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**COMMUNICATION FROM THE COMMISSION
TO THE COUNCIL, THE EUROPEAN PARLIAMENT
AND THE ECONOMIC AND SOCIAL COMMITTEE**

Pricing policies for enhancing the sustainability of water resources

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PREFACE

Water is a major concern for environmental policies in the European Community and is one of the environmental priorities of the European Commission. The main pillar of water policies during the coming decades will be the proposed Directive establishing a framework for Community action in the field of water policy (or Water Framework Directive). In line with recent initiatives to give more weight to economic instruments in environmental policies, the proposed Water Framework Directive promotes the use of water charging to act as an incentive for the sustainable use of water resources and to recover the costs of water services by economic sector. This will contribute to meeting the environmental objectives of this directive in a cost-effective way.

Against this background, the Commission presents this Communication with the following objectives:

- (1) To clarify the main issues related to the use of water pricing for enhancing the sustainability of water resources;
- (2) To present the rationale behind the Commission's preference for a strict application of sound economic and environmental principles in water pricing policies;
- (3) To propose a set of guiding principles that will support the implementation of the proposed Water Framework Directive and more specifically its water pricing article.

The key messages put forward by the Communication are as follows.

- (1) The sustainability of water resources is at stake in many river basins in Europe, from both a quantitative and qualitative point of view. Appropriate water pricing has a key role to play in the development of sustainable water policies.
- (2) To play an effective role in enhancing the sustainability of water resources, water pricing policies need to be based on the assessment of costs and benefits of water use and to consider both the financial costs of providing services as well as environmental and resource costs. A price directly linked to the water quantities used or pollution produced can ensure that pricing has a clear incentive function for consumers to improve water use efficiency and reduce pollution.
- (3) The integration of economic and environmental objectives into Member States water pricing policies is highly diverse at present. Overall, the full recovery of financial costs is only partly achieved, and environmental and resource costs are rarely considered. The inadequacy of water pricing policies is striking for the agricultural

sector, especially in Southern European countries where it is by far the largest consumer of water and where scarcity problems are the greatest.

- (4) Water pricing policies in countries where the EU has a particularly strong involvement rarely integrate economic efficiency and environmental objectives. This is true for accession countries, where pricing is an important issue in the context of enlargement. It is even more valid for developing countries, where the application of economic principles in water policies is in its infancy.
- (5) Efficient water pricing policies have a demonstrable impact on the water demand of different uses. As a result of changes in water demand, efficient water pricing reduces the pressure on water resources. This is particularly true for the agricultural sector. The available evidence suggest that farming communities can be expected to adapt to certain price increases that would result from a stricter recovery of the costs of water services. Different levels of cost recovery among countries and economic sectors such as agriculture and industry, are likely to influence the competitiveness of these sectors both in the internal market and international trade.
- (6) Pricing policies that better account for the environment will build on: (i) a firmer application of the principle of recovery of costs; (ii) a wider application of pricing structures that provide incentives and the promotion of metering devices; (iii) the assessment of major environmental costs and, where feasible, the internalisation of these costs into prices; (iv) a transparent policy development process with the participation of users/consumers; and, (v) a phased implementation of pricing policies that better integrate sound economic and environmental principles.
- (7) Water pricing will need to be integrated with other measures to ensure environmental, economic and social objectives are met cost-effectively. The proposed Water Framework Directive offers the right framework to do so in the context of the preparation of the river basin management plans.
- (8) Other sector, structural and cohesion policies need to be designed and implemented so as to ensure consistency and coherence with, and effectiveness of, water pricing policies. As far as agriculture is concerned, reconciling water and agriculture remains a key priority for the Common Agricultural Policy (CAP) and existing policy instruments (e.g. agri-environmental measures in rural development programmes). The CAP should support the sustainable use of water resources in line with the economic and environmental principles promoted in the proposed Water Framework Directive and in this Communication.

The Commission fully recognises the sensitivity of the pricing issues discussed in this Communication for a wide range of stakeholders and Member States. This sensitivity should not be reason for misreading the Commission's message as an advocacy for a "pricing alone" policy. Clearly, pricing is not the sole instrument that can (and will) solve water resources problems in Europe and elsewhere. However, pricing should be given due consideration to ensure it promotes more efficient and less polluting use of our scarce water resources.

Overall, the Communication aims at provoking a fruitful political debate and sharing of views that will lead to the identification of practical steps and development of guidelines for the implementation of the water pricing article of the proposed Water Framework Directive. And the Communication is hoped to play an information role for stakeholders who will actively participate in the preparation of the river basin management plans and programmes of

measures provided for by the Water Framework Directive. In this context, the European institutions and Member States are invited to give full consideration to this Communication and to build on its key messages to ensure future water pricing policies fully contribute to meeting the environmental objectives of this Directive in a cost-effective way.

The Communication will also support the assessment of the role water pricing may play in the context of enlargement and the implementation of the environmental *acquis* in accession countries. Finally, it will supplement the EU guidelines for development policy entitled *Towards Sustainable Water Resources Management* by stressing the key components of sustainable water pricing policies.

