

The polluter pays principle: The need for an institutional perspective on cost recovery in the water sector.

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Abstract

According to Article 9 of the Directive, the costs of water services, including environmental and resource costs, will have to be recovered taking account of the polluter pays principle. Environmental damages, and thus also the monetary value that is attributed to them, depend on both temporal and spatial factors. Quantitative and qualitative aspects affect the category of financial costs. The distinction between financial, environmental and resource costs is an artificially constructed one, depending on the stringency of environmental standards reflecting local preferences and ideology and the degree of compliance, reflecting the overall policy setting, institutional efficiency and broader patterns of governance. The introduction of cost recovery for environmental and resource costs adds yet another requirement to pricing systems for water supply and sanitation services and requires a reconsideration of the definition of public service obligations. This article illustrates that the implementation of cost recovery in the water sector is guided by formal rules that are not necessarily rooted in environmental policy.

1. Introduction

Environmental pressures have increasingly gained significance on the political agenda over the past decades. This environmental awareness is accompanied by a growing understanding of the importance of network industries in the environmental debate. Electricity and gas markets are e.g. clearly linked to the global warming debate. But the link between environmental issues and the development of network industries is probably the most pronounced in the case of the water supply and sanitation sector. In fact, the very existence and expansion of sanitation infrastructures is partly based on health and environmental considerations.

The level at which formal rules are formulated in a European context is guided by the principle of subsidiarity, under which the European Union only acts if and in so far as the objectives of the proposed action can not be sufficiently achieved by the Member

States, provided that it does not concern areas in which the European Union has exclusive competence (European Union, 2008a). This implies that if actions can be sufficiently addressed at central Member State level, regional level or local level, the European Union shall not intervene. Despite the principle of subsidiarity, the role of the European Union remains however very important. This is especially true for the water sanitation sector, as the speed at which sanitation networks develop is to an important extent linked to environmental requirements imposed by the European Union, such as Council Directive of 21 May 1991 concerning urban waste water treatment, 91/271/EEC (European Union, 1991), commonly referred to as the Urban Waste Water Directive. This Directive lays down requirements with respect to the collection, treatment and discharge of urban wastewater and the treatment and discharge of waste water from certain industrial sectors.

Not only are the interrelations between the governance of network industries and environmental policies becoming apparent, both are increasingly subject to market forces. Parallel to the process of liberalization that has characterized most network industries, environmental