of basins capturing rainwater and recharging water supplies, also using winter run-off.

2.2.1.2 Better planning

Better planning is intended by some respondents as the adoption of long-term visions for water use, together with short-term operational plans; the integration of water- and energy- efficiency within broader plans for environmental and economic sustainability; the implementation of flood or drought prevention programmes, or of safety and civil protection plans; and the regulation of river catchment areas.

Better planning may be supported by monitoring activities, and these may need the establishment and running of networks. Further, the creation of models and the development of indicators are mentioned, with models adjusted to the different local conditions and scenarios. Forecasting irregularity in water provision caused by climate change may also allow the monitoring of resources, including groundwater, and help ensure water supply. Finally, compiling water ‘balances’ (census of water resources, including the registering of boreholes, water use and effect on water supplies, inflows and outflows, surface and underground status) is considered to be an appropriate approach towards more effective water resource management.

The Danube-Oder-Elbe river corridor

The construction of the Danube-Oder-Elbe multi-purpose water corridor would incorporate functions related to flood prevention, water management, transport, energy, environmental protection and leisure. This project is inspired by the example of the Danube-Main Canal in Bavaria, Germany, which largely follows the valley of the river Altmuehl and has been in operation since 1993. According to the water corridor website, the infrastructure is considered to be the ‘missing link of the interconnected network of European waterways’ that ‘uses the extraordinary advantages of the Czech Republic territory, where is the lowest point of the European watershed between the Danube and the Oder rivers (the Moravian Gate)’.

Sources: *South Moravia Regional Council, Czech Republic and Danube-Oder-Elbe (D-O-E) website.*

The ‘local water development plan’ tool in Austria

Water resource management is a particularly sensitive area of activity for all Austrian local authorities. Each local authority is responsible for its own water supply, wastewater treatment, water pollution prevention and flood prevention – even if these tasks have been delegated to associations, cooperatives or private companies. To ensure that all these matters are dealt with, taking into account current and future challenges, not in isolation but coordinating with all the fields affected, each local authority needs a forward-looking water management plan. The ‘local water development plan’ is a tool to make this forward planning easier; it gives each local authority a solid foundation for future development leading to a sustainable approach to water resources and natural hazards. The local water development plan is drafted by the ÖWAV - Austrian Water and Sewage Association - and presented at a conference, including examples that have already been put into practice and show the positive opportunities for development that the implementation of such a plan provides to local authorities. *Source: State Government of Vorarlberg, Austria.*

2.2.1.3 Adequate implementation instruments

On pricing mechanisms, it is noted that the price of water should reflect demand, in order to avoid, for example, water for domestic use costing more than water used in industry and agriculture where consumption is greater; a ‘fairer’ price should also encourage the uptake of

water-saving technologies or the adoption of more efficient practices. Other mechanisms for implementation include measures motivating savings or incentives. Grey water subsidies are also mentioned.

Several respondents refer to research programmes as the way to investigate solutions and to improve the understanding of climate change impact on water resource, in quantitative and qualitative terms. While the importance of collaborative R&D projects across European areas is underlined, also for the sharing of best practices, the need to build on and to follow up research findings, either from national or from European projects, through the implementation of programmes, is stressed by various respondents.

Water and the Framework Programme on Climate Change of Galicia

According to the climate change policy adopted by the regional government of Galicia (Galician Framework Programme on Climate Change 2010-2020), the main actions to be undertaken by the Administración Hidráulica de Galicia (AHG) through the Augas de Galicia, i.e. the catchment area body managing the Galicia-Costa river basin district, are:

- Maintaining and monitoring the existing networks in the Galicia-Costa river basin district, and namely: the network for measuring river volumes; networks under the Water Framework Directive; and the CAVE quality and discharge network. These networks will make it possible to assess the influence of climate change through changes in flow volumes, and in physical, chemical, biological and quantitative parameters, as well as the impact on discharges during periods of drought or flood.
- Carrying out studies in flood areas to meet the requirements of the Flood Directive 2007/60/EC, to draw up flood risk management plans, including the potential impact of climate change on increasing the intensity or frequency of such phenomena.
- Studying the impact of climate change on underground water, to gather important information for small settlements depending upon underground resources for their supply.
- Reducing emissions of GHG, taking into account the carbon footprint, for example, of sludge.
- Drawing up a drought plan establishing guidelines for drought prevention and management.
- Monitoring, as part of the Supply Plan prepared for Galicia Costa (the Auga Plan), on the basis of a series of benchmarks, the most important of which are those related to climate change, in terms of CO₂ produced, energy consumption (use of renewables), waste production and management. These benchmarks will allow the measurement of the impact of the actions proposed in the plan and the effectiveness of the sustainability measures that are being introduced.