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1. INTRODUCTION

1.1. Sustainability of water resources

A close look at the state of water resources at present reveals that the sustainability of the water system is at stake in many areas of Europe. Although several indicators show an apparent stability or reduction in water stress¹ at the European Union scale², these indicators hide significant spatial and temporal differences and alarming local situations. For example:

- (1) Over-abstraction of water has put the sustainability of many aquifers at stake. As a result, the salinisation of aquifers through seawater intrusion remains critical in many coastal areas. Also, 50% of wetlands have “endangered status” due to groundwater over-exploitation. Problems of over-exploitation are common in Southern Europe, but are also present in Northern Europe.
- (2) Reductions in river flow resulting from over-abstraction have led to the degradation of the ecological status of some rivers. Water quantity problems often amplify existing problems of water quality and pollution.
- (3) The number of heavily polluted rivers has decreased over the past 20 years. However, quality improvement is mainly recorded in large rivers and diffuse pollution from agriculture remains problematic. Thus, nitrate concentrations in rivers remain high leading to eutrophication of coastal areas.
- (4) Nitrate concentrations higher than the 50 mg/l limit set by the Drinking Water Directive are still recorded in private and small communal supplies from shallow aquifers, and in areas with intensive agricultural and livestock production. These high concentrations pose a health risk to affected populations.

Factors that explain this situation include barriers to the adoption of more efficient technologies, limited incentives to reduce water use, inadequate institutional frameworks, gaps in the integration of environmental concerns into sector policies, and lacking or poorly implemented environmental policies. Increasingly, investigations of current policies and their impact underline the part played by existing water pricing policies that do not give the “right” signal for using water in a sustainable manner.

1.2. Economic instruments and the environment

The 1990s have seen an increasing emphasis on the use of economic instruments, e.g. taxes, charges, subsidies or tradable permits, for enhancing the sustainability of the environment. Economic instruments and the economic value of natural resources have found their full legitimacy in the Rio Declaration on Environment and Development of the United Nations in 1992. And their importance has been regularly

¹ Water stress occurs when the demand for water exceeds the available amount during a certain period or when poor quality restricts its use (*Environment in the European Union at the turn of the century*, European Environment Agency (EEA), 1999).

² *Environment in the European Union at the turn of the century*, EEA, 1999.

stressed since, as illustrated by the Ministerial Declaration of the Second World Water Forum (Den Haag, March 2000).

In the EU, economic principles and the use of economic instruments have been gradually but clearly embedded into environmental policies. The Treaty now integrates the Polluter Pays Principle as a foundation of all European environmental policies³. The Fifth Environmental Action Programme of the European Commission ending in 2000 has the broadening of the range of policy instruments as one of its top priorities. However, progress in the actual application of economic instruments remains limited so far.

1.3. Water pricing and the sustainability of water resources

The Commission has advocated an increased role for pricing in enhancing the sustainability of water resources in the context of the proposed Directive establishing a framework for Community action in the field of water policy (or Water Framework Directive).

- (1) Efficient water pricing acts as an incentive to reduce pollution and improve the efficiency of water use. Thus, it reduces the pressure on water resources and the environment, and it ensures available resources are efficiently allocated between water uses.
- (2) As a result, water supply and treatment infrastructure can be more adequately sized. This means providing water services and protecting the environment more cost-effectively.
- (3) It mobilises financial resources to ensure the financial sustainability of water infrastructure and service suppliers, and to pay for environmental protection.

It is argued that the lack of importance given to economic and environmental issues in designing existing water pricing policies, as opposed to more general social or development objectives, has led to current situations of inefficient use, over-exploitation and degradation of surface and groundwater resources.

1.4. The objectives of the Communication

The main objective of the Communication by the Commission is **to present the issues surrounding, and options for, the development of water pricing policies that enhance the sustainability of water resources.**

The term *water price* is used here in its very general sense and defined as the marginal or overall monetary amount paid by users for all the water services they receive (e.g. water distribution, wastewater treatment), including the environment. Thus, it encompasses elements linked to the quantity of water extracted from the environment and to the pollution emitted to the environment.

³ Article 174.2 of the Treaty, paragraph 2, states that *It (Community policy on the environment) shall be based on the precautionary principle and on the principle that preventive action should be taken, that environmental damage should as a priority be rectified at source and that **the polluter should pay.***

The Communication builds on a presentation of theoretical concepts and issues, a review of existing water pricing policies in the EU Member States and other countries of direct relevance to EU policies, and on the assessment of the impact of these policies (see Section 2 and the accompanying Working Document by the Commission services entitled *Water pricing policies in theory and practice – SEC(2000)1238*). Finally, it proposes guiding principles for the implementation of water pricing policies that better account for environmental protection and economic efficiency (Section 3). The Communication reflects the current state of theoretical and empirical analysis, and has been developed with input and feedback from a wide range of stakeholders⁴.

⁴ The key activity in this exchange of information and views is the organisation of a Conference in Sintra, Portugal in September 1999. Entitled *Pricing Water - Economics, Environment and Society*, the Conference was organised in collaboration with the Portuguese Instituto da Agua. Around 30 speakers and 200 participants representing a wide range of stakeholders from the European Union, Central and Eastern European countries and Mediterranean countries participated in this Conference.

2. WATER PRICING POLICIES IN THEORY AND IN PRACTICE

2.1. Basic concepts and theory

The main uses of water resources include economic sectors such as agriculture, households, energy, industry and tourism, but also environmental uses such as providing natural wastewater treatment or habitat for wildlife. For most uses, a large variety of water services are developed, from the abstraction, storage and distribution of water to the collection and treatment of wastewater.

To play an effective role in enhancing the sustainability of water resources, water pricing policies need to reflect different cost types:

- (1) **Financial costs** of water services, that include the costs of providing and administering these services. They include all operation and maintenance costs, and capital costs (principal and interest payment, and return on equity where appropriate).
- (2) **Environmental costs**, that represent the costs of damage that water uses impose on the environment and ecosystems and those who use the environment (e.g. a reduction in the ecological quality of aquatic ecosystems or the salinisation and degradation of productive soils).
- (3) **Resource costs**, that represent the costs of foregone opportunities which other uses suffer due to the depletion of the resource beyond its natural rate of recharge or recovery (e.g. linked to the over-abstraction of groundwater).