Source: Administración hidráulica de Galicia: Aguas de Galicia y empresa pública de obras y servicios hidráulicos, Spain.

Raising awareness, running campaigns on efficient water use, informing and educating people about sustainable water use and on the existence of more efficient technologies, are also mentioned. In particular, it is noted that initiatives associated with risk management require significant communication activities as they involve a high number of stakeholders.

Finally, reference is made to the participation of local and regional administrations in policy design, through measures giving LRAs the instruments to implement local water policies, including control over territorial economic activities.

The ‘Ti voglio bere’ (I want to drink you) project in the municipality of Volvera

In November 2009, the City Council of Volvera joined the water saving campaign launched by the Environmental Research Center of Turin with the project ‘*Ti voglio bere*’ (T.V.B.) whose main objective is to promote the use of tap water. The project is based on the simple assumption that drinking tap water instead of bottled water has several positive impacts, especially from an environmental point of view, as it significantly reduces waste production. The main activities of the T.V.B. project include: (i) analysis of water consumption within a few municipal buildings and preparation, on the basis of the results of a ‘Water Action Plan’; (ii) analysis of water consumption and flows in all municipal buildings and technical inspection of all ‘water points’; the results and actions needed to improve water use and savings are included in the Water Action Plan together with costs and timetable. The Action Plan was adopted by the Town Council as a ‘guiding document’ with a view to begin allocating the investments required for its implementation as early as 2011; (iii) carry out a survey across households to investigate attitude and habits towards the use of tap water. Out of the 2,500 questionnaires distributed, 252 were returned, implying a sample of about 10% of the target population.

The main findings of the survey were: (a) the attitude of families in Volvera towards tap water is similar to that of the average Italian family, preferring to drink bottled water; (b) the choice to drink bottled water is mainly determined by organoleptic properties (taste, flavour, color) and not by sanitary reasons; (c) there is a general low awareness of the environmental and social impacts that the use of bottled water implies; (d) the need to receive more information about tap water is prioritised as high by the families surveyed; (e) families seem willing to change their habits and drink tap water if its organoleptic quality improves; (f) there is a low share of families paying attention to water savings within their households.

There are indeed prejudices towards the use of tap water, an attitude that is commonly shared at the national level. In fact, Italy has a massive consumption of bottled water, with some 85% of households buying it, for a total of some seven billion bottles sold every year. Bottled water is distributed mainly in plastic containers whose life cycle and transport is associated with relevant emissions of CO₂ and use of energy; bottled water also has an impact on the production of waste, in particular on packaging and plastic waste. It is estimated that the use of tap water could save the production of 14 Kg of plastic and 56 Kg of CO₂ for an average 3-people family, as well as a cost of EUR 260 per year per family (this last figure being calculated by ADUC - National Association for the Rights of Consumers and Users). Finally, it should be noted that tap water goes through much more precise quality checks than bottled water and its cost may be as much as 1,000 times lower than that of bottled water.

Source: Comune di Volvera, Italy.

2.2.3 Encouraging public participation in water-related policy-making

Public participation is considered to be essential for the policy-making process to function properly. In some countries it is reported to be compulsory for some policy areas. It is achievable through media, education, training and awareness campaigns and implies the need for information to be objective and transparent.

Public participation is considered essential for several reasons:

- It is a *conditio sine qua non* for any type of measure, including those related to climate change mitigation and adaptation, to be understood and accepted and, consequently, to be successfully implemented
- It is expected to have (positive) consequences on voting results, i.e. it represents a way to influence people's opinion of the activities undertaken by local and regional administrations
- It underlines the need for local authorities themselves to be fully aware and knowledgeable about the problems in order to be able to 'convince' the public to accept behavioural changes on such an essential good as water
- It is a way to ensure that policies are adopted by consensus and reflect the interests of the citizens
- It makes it possible to raise awareness on problems expected in the medium-to-long term and that may not be evident at present, especially in countries with easy and secure access to water.

It should be noted that in some countries public consultation is statutory. For example, in Belgium and the Netherlands public consultation is reported to be required when drawing up policies related to water. In Sweden, consultation is stipulated under the planning and construction law and the environmental code.