Overall, each user should pay for the costs resulting from its use of water resources, including environmental and resource costs. Moreover, prices should be directly linked to the water quantity used or the pollution produced⁵. This ensures that prices have a clear incentive function for users to improve water use efficiency and reduce pollution.

2.2. Water pricing policies in the EU Member States

The integration of economic and environmental objectives into water pricing policies is highly variable among Member States of the EU, within Member States and between economic sectors. Overall, the full recovery of financial costs is only partly achieved. This is particularly valid for sewerage services and for the agricultural sector, especially in Southern European countries where this sector is by far the largest and least efficient consumer of water and where scarcity problems are greatest. Agriculture pays much lower prices than other sectors, as a result of both direct subsidies and cross-subsidies with financial transfers from the household and industrial sectors to agriculture.

⁵ The overall price P paid by a given user can be computed as $F + a.Q + b.Y$, with F : an element related to fixed costs, general taxes, etc; a : a charge per unit of water used; b : a charge per unit of pollution produced; Q : the total quantity of water used; Y : the total pollution produced. A reduction in the quantity of water used (Q) and/or the pollution produced (Y) will then lead to a reduction in the overall water price P paid by the user. Thus, it provides an incentive for users to increase water use efficiency and reduce pollution.

Environmental and resource costs are rarely considered in pricing policies. In most cases where countries have established abstraction and discharge charges, they are mainly aimed at revenue collection, that can then be used for financing activities that enhance the quality of water bodies and related ecosystems.

Although most of water price structures for domestic water supply include fixed and variable elements and have an incentive role, flat (lump sum) water charges independent of use or pollution are still in use. Most irrigation charges are area-based, leading to low water use efficiency especially in surface gravity irrigation systems. Conversely, farmers that pump water directly from underground aquifers pay the full financial costs of their water supply and face a strong incentive to use water efficiently. However, they are never charged for the environmental and resource costs resulting from their (over-) abstractions.

The recent years have recorded an increasing role given to pricing in water policies in many Member States. Increasingly, the objectives of water pricing policies include the full recovery of financial costs and the integration of environmental concerns. However, the strict implementation of these principles remains to be seen.

2.3. Water pricing policies in non-EU countries

Water pricing policies in countries where the EU has a particularly strong involvement rarely integrate economic and environmental efficiency objectives. This is true for accession countries, where the potential role of efficient price structures is often countered by price levels that are too low to give a clear signal to users. In the context of the enlargement of the EU, i.e. the very high costs foreseen for compliance with the environmental *acquis* and more particularly water legislation as compared to the limited financial resources that can be mobilised, pricing will play a key role in future water policies of these countries.

The application of sound economic and environmental principles in water pricing policies is even more limited for developing countries, mainly as a result of affordability⁶ and social concerns. In these countries, the application of stricter economic principles is in its infancy, and is driven by an increased involvement of the private sector in urban water services and by the donor community as illustrated by the EU guidelines *Towards Sustainable Water Resources Management*. Irrigation that is the largest user remains highly subsidised, and financial revenues are often insufficient to recover even operation and maintenance costs of irrigation systems.

As safe sanitation and water supply is not ensured for large parts of the population of these countries, affordability issues will remain significant and will require a careful design of pricing policies that balances economic and environmental objectives with social objectives.

2.4. How can water pricing policies impact on economics, environment and society

Efficient water pricing policies have a demonstrable impact on the water demand of different uses. This is particularly true for the agricultural sector, but remains valid for industrial uses and for domestic outdoor uses. As a result of the direct impact of

⁶ Affordability is defined as the relative importance of water service costs in users' disposable income, either on average or for low-income users only.

pricing on water use and pollution, the pressure on water resources is reduced. This can lead to the reduction of over-abstraction of groundwater resources and the recharge of aquifers, the increase of flows in rivers and the restoration of the ecological status of rivers or adjacent wetlands. Precise information on the impact of pricing on the physical environment remains, however, limited.

Efficient water pricing also ensures that water infrastructures are adequately designed and that sufficient financial resources are collected to properly maintain, operate and renew infrastructures.

The production costs of different sectors (e.g. agriculture, industry) are currently influenced by the varying application of the cost recovery principle within the EU. This is likely to influence the competitiveness of the concerned sectors both within and outside the EU. Thus, it calls attention to the need for a harmonised approach to pricing within the EU.

A stricter recovery of the costs would impact on the affordability of water services, especially for low-income groups and some rural and farming communities that pay little of the total water service costs. However, the increase in the percentage of disposable income allocated to water services for domestic users would remain limited on average. And the existing significant range of prices for irrigation water shows that farming communities are likely to adapt to a certain level of price increase.

3. MOVING TOWARDS WATER PRICING POLICIES THAT ENHANCE THE SUSTAINABILITY OF WATER RESOURCES

This section proposes guidelines to policy makers and stakeholders to develop water pricing policies that enhance the sustainability of water resources. It does not advocate for a uniform price of water or for replacing regulation by economic instruments and pricing. However, water pricing that builds on these principles and thus that accounts for local environmental and socio-economic conditions can provide strong incentives for a more sustainable use of water resources and ensure that environmental objectives are met more cost-effectively.

Many of the elements described below are already applied for some uses, and in some countries. Their application is by no means uniform, but current trends in water pricing policies show that many stakeholders are already aware of the need to make further progress in integrating environmental and economic objectives in this field.

3.1. Improving the knowledge and information base

The successful development of water pricing policies that account for economic and environmental objectives is highly information-dependent. Sound estimates of key variables and relationships, e.g. concerning current demand, benefits and costs functions, are needed to ensure that appropriate price structure and level can be identified, and that its impact on water demand, cost recovery and the environment can be assessed.⁷

3.1.1. *Estimating the demand for water*

Assessing water use and pollution

It is important for proper pricing policies that polluters and users are clearly identified and that consumption and contribution to pollution are known. Today, relatively little is known about water use in the agricultural sector. And the existing pollution load of water emission to natural water bodies is also rarely measured apart from those by large industrial installations. Thus, the installation of metering devices should be actively promoted as it supports the implementation of volumetric pricing structures and enables a better knowledge of particular uses.⁸

However, measurement programmes providing precise data on all users could be very costly and therefore unrealistic⁹. Where meters are not a practical or economic option, alternative technologies are required for assessing current use and pollution. The use of satellite imagery is one example of innovation that can be used for assessing agricultural water demand. **It is important to identify, test and make**

⁷ High information costs are often mentioned as constraint to the development of water pricing policies that better account for economic and environmental objectives. It is important to stress, however, that water demand and supply information is also required for the definition of water policies in general, e.g. the development of River Basin Management Plans as provided for by the proposed Water Framework Directive.

⁸ In many countries, the installation of water meters is currently promoted and financially supported e.g. in the UK for domestic users and new dwellings. In France, the 1992 water law obliges irrigators to install meters.

⁹ Thus, their costs outweighing the potential benefits from improved water use efficiency.

operational data collection methodologies (i.e. which data collection technology, at which spatial scale, with which temporal frequency) that provide a useful estimate at reasonable cost of current pollution and use.¹⁰

Linking water prices and water demand

Estimates of the price elasticity of demand are needed to predict the change in water demand that would result from amending existing water pricing policies, price structure and level as well as extending metering. Similarly, the identification of the optimum level of any pollution charge requires the assessment of the elasticity of damage costs arising from pollution.

The analysis of the impact of existing water pricing policies demonstrates the wide range of price elasticity of water demand. **A systematic assessment of the price elasticity of demand and of damage costs of pollution is needed for the main economic sectors under different hydrological and socio-economic conditions¹¹.**

3.1.2. *Estimating the costs of water services and use*

Financial costs

Accurate water supply information is needed to assess the long-run marginal costs of supply and develop relationships between water supply levels and costs. This is particularly true if water supplies are highly variable and unreliable.

The main costs to be considered include operation and maintenance costs, and capital costs (principal and interest repayment and return on equity where appropriate)¹². Today, the existing accounting rules used by Member States imply different ways of calculating costs¹³. Also, the costs of different services can be included into water prices¹⁴. As a result, comparisons between the costs of water supply and treatment services, water prices and existing levels of cost recovery are often misleading.

The adoption of common definitions for key cost variables would facilitate the comparison between costs and prices and benchmarking¹⁵ for different water services, uses and countries.

¹⁰ Differences in the level of aggregation at which use and pollution are estimated are likely to arise for different types of use and pollution (e.g. point-source pollution versus diffuse pollution).

¹¹ Available methodologies for estimating the price elasticity of demand include econometric and statistical approaches of time series or cross section data, modelling the economic behaviour of sectors, or assessing users' reactions to changes in prices through direct interviews.

¹² While the estimation of water service costs is relatively straightforward, the allocation of these costs to specific uses may be more problematic in some cases, e.g. multi-purpose storage dams that supply water simultaneously to agriculture, municipalities and the environment. Simple cost allocation rules (based on the volumes supplied or pollution produced) can be used and are generally accepted by users.

¹³ In the Netherlands, for example, the depreciation of capital investments in domestic water supply is calculated based on capital costs minus subsidies. This has led to a situation where there are insufficient financial resources for the renewal of existing infrastructure.

¹⁴ Household water supply and waste-water treatment costs, for example, are always included into water prices, apart from Ireland that finances these services through the general taxation system. There is no systematic rule, however, for the inclusion of the costs of storm-water management and flood protection that are often financed directly through the general taxation system.

¹⁵ Benchmarking is a tool that aims at improving the environmental performance by identifying the gap between a given performance and the "best practice" and the main causes for this gap.

Assessing environmental and resource costs

Despite significant progress in recent years, the assessment of environmental and resource costs (and benefits) remains a challenge. It requires a good understanding of the functioning of the hydrological cycle within the river basin¹⁶, and the ability to assess the impact of particular uses on other uses and water bodies. This requires expertise and tools that are not always available or operational, but that constitute the basis for any sound decision made with respect to water resources management. Existing methodologies for the monetary valuation of environmental and resource costs, and more particularly ecology-related environmental costs, are often not sufficiently robust. These methodologies, which are mainly used by researchers, need to be further developed and made operational in the context of water policy planning.

However, taking account of these costs while designing new water policies is urgently needed. Furthermore, and as illustrated in Box 1, methodologies to assess the costs of mitigation measures for restoring the environment are robust enough to assess and allocate major environmental and resource costs to the uses responsible for these costs.¹⁷ **It is important to move forwards through a systematic integration of environmental and resource costs into the development of pricing policies¹⁸. Efforts are needed to ensure that assessment and valuation methods are made easily available and understood fully in their strengths and limitations.**

Box 1. Integrating environmental costs into water pricing policies: the first steps

A wide range of methodologies has been developed to assess and evaluate environmental costs and benefits related to water use. Where mitigation measures to restore water quality or quantity can be identified, a practical way of incorporating environmental and resource costs into prices is to estimate the costs of mitigation measures and then adapt water prices and charges accordingly.

- Allocation of investment and operation costs of a dam built to restore low river flows, resulting from over-abstraction of adjacent aquifers, can be made to the uses responsible for over-abstraction
- Costs arising from the higher treatment level and increased treatment capacity required because of uncontrolled pollution levels can be allocated to the users responsible for the pollution.

3.2. Setting the right water prices

The water supply, demand, benefits and cost information provides a solid basis for defining water pricing policies that promote an efficient use of water resources and limit pollution by different economic sectors. In theory, the overall optimum of water use is reached where the marginal benefits from water use match the marginal costs, including environmental and resource costs.

¹⁶ Including linked ecosystems and habitats, e.g. the buffer function of marginal wetlands for pollutants.

¹⁷ In some cases, in order to reduce assessment costs, it is possible to use valuation results obtained from sites with similar characteristics. This *benefits transfer*, however, is still a major research issue.

¹⁸ Environmental benefits may also arise from specific uses, e.g. the water buffering capacity of some agricultural land. These benefits require also due consideration and assessment.

Pricing structures should include a variable element¹⁹ (i.e. volumetric rate, pollution rate) to ensure they serve an incentive function to water conservation²⁰ and reduction of pollution. However, the weight of the variable element needs to be balanced against the need to ensure the recovery of financial costs and thus the sustainability of water services and infrastructure. This particularly applies in situations with highly uncertain water supplies²¹, or where prices lead to an effective reduction in consumption and pollution, and thence of financial receipts.

Water prices should be set at a level that ensure the recovery of costs²² for each sector (i.e. agriculture, households, industry). Overall, it is important to ensure that the most polluting and least efficient sectors pay for their pollution and use. A significant reduction in existing pressures on water resources can be expected through a sectoral recovery of costs of water services.

Water pricing policies should consider both surface water and groundwater. This will limit possible negative induced effects the development of more efficient pricing for one source of water could have on the other source of water²³. However, this does not necessarily mean the same price of water for both sources. For example, in situations with very limited good quality groundwater, lower prices for surface water can encourage the use of surface water for economic sectors, keeping good quality groundwater for household needs and human consumption.

Assessment of the administrative costs of new pricing policies is necessary to guarantee that the predicted gains in efficiency out-weigh the costs of establishing and managing the new system. Such costs may be particularly high when complex policies are established, which involve detailed monitoring and metering or the evaluation of a large range of environmental and resource costs.

Water pricing policies should also include an implementation plan. **The introduction of water pricing that better account for economic and environmental principles will need to be phased in for reasons of both affordability and political acceptability.** This is particularly true for users and sectors that do not currently pay for the full financial costs of services (e.g. agriculture) or that may already face problems of affordability (e.g. some social groups). Phased implementation gives users time to adjust to new conditions and thereby minimise the burden on any affected group. It also increases the predictability of that system for both users and suppliers.

The provision of water at artificially low prices to account for social and affordability objectives is a crude instrument for pursuing equity objectives. This form of subsidy encourages inefficient use and pollution. **Thus, in situation of unsustainable water use, social concerns should not be the main objective of water pricing policies,**

¹⁹ This variable element may vary for different locations and periods of the year to account for differences in water scarcity and water stress problems.

²⁰ While improvements in water use efficiency are the most common target for pricing policies, overuse of water in agriculture may be environmentally beneficial under specific soil and water salinity conditions. This should be taken into account in designing pricing policies.

²¹ It is important that the recovery of financial costs of services is ensured during periods of droughts when supplies may be very low.

²² Including environmental and resource costs

²³ For example, a stricter application of economic and environmental principles in pricing for surface water may lead to significant increases in groundwater uses and over-abstraction.

although they need to be taken into account while designing new pricing policies. And social concerns are better dealt with through accompanying social measures.

For some sectors or users, specific pricing schemes can be proposed such as *rising block* pricing that combine affordability and economic efficiency objectives, e.g. the combination of a free basic water allowance with high unit prices as an incentive to reduce excessive and non-basic water uses whilst keeping the revenue collection to the level needed to finance water services. **Nonetheless, a clear ex-ante and ex-post assessment of both the social welfare effects and impacts on household water demand of such pricing policies is necessary to ensure that both social and environmental objectives can be and have been met.**

Overall, the application of economic and environmental principles into pricing policies and the level of application of the cost recovery principle are likely to vary according to specific socio-economic conditions. In regions with currently low levels of basic water services and where social and economic development are key objectives (e.g. developing countries, regions of accession countries), subsidies to support large investments can be required. And past (sunk) investment costs may not be recovered from users. However, water pricing should keep its incentive element and account for depreciation and replacement costs to ensure the renewal of the infrastructure and therefore the sustainability of the basic water services provided.

3.3. Pricing policies and spatial scale

With the increasing importance given to the river basin, as illustrated by the proposed Water Framework Directive, scale issues have gained some importance in water policies. Clearly, the river basin scale is not applicable to the assessment, collection and use of revenue to cover financial costs. **Financial costs are better assessed and managed at the scale of the water service suppliers**

However, the river basin scale (or sub-basin scales according to the environmental issues considered) is the basis for assessing environmental and resource costs and benefits as it represents the level at which environmental externalities take place. This assessment may require a new organisation or the assignment of this task to an existing organisation, a particularly sensitive issue for transboundary river basins where the assessment of environmental costs, and their financial implications, will need to be accepted by stakeholders and administrations from different countries.²⁴

For the collection of environmental charges one may favour their inclusion in a single "water bill" to minimise administration costs. This is already practised in several EU Member States. As a result, financial transfers are required, between the supplier of water services collecting the water charges and the organisation that will draw on financial receipts from environmental charges to address environmental or resource damage issues.

²⁴ For example, the dumping of polluting substances into the Rhine River in France will induce pollution and costs for all domestic users of downstream countries. An analysis at the scale of the Rhine River basin is then required to estimate associated environmental and resource costs.

Options that can be envisaged for the use of environmental and resource charges include their allocation to the central budget of a country, or to the budget of a specific regional or river basin organisation that will allocate these financial resources to water protection and water supply and wastewater improvement activities. Overall, the combination of water charges and subsidies for environmentally-friendly investments and practices has often proven very effective in tackling environmental problems²⁵.

3.4. The role for users and consumers

Adaptation in the existing institutional framework may be required to support the move to incentive pricing reflecting the environmental costs of water use. In particular, consumers and users need to be involved in and informed of price policy decisions. **Bottom-up approaches to water pricing achieved through public participation and transparency are essential** in (i) contributing to the definition of water pricing policies, (ii) increasing the chances of successful implementation, and (iii) making these policies socially and politically acceptable. Consultation of stakeholders also provides water service suppliers with valuable information on the potential impact of price changes and on how to design their services in the most efficient way.

The involvement of users and stakeholders can take varying forms (see Box 2). The objectives of users' associations participating in price policy development will vary depending on the users they represent. Purely domestic water consumers' associations and irrigators' associations are more likely to aim for a decrease in water price combined with improvements in the quality of water services, and may not consider larger environmental issues that may be better defended by environmental Non-Governmental Organisations. **A broad stakeholder consultation involving all users concerned, is key to the development and acceptability of pricing policies with clear environmental goals.**

Box 2. Users and stakeholders involvement in water policies

Users and stakeholders involvement can take various forms. In France, all stakeholders are represented in the *Comités de Bassin* (river basin committees) and discuss future levels of pollution and abstraction charges for different sectors. In the UK, regional consumer services committees ensure consumers' involvement in water pricing policies for piped services. In some countries, general consumers associations are involved in the setting of water prices or in raising citizens' awareness of environmental problems linked to current water uses. However, their involvement in water policy discussions is often sporadic.

As a result of the quasi-monopoly situation of most water suppliers (whether public or private), control of the water prices charged to consumers is necessary to ensure that prices adequately reflect existing costs and do not hide inefficiency. Different price control mechanisms have already been developed in Member States²⁶. However, these control mechanisms concentrate mainly on the financial cost dimension of water prices. And **there is a need to ensure that the**

²⁵ Also, it facilitates the acceptance by users of new charging systems.

²⁶ For example, ex-ante compulsory control is performed by OFWAT in the UK, and an ex-post control is performed upon consumer request in Germany. Of interest also are the recent attempts to introduce competition between private water suppliers in the UK as a means to increase efficiency in delivering services and limit increases in consumer prices.

financial revenue from the recovery of environmental and resource costs is used efficiently in case of earmarking.

3.5. Communication and information

Water pricing policy should be transparent and easily understandable to ensure that its incentive effect can adequately play its role. Information and communication are therefore key elements of pricing policies. There is a need to explain to consumers and users how water prices and water bills are formed (see Box 3), to justify changes in water price structures and levels, and to link general environmental awareness with prices and consumption.

Box 3. The observatory of water prices in the Artois-Picardie basin (France)

Since 1994, the Artois Picardie Basin water agency has undertaken an annual survey of price and costs of local authorities involved in water and sewerage services. Its results are fed-back to local authorities. Information from consecutive surveys is used for monitoring trends in costs and prices. Since 1997, this survey is complemented by opinion polls to capture the perceptions of domestic users towards water services (quality, price, etc). The information is widely disseminated to consumers and local authorities. The pools highlighted more information on the functioning of the water cycle was necessary if price increases were to be understood and accepted by consumers.

Consumers and stakeholders also need to be better informed about the functioning of the hydrological water cycle and how their use negatively influences the environment and other competing uses. Tailored education programmes are needed for different age groups.

Benchmarking that compares the quality of water services, costs and prices, whether at the scale of the water supplier, river basin or country²⁷, is another key element of a communication strategy that supports consumers and decision-makers in their assessment of the quality and cost-effectiveness of water services. It has the dual role of comparison and improvement of definitions and computation methods for assessing given variables such as costs or prices. In monopoly situations with no possibility of choosing between alternative water service suppliers, benchmarking and comparison of the suppliers' performance can act as an incentive for them to improve their efficiency and quality of services and reduce their costs and prices.

However, current benchmarking of water services falls short of assessing the impact of existing practices on the environment and need to be adapted to reflect more general environmental concerns.

3.6. Integrating water pricing into river basin management plans

Recent developments in water policies in the EU (i.e. the proposed Water Framework Directive) and elsewhere have stressed the importance of river basin management plans for achieving environmental objectives²⁸. **Water pricing is a key**

²⁷ At the national scale, Eurostat has planned pilot studies for assessing current cost and price levels in selected EU Members. So far, pilot studies have been undertaken in two countries, Luxembourg and Spain.

²⁸ Overall, river basin management plans are intended to set out measures for reaching well-defined objectives and targets in the most cost-effective manner.

instrument of the river basin management plan to achieve economic and environmental objectives in a cost-effective way.

However, water pricing needs to be complemented by other measures to tackle both water quantity and water quality issues (see Box 4). The challenge is the identification of an agreed set of measures that will ensure economic, environmental and other objectives, such as financial sustainability, fairness or affordability, are achievable (and achieved) simultaneously.

Box 4. Water pricing and River Basin Management Plans in the proposed Water Framework Directive

Management plans will be developed for each river basin to set out a programme of measures for achieving the environmental objectives of the proposed Water Framework Directive. This programme will include: (i) basic measures (including emission and abstraction controls) required to implement Community, national or local legislation; (ii) water pricing policies that better account for the environment; and, (iii) supplementary measures such as new legislative and voluntary instruments, codes of good practices, re-use measures, and educational, research and demonstration projects.

Covering environmental costs might not be always practically feasible because of the site-specific environmental impact of abstraction or discharge points. To achieve environmental objectives through pricing only may imply setting different prices for each and every abstraction point. In such situations, it may be more appropriate to judiciously combine site-specific regulatory tools (e.g. abstraction and discharge licensing) with charging that should at least cover the costs of effective monitoring and regulation, and that may provide additional income for supporting environmentally beneficial projects (e.g. wetland restoration).

In the case of diffuse pollution from agriculture, the scale at which pollution charges are estimated and established is key to their effectiveness. A price linked to the average pollution at the scale of the river basin might not yield significant pollution reductions, as a result of the diversity of farming systems and the absence of a direct incentive (price reduction) for individuals engaged into pollution reduction strategies. At the opposite, prices linked to the pollution produced by each individual farmer are likely to be more effective. However, the costs of collecting pollution information to estimate individual prices might outweigh the benefits resulting from pollution level reductions.

3.7. Water pricing and other policy initiatives of the European Union

Co-ordination and synergy between water pricing and other policy domains of the European Union are key elements for economic and environmental effectiveness. Several policy areas are clearly relevant in this regard.

3.7.1. Agricultural policies

Through their impact on production and economic development, sector policies influence, whether directly or indirectly, the use of water. Thus, they affect the effectiveness of pricing policies with regards to their impact on the environment.

Current trends in irrigation water use clearly stress the importance of the Common Agricultural Policy in promoting irrigated crops whether through price support or direct subsidies for irrigated crops. This trend is particularly alarming in areas with

high water scarcity and intense competition between uses such as in the South of Europe, but also concerns regions of Northern Europe²⁹. More importantly, current agricultural market policies do not promote improvements in water use efficiency, which remains low in agriculture particularly in large-scale surface irrigation systems.

Water pricing can play a key role in giving incentive to make water use in agriculture more efficient, thereby reducing pressure on the environment and freeing resources for other competing uses. As an illustration, an effective way to start introducing water pricing to the sector might be to calculate, at the appropriate geographical scale, a water quota per hectare and per crop grown based on the best practice in water use. Farmers using more than the determined quota would be penalised by sharply increased water prices. While this would not end the production of crops unsuitable to specific regions with regards to their water requirements, this practice would ensure a more rational use of water.

The recent reform of the Common Agricultural Policy (CAP) gives Member States the opportunity for the first time to take action on water use, by allowing them to ascribe environmental conditions to some CAP payments allocated to farmers³⁰. France has already taken up such (cross-compliance) conditions and other Member States have also shown interest. The opportunities brought about by this new instrument are indeed very significant³¹. However, **using the opportunity provided by the CAP will need to be pursued to ensure that the potential impact of water pricing policies is fully exerted.** Also, efficient water pricing should not be countered by agricultural product price policies and subsidies for irrigation and irrigated crops that negatively impact on the sustainability of water resources.

3.7.2. *Horizontal policies*

The recent revision of the regulations governing the Structural and Cohesion policies have seen a reinforcement of the role of key environmental and economic principles. Guidelines recently prepared on the application of the Structural and Cohesion funds identify how they should be used to strengthen the application of the Polluter Pays Principle.

Although the guidelines promote a stricter application of economic principles in projects supported by these funds, the present financial incentive remains limited and its impact is unlikely to be large. However, the reform is an important shift in philosophy. **Further progress is needed for Member States and applicant countries to integrate economic efficiency and environmental principles into water charging schemes for investments supported by the structural and cohesion funds³², the Instrument for Structural Policies for pre-Accession**

²⁹ Agriculture, Environment, Rural Development: Facts and Figures - A Challenge for Agriculture. European Commission/Eurostat, 1999.

³⁰ Regulation 1259/1999, article 3 on 'environmental protection requirements'.

³¹ With the 1259/1999 regulation, Member States have a tool to make respected the environmental regulation. However, with the existing environmental regulation in place, it is likely that Member States will address mainly water quality, and not water quantity, problems.

³² In 1996, cohesion funds for water supply and wastewater treatment projects represented 848 millions Euro (approximately two third of the total envelop for the environment).

(ISPA)³³ and the Special Accession Programme for Agriculture and Rural Development (SAPARD) for Accession countries³⁴. Overall, funding accompanied by water pricing with no incentive to promote efficient water use should be phased out. Member States should give priority to sustainable water use and to investment that supports it (e.g. the installation of meters for different uses).

3.7.3. Research and demonstration

The 5th EU Framework Programme for Research and Technological Development and Demonstration of the European Commission, and in particular the generic activity of socio-economic research and its key action on "sustainable management and quality of water" that foresees research on pricing within its sub-area dedicated to socio-economic aspects of sustainable water use, provide the means for improving the knowledge base on water pricing policies and their impact and support the development of future water pricing policies. It will build-on and strengthen research in the area of water pricing that was already supported by the 4th EU Framework Programme as illustrated in Box 5.

Box 5. Water pricing and the Metron project

The objective of the Metron project (ENV4-CT97-0565), funded by DG Research within its 4th Framework Programme, is *to identify and evaluate alternative policies and policy instruments for the sustainable use of water in European metropolitan areas*. The project has investigated existing water pricing policies in metropolitan areas in OECD countries, observed trends in these policies, and progress being achieved and still being required for integrating efficiency, effectiveness and equity objectives into pricing policies. The project also contains the detailed analysis of pricing policies and their combination with other measures, e.g. conservation measures and awareness campaigns, for 5 cities.

More particularly, efforts should be targeted towards the development of knowledge and methodologies for: (i) the assessment of environmental costs and damage, the assessment of elasticity for given sectors (e.g. agriculture); (ii) the analysis of the role water pricing policies may play to integrate sustainable water use and tourism development; (iii) the assessment of the environmental impact of existing water pricing policies; (iv) the analysis of the potential for using new information technologies to assess specific water/economic variables (e.g. use of satellite imagery for assessing irrigation water demand and use); (v) the development and application of methodologies (e.g. cost-benefit assessment) and tools for supporting policy choices on water pricing at the river basin scale; and, (vi) the analysis of the nature of water (e.g. economic good or basic right) and of consumers' social perception of water.

In some cases, the application of existing principles and methodologies (e.g. for the evaluation of environmental and resource costs) remains the principal challenge. Further efforts for the implementation and dissemination of existing approaches are required. **Pilot programmes used as demonstrations to stakeholders to assess the**

³³ For the period 2000-2006, 520 million Euro will be allocated to environmental projects. Drinking water supply and the treatment of wastewater will represent the bulk of these projects.

³⁴ As indicated in the new orientations for the use of structural and cohesion funds for the period 2000-2006, the challenge is to find the right balance between social and economic objectives and the protection of the environment. Concurrently, charging systems should also ensure sufficient financial resources are collected for the renewal of the infrastructure and the sustainability of water services.

potential benefits and costs of new water pricing policies have a key role to play. The Life programmes of the European Commission offer opportunities to test and demonstrate the role efficient water pricing can play to enhance the sustainability of water resources, as illustrated in Box 6.

Box 6. Demonstrating the potential use of water pricing in LIFE projects

In 1998, the Non-Governmental Organisation WWF-Spain/ADENA initiated a project in the municipality of Alcobendas, North of Madrid, to reduce water abstraction and enhance the conservation of water resources. This project, supported by the European Union LIFE programme, is designed to illustrate the feasibility of demand management measures for domestic uses at the municipal level. It involves a range of stakeholders and includes information and promotional campaigns to increase consumers' awareness of water issues. The project includes activities to evaluate the current decreasing block-rate tariff system that favours high consumption, and will propose new tariff structures to promote water saving and to achieve full recovery of financial costs.

4. CONCLUSION

As a result of the absence of clear economic and environmental objectives, current water pricing policies do not always send the right signals to consumers and users to ensure that water resources are used efficiently. Overall, while there is a general recognition of the need to recover financial costs through charging, environmental and resource costs are rarely considered in pricing policies. This is particularly true for the agricultural sector, the largest use in Southern European countries. But it is also valid for some domestic users, and for the industrial sector.

The analysis of existing water pricing policies and of their economic, social and environmental impact suggest areas for the development of pricing policies that better account for environmental concerns. More specifically, pricing that better accounts for the environment will build on: a firmer application of the principle of recovery of cost with efficient targeting based on costs and benefits of water use; a wider application of pricing structures providing incentives and the promotion of metering devices; the assessment of major environmental costs and, where feasible, the internalisation of these costs into prices; a transparent policy development process that involves users and consumers; and, the implementation of new pricing policies in a phased manner to ensure acceptability and stability.

Future national policy initiatives will have to ensure that water pricing (and full cost recovery) is not the only instrument used. A sustainable demand-based strategy implies the combination of pricing with other means, e.g. promotion of water saving devices and practices, reduction of water leakage's in the production-supply-distribution systems, or education and public information campaigns that are supplementary to water pricing³⁵. Also, the coherence between water pricing policies, structural and cohesion policies and sector policies will need to be strengthened to ensure that the potential impact of pricing policies can be felt to the full.

The forthcoming implementation of the proposed Water Framework Directive will provide the right impetus to build on the elements of the present Communication. The Council and Parliament are invited to take note and discuss the present Communication and encourage national and regional authorities to pursue water pricing policies along the lines set out in this document, so as to meet the environmental objectives of this Directive in a cost-effective way.

The Commission also invites Member States to participate in the preparation of practical guidelines for the implementation of the article on water pricing of the proposed Water Framework Directive. The development of these guidelines will build on the review of existing practices in water pricing policy development in Member States and on the outcome of the discussions of the present Communication.

³⁵ The trading of water rights or permits is another demand-management tool that is increasingly discussed in the field of water management in Europe and elsewhere. In the EU, only Spain has taken clear legislative steps for the introduction of such trading mechanisms. Today, research is required to investigate the potential use of such mechanisms in future European water policies.

The availability of information will be key to the development and use of these guidelines. Thus, Eurostat and the Commission will pursue their efforts to assess the availability, in Member States and also in applicant countries, of statistics pertaining to costs of water services and water prices. This assessment will feed into the identification of robust and cost-effective methodologies for collecting cost, benefit and price information as requested in the proposed Water Framework Directive.