The most frequently mentioned mechanisms for tackling public participation in the policy-making process include:

- Media coverage, including TV and radio programmes and the use of 'social media'. By explaining the consequences of common behaviours of individuals/businesses across the different sectors concerned by the use of water (agriculture, industry, households etc.), understanding and awareness of policy measures is targeted
- Awareness campaigns, if possible targeted to small and well defined areas, in order to be able to clearly determine the roles, targets, rights and benefits of the policy to be put in place. It was further specified by one respondent that standard information campaigns at the EU level are not recommended as campaigns need to be adapted to local circumstances
- Advertising campaigns, public consultations and/or debates, information events, online forums, requests for feedback, competitions and prizes, surveys.
- Training seminars tailored to the audience of each sector, for example to farmers in the agricultural sector
- For specialists, lifelong learning or topic-focused workshops
- Education in schools, in order to invest in future generations
- Using (good) examples from other regions or countries, possibly through the development of pilot schemes with adequate visibility
- Designing strategies to channel and mainstream the public's contribution to the decision-making process up to the legislative authority because *'It is the extent to which the views of the public are really taken into account that determines the success of public policies, and not vice versa'*.⁴

⁴ Questionnaire from the *Association Européenne des élus de Montagne*

Aquaval: boosting the sustainable management of rainwater in municipalities

Aquaval is a programme funded by the EU under the LIFE+ Community Initiative. The programme aims to boost a more sustainable management of rainwater in municipalities, ensuring that rainwater is included in water resource policies. The main target is to find innovative solutions to problems involving the quantity and quality of urban run-off. The guiding principle is to make the best use of municipalities' landscape and morphology in order to integrate water infrastructure using Sustainable Urban Drainage Systems (SUDS). Thus, Aquaval is meant to develop systems that will not only help mitigate the consequences of torrential rain but that will also collect water for subsequent use. This will reduce the impact of urban development and ensure that social and environmental values are applied to the local surroundings. Specific objectives include:

- Preventing sewage overflow and improving the quality of water of the Albaida and Turia rivers that receive urban run-off.
- Preventing flooding and frequent overflows from the town centre's sewage network under heavy rain.
- Making the drainage infrastructure versatile enough to cope with the effects of climate change.
- Reducing electricity consumption in urban water management and in buildings.
- Reducing the 'heat island' effect in towns and cities.
- Saving drinking water by using rainwater for irrigation, street-cleaning, etc.
- Promoting the implementation of SUDS in southern Europe.
- Developing municipal policies that integrate environmental aspects into legislation related to land use planning and water management.
- Creating new employment niches.
- Achieving industrial diversification while introducing new materials and products and drainage systems.

Source: Benaouasil Town Council. Spain.

Some respondents highlighted the importance of disseminating information in an objective, transparent and clear way, including the attribution of responsibilities to local/regional administrations.

Complexity is added to the process of public participation by the fact that a certain degree of flexibility is required, as climate change trends may change. On the development of adaptation policies, the concerned stakeholders are required to assess the implementation of these policies and to learn on the basis of the assessment results the best possible way to foster resilience. As a consequence of policy adaptation, instruments used for encouraging compliance with policy development also need to be flexible, such flexibility being achieved by considering complementing approaches.

Madrid – city's mechanisms for public participation

The opinions of the public must be taken into account in the planning and managing of water resources. To ensure that any policy applying to management and use of water is accepted by the public, people must be involved in framing it. To do this, it is essential to use the city's existing options for public involvement such as district councils, the voluntary sector, district committees and the Agenda 21 City Forum; if necessary, other specific mechanisms will need to be created such as working groups, workshops, or questionnaires.

Source: Ayuntamiento de Madrid, Spain.

It is on the basis of complexity that one respondent, the only one among all participants in the survey, commented that water is not an issue to be addressed through large-scale open participation procedures.

2.2.4 Incentives favouring the adoption of good water management practices

The focus of most of the replies is on economic incentives. Social incentives were considered to be those encouraging changes in people's behaviour without the use of financial means, while environmental incentives referred to environment-related regulatory mechanisms, labelling or certification schemes.

The majority of respondents provided information on economic incentives:

- Providing subsidies for supporting: (a) property owners, for the uptake of more efficient technologies in their houses or for building wells to collect water and thus reducing flooding; (b) the use of most advanced technologies, in order to encourage their dissemination; (c) investments in infrastructure; (d) families consuming less water; (e) good 'behaviour patterns' in general, for example as related to water recycling or wastewater processing, making funding dependent upon good water management.
- Facilitating the provision/negotiation of soft loans for implementing efficiency measures in buildings and installations.
- Providing financial support through various means such as: (a) cost-sharing for installing technologies allowing appropriate water use; (b) public financial assistance through support programmes or grants for installing water saving devices, improving water use efficiency, building the necessary infrastructure, adopting innovative measures, purifying water, etc.; (c) EU co-funding, making financial support conditional on the achievement of results in terms of management and savings, in line with the conditionality principle that is being discussed within the forthcoming post-2013 cohesion policy.
- Tax exemption for water conservation measures; tax relief/reduction for companies adopting environment-friendly technologies.

Besides incentives, penalties are also considered to be effective instruments to encourage behavioural changes or the uptake of good practices. In particular, emphasis was on the use of taxing instruments and pricing mechanisms:

- Taxing the unsustainable use of water resources, for example where demand exceeds water capacity.
- Taxing industrial waste disposal.
- Introducing fines for polluting behaviours.
- Applying local taxes or fiscal measures on wastewater production or, alternatively, ensuring that wastewater is treated and recycled.
- Pricing mechanisms: (a) raising the price of water, though unpopular, may be an effective tool to stimulate an efficient use of water and the reduction of consumption; (b) internalising environmental cost into the total cost of water; (c) applying the 'polluter pays' principle; (iv) applying tariff brackets with costs rising in line with cubic meters consumed.

However, it has been noted by some respondents that an appropriate pricing policy should result as much as possible in reduced costs and increased social benefits.

Water Levy in Galicia

From the economic viewpoint, taxes could be introduced to encourage resource conservation. In Galicia, regional Law 4/2010 of 9 November 2010 just entered into force, establishing the Water Levy as a Regional Government tax on the use and consumption of water within the Autonomous Community of Galicia, based on the damage its use might have on the environment. One of the new features introduced by the levy is the encouragement to save water and the idea of the responsible consumer, since one part of the levy is a flat rate and the other is proportional to actual use, which is based in turn on a series of consumption brackets and the number of residents in each household.

Source: Administración hidráulica de Galicia: Aguas de Galicia y empresa pública de obras y servicios hidráulicos, Spain.

Social incentives were considered to be initiatives encouraging changes in people's behaviour without the use of financial means. Social incentives range from competitions and awards to training, awareness and other information-sharing and involvement mechanisms aimed at tackling the understanding and implementation of water-related activities. More precisely, the following were highlighted by the respondents:

- Competitions or prizes for good corporate water management.
- Awards and rewards for taking up good practices.
- Media visibility for outstanding performance companies.
- Campaigns for the general public aimed at encouraging behavioural changes.
- Awareness-raising on water as a limited resource, including within schools and among children.
- Training as a way to improve the well-being of users by enhancing their understanding of drinking water-related issues.
- Training and awareness-raising to both private and public corporations.
- Environmental education.
- High-impact messages for the public or for targeted stakeholders or economic operators, as is the case for messages passed to guests within the hotel industry.
- Participatory development of water plans.
- Clear highlighting of the benefits for the users, including in terms of costs, with regard to water supply and wastewater disposal.
- Giving visibility to existing positive examples and good practices.
- Existence of strong water management bodies within public authorities, able to involve all relevant stakeholders.

Environmental incentives are also poorly defined by the respondents. They were considered to be incentives linked to environment-related regulatory mechanisms, labelling or certification schemes. More precisely, the following were highlighted by respondents:

- Legislative measures to encourage sustainable use.
- Labelling of efficient water use.
- Certification identifying businesses implementing efficient water use.
- Use of compensation schemes.

Finally, it was noted that good practices should be related to choices that are economically viable, as this will speed up their uptake (the example of unleaded petrol was mentioned by one

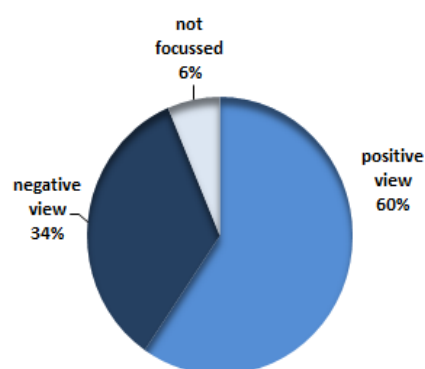
respondent); if products concerned with good practice are commercially competitive, their introduction on the market is more easily promoted.

2.2.5 EU role in promoting water conservation and efficiency

The majority of the respondents regard the involvement of the EU in promoting water conservation and efficiency positively. On the introduction of targets, several replies are explicitly supportive but there is also an emphasis on the fact that local specificities need to be taken into account in any binding mechanisms that may be introduced, as water problems vary greatly across European regions.

Replies rarely addressed the three queries on the EU role directly, namely: (i) the introduction of water-saving targets; (ii) the encouragement of water-saving technologies; (iii) and the use of binding instruments for the promotion of water conservation and efficiency. Consequently, positive replies could not be precisely categorised against these three issues. Rather, replies have been broken down into those expressing a positive and those expressing a negative view with respect to the overall question on the EU role (Chart 4).

Chart 4 – Categorisation of replies received on question 5 related to the role of the EU



A very common remark made in both positive and negative replies is that any role played by the EU should take into account local specificities in terms of water availability and quality, as water-related problems and measures vary greatly across European regions and standard solutions or targets would not be suitable. For those expressing a positive view, targets need to be adapted to different geographical characteristics of regions and local conditions.

The respondents expressing a positive view on the EU playing a role in setting water-saving targets and/or encouraging water-saving technologies, also focused on one or more of the following points:

- a) Binding targets may represent an effective incentive, not only for the adoption of water-saving technologies but also for encouraging research and development and private sector investments.
- b) Since binding instruments should take into account specific regional characteristics, the voice of regional authorities should be heard throughout the introduction process of these instruments.
- c) The use of binding instruments should accompany the application of the subsidiarity principle; hence, decisions on arrangements and instruments to achieve targets should be entrusted to MS and LRAs so as to reflect the characteristics of individual countries and regions.
- d) Since it is evident that ‘one-target-fits-all’ is not feasible, the EU should define general targets and rules together with a set of ‘open parameters’ at sub-national level, against which regions could set values according to regional features such as geographic characteristics, population, water resources, etc.
- e) Realistic targets may facilitate progress but should be accompanied by measures such as financial support.

The respondents expressing a negative view on the EU playing a role in setting water-saving targets and/or encouraging water-saving technologies raised the following arguments:

- a) Water plans should be as local as possible, as well as pricing and regulation of demand for which local administrators should bear responsibility. The EU role must be limited to principles of administration (such as the catchment-based approach), raising awareness and encouraging a change in attitude towards water-saving behaviours.
- b) In countries where water shortage is a problem, it would be wrong to start regulating before all basic needs are met.
- c) Setting EU objectives will have an impact in the short term only, but for longer term objectives a mindset change is needed. One respondent underlines that policies need to *'stop treating water as a marketable commodity'*; instead it has to be considered *'as a universally accessible good provided by nature and processed by people for other people at cost price and with no profit motive'*.⁵
- d) The EU should provide the framework or strategic goals within which more specific goals could be set by MS according to their natural and climatic conditions; or guidelines and financing, through a number of instruments, to encourage the implementation of water-savings technologies.
- e) Currently, for countries facing water shortage problems, cross-country agreements are more important than binding instruments at EU level.
- f) Encouragement or recommendations are preferable because binding instruments would apply everywhere while not all regions/areas are affected by water problems; in these regions/areas measures are not and will not be needed. Thus, for some regions binding instruments would imply only the inappropriate introduction of red tape.

Other suggestions on the role that the EU could play include:

- a) Ensuring a uniform approach across Europe with regard to water saving.
- b) Focusing on the most water demanding sectors, such as the agricultural sector.
- c) Supporting the introduction of technologies and technical solutions, especially with regard to environmentally-friendly technologies, along the lines of Best Available Technology for air pollution control.
- d) Establishing methods and approaches for protecting and recovering water resources, including avoidance of contamination and water quality improvement.
- e) Providing incentives for implementing measures that ensure access to water by all regions.

2.2.6 LRAs' measures for coping with extreme events

With reference to initiatives already underway, several activities were highlighted by respondents to cope with extreme events such as floods and droughts. These activities have been categorised into five main groups, depending on the level addressed: (i) institutional/regulatory; (ii) management; (iii) operational; (iv) structural; and (v) public-related.

Institutional/regulatory level

- Setting up working and discussion groups with all authorities concerned, at all levels, and social stakeholders to facilitate coordination.
- Setting up cross-sector coordination bodies, at basin level, and at local level.
- Supporting regular dialogue and communication to pool expertise and experience.

⁵ Questionnaire from the *Société wallonne des Eaux – SWDE*

- Regulating building permits and the designation of water storage areas around water catchments.
- Prohibiting construction on risk areas (poorly drained, flood-prone) and taking action against abuse, both along riverbeds and in hydro- geologically-sensitive areas.
- Regulating the system of compensation for damage caused by flooding, in order to streamline procedures.

Management level

- Adopting and applying the principles of integrated water management.
- Establishing cross-regional flood protection programmes, cross regional coordination of programmes on river catchment areas, as well as coordination of programmes that derive from different responsibilities (flood protection, civil protection, land use) through protocols/manuals of procedures.
- Updating legislation, planning and strategic documents.
- Setting environmental goals.
- Monitoring investments and interventions and assessing the impact.
- Increasing the effectiveness of financial support and incentive measures.
- Planning tools (land use plans, urban development plans, civil protection plans, urban water basin management plans, rainwater management plans, water balances between basins, etc.). Urban planning should take into account the creation of adequate routes for storm water spreading; rural areas should have catchment basins reducing the risk of flooding; land-use planning should include information on potential flood areas or flood plans should be developed based on the limits of the floodplains of local rivers.
- Using modelling and forecasting tools to simulate optimal management, especially with regard to the integration of water resources in case of drought. These models should enable an assessment of the infrastructure and mechanisms needed to cope with these events.
- Setting of temporary restrictions on water use for certain purposes (garden irrigation, filling swimming pools, road cleaning, etc.) under extreme drought conditions, in line with a protocol for action.
- Making warning systems operational, preparing emergency response plans, recovery plans, risk maps.
- State of preparedness by local authorities with appropriate risk management plans.
- Trialling disaster management plans related to floods or prolonged droughts.

Cooperation and coordination to address flooding in Gothenburg

For a long time, Gothenburg has been addressing the risk of flooding due to storm flows and rising sea levels, and its potential impact on water supply, population centres and infrastructure. Work is being done in broad cooperation with both the relevant municipal officials and external stakeholders: ongoing urban development work in the city centre around the Göta River provides for flood protection measures, alterations; drinking water is supplied through regional cooperation from various sources. Furthermore, water preservation efforts to safeguard and improve water quality are managed partly through stakeholder forums that play a coordinating role between public water authorities and local players.

Source: Gothenburg Municipality, Sweden.

Cross-border cooperation and water

Cooperation around Lake Constance is emblematic of the tradition of cross-border cooperation in mountain areas. Lake Constance borders 10 regions. Over 3 million people live nearby. The first case of cross-border cooperation dates from 1824 in the field of navigation. It grew successfully after the Second World War to stop pollution of the lake. Cooperation took institutional form in 1960 with the setting-up of the International Commission for the Protection of the Waters of Lake Constance by Bavaria, Baden-Württemberg, Austria and Switzerland and the creation of the international conference for Lake Constance¹ (now a Euro-region) in 1972. The INTERREG programme has made a new level of collaboration possible, leading to the proliferation of institutional and informal networks of local stakeholders. Cooperation around Lake Constance has been motivated above all by issues involving the use and quality of water.

Source: Association Européenne des élus de Montagne, France.

Operational level

- Restoring and/or improving the ecological function of the terrain, re-establishing their water regime, planting vegetation on slopes
- Erosion-prevention measures
- Effective management of small water courses and streams
- Expanding green areas for reducing surface water run-off, afforestation of bare land
- Cleaning and maintenance of river beds to restore the natural flows
- Desalinisation of sea water
- Collection in catchments of rainwater
- Re-direction of rivers in drought-prone areas for irrigation purposes.
- Improving the resilience of water systems to climate change and drought through infrastructure and land use planning to reduce flood risks
- Establishing water reserves, catchments.

Improving the ecological state of water courses to prevent flooding

Since 2003, Arnsberg has carried out a number of measures to improve the ecological state of its water courses, mainly the Ruhr. This has simultaneously had significant positive effects on flood protection. A total of EUR 13 million has been invested. Around 7km along the length of the Ruhr and around 6km along smaller streams were re-landscaped and/or re-natured. This has made Arnsberg the leading municipality in Germany as regards measures taken along water courses. The requirements of the EU Water Framework Directive, taking into account the principle of downstream liability, have thus largely been fulfilled. Work is currently in progress on a design for flood protection measures that complement the re-naturing measures. *Source: Stadt Arnsberg, Germany.*

Water-related natural disasters in mountain areas

Risks related to snow are well known and avalanche research has made enormous progress; yet, there are still a hundred deaths per year in the Alps due to avalanches. Measures to combat avalanches include the delimitation of areas at risk, the placing of ever larger protection walls, the placing of nets, architectural precautions, limiting population density and the height of buildings, the organisation of evacuation plans, the classification of forest areas as protective belts, and the preventive triggering of avalanches. Other risks include the collapse of ice blocks and the opening of glacial lakes as well as excessive rainfall. Pastures and forests contribute to regulating such risks. Other preventive measures include the landscaping of mountainsides and the reclamation of land at high altitude. Such practices should become general practice for all the local authorities concerned so as to boost their risk prevention capacity and their ability to cope with potential emergencies. *Source: Association Européenne des élus de Montagne, France.*

Structural level

- Building technical structures, flood protection structures, flood control reservoirs, canals/dams to protect from heavy rainfall, infrastructure preventing river overflows
- Maintaining and securing the physical infrastructure, ensuring it remains operational
- Developing sustainable urban drainage systems (such as those using porous pavements, drainage boxes), drainage channels and networks
- Building vertical barriers in river beds, widening river beds
- Constructing flood-gates within barrier walls to regulate extraordinary events
- Facilitate restocking of groundwater aquifers from flood basins, or dams.

Public-related

- Providing timely information on forthcoming extreme weather events.
- Supporting citizens in adopting their own damage limitation measures or in making their houses less vulnerable.
- Raising public awareness.
- Establishment of flood protection associations.

Coping with flooding in the city of Oulu, Finland

In the new residential area of the city of Oulu, storm water floods have been taken into account as a factor in landscaping. Metsähallitus (Forest and Park Service) has, for example, mapped the location of drained but poor and stunted forest areas and waste land on state-owned land in the catchment basin of the Iijoki river to determine where ditches can be blocked (without any loss in terms of forestry) to help promote the retention of water in the soil. There is good cooperation between the various players (environmental authority/operators in different sectors) in the region.

Source: Centre for Economic Development, Transport and the Environment for Ostrobothnia, Finland.

Re-using wastewater to deal with drought in Madrid

A very powerful instrument for preventing and dealing with droughts is the re-use of treated wastewater for purposes other than drinking. Madrid is a pioneer and European leader in this field, since it has a 90km network and five treatment plants, which supply and distribute water for watering parks and golf courses and for street cleaning. Implementing this policy saved the city of Madrid more than 5.5 cubic hectometres of drinking water (6 times more than the volume saved in 2003), which is equivalent to the monthly consumption of a city of 75,000 inhabitants, and this would be available for use in times of predictable drought. *Source: Ayuntamiento de Madrid, Spain.*

One respondent specifically mentioned the Covenant of Mayors as the driver for environmentally sustainable governance and sharing knowledge and good practices among public authorities.

2.2.7 Other raised issues

Apart from issues related to specific interventions and measures that have been included in the previous sections, the following new arguments have been raised:

- Measures and resources should be correctly focused.
- Taxation and pricing are considered important instruments to 'guide' behaviours; for example, taxes may discourage the use of water or the drainage of rainwater through sewers that prevent water retention. Nevertheless, some respondents objected that encouraging and rewarding would be preferable to the setting of mandatory requirements and obligations and that pricing should encompass mechanisms to avoid penalising those that achieve water savings.
- The combination of different solutions (for example, modernising irrigation systems, the combined use of groundwater and surface water, re-use of wastewater, etc.) enables maximal efficiency and impact on improving the environment and protecting water resources, linking up different users and uses.
- There is a need for clearer roles, for avoiding overlapping of responsibilities that often leads to lack of agreement when management issues arise, and for preventing action being taken individually. Overall, the social and environmental impact of decisions should always be taken into account.

- Policies should be concerned not only about volumes of water (droughts, floods) but also about quality of water, implying the need to protect water ecosystems and encouraging investment so as to achieve a good ecological status.
- Lack of awareness among the general population is also due to the fact that water scarcity is not a widespread problem across European regions, i.e. it is not a problem for everyone. This situation is aggravated by data that often provides national averages, thereby not clearly disclosing the fact that some regions/areas have serious water deficits.
- Water is essential for socio-economic development but this point seems to be missing from the consultation. The focus at policy level should also be on identifying arrangements to foster the economic development of areas suffering from water scarcity, i.e. looking at water as constraining or challenging development/growth, especially in Mediterranean areas. Additionally, policy should pursue the reduction of differences between inland areas, from where the water comes, and metropolitan and coastal areas where most of the water is consumed, i.e. become geo-policy. This implies the need to balance and harmonise regional and sectoral development according to a fair distribution of water resources, avoiding bottlenecks that constrain development.
- Broad cooperation between different areas of competence such as municipal and national authorities, industry, and research and academic institutes is necessary.
- Tools and regulations (codes) should be updated, for example by reviewing codes of good practice for the construction of sewage systems along an adaptive approach; by updating technical standards that have not kept pace with change; by drawing up 'next generation' water management plans, etc.
- There is a need for increased operational focus, changing the mindset in national and local public administration.

Appendix I - List of Survey respondents

State	Organisation
AT	Office of the Regional Government of Burgenland (Land Burgenland)
AT	Office of the Tyrol Regional Government (Amt der Tiroler Landesregierung)
AT	Salzburg Provincial Government, Department of Water Management (Amt der Salzburger Landesregierung, Fachabteilung Wasserwirtschaft)
AT	State Government of Vorarlberg (Vorarlberger Landesregierung)
BE	Flemish Environment Agency (Vlaamse Milieumaatschappij)
BE	SWDE - Société wallonne des Eaux (Walloon company for water supply and sanitation)
CZ	Liberec Regional Council (Krajský úřad Libereckého kraje)
CZ	Povodí Ohře, State Corporation (Povodí Ohře, státní podnik)
CZ	South Moravia Regional Council (Zatupitelstvo Jihomoravského kraje)
DE	Arnsberg City (Stadt Arnsberg)
DK	Danish Regions (Danske Regioner)
EE	Kuressaare Municipal Authority (Kuressaare linnavalitsus)
EE	Sindi municipal authority (Sindi linnavalitsus)
EE	Tõrva Municipality (Tõrva Linnavalitsus)
EL	Region of Attica (Περιφέρεια Αττικής)
ES	Almoradí Municipality (Ayuntamiento de Almoradí)
ES	Autonomous Community of Galicia (Xunta de Galicia)
ES	Autonomous Community of the Region of Murcia (Comunidad Autónoma de Murcia)
ES	Autonomous Community of Valencia (Generalitat Valenciana)
ES	Benaguasil Town Council (Ayuntamiento de Benaguasil)
ES	Callosa de Segura Municipality (Ayuntamiento de Callosa de Segura)
ES	Catalonia Region (Generalitat de Catalunya)
ES	Federation of Aragonese Municipalities, Districts and Provinces (FAMCP) (Federacion Aragonesa de Municipios, Comarcas y Provincias (FAMCP))
ES	Local Agency for Economic and Social Development of Alicante City Council (Agencia Local de Desarrollo Económico y Social de Alicante)
ES	Madrid Municipal Council (Ayuntamiento de Madrid)
ES	Mutxamel Town Council (Ayuntamiento de Mutxamel)
ES	Ribesalbes Town Council (Ayuntamiento de Ribesalbes)
FI	Centre for Economic Development, Transport and the Environment for Ostrobothnia (Pohjois-Pohjanmaan elinkeino-, liikenne- ja ympäristökeskus)
FR	European Association of Elected Representatives from Mountain Regions

State	Organisation
	(AEM) (Association européenne des élus de montagne (AEM))
FR	European House of French Local Authorities (Maison européenne des pouvoirs locaux français)
HU	Representation of Budapest to the EU
IT	Environmental association (Associazione ambientale)
IT	Le Marche Region (Regione Marche)
IT	Taranta Peligna Town Council (Comune di Taranta Peligna)
IT	Volvera Town Council (Comune di Volvera)
MT	Xaghra (Gozo) Local Council (Xagħra)
NL	Municipality of Nijmegen (Gemeente Nijmegen)
NL	Province of South-Holland (Provincie Zuid-Holland)
PT	Ferreira do Alentejo Town Council (CM Ferreira do Alentejo)
PT	Lisbon City Council (Câmara Municipal de Lisboa)
PT	Santiago do Cacem Municipal Council (Câmara Municipal de Santiago do Cacem)
SE	Gothenburg Municipality (Göteborgs Stad)
SK	Ateliér Dobrucká, s.r.o.
SK	Association of Towns and Communities of Slovakia (Združenie miest a obcí Slovenska)
SK	Košice City (Mesto Košice)
SK	Pliešovská kotlina microregion (Mikroregión Pliešovská kotlina)
SK	Research team from the Plant Production Research Centre, Grassland and Mountain Agriculture Research Institute (VÚTPHP), Banská Bystrica (Kolektív VÚTPHP Banská Bystrica)
SK	Trnava Region (Trnavský Samosprávny Kraj)
SK	Zvolen University of Technology (Technická Univerzita vo Zvolene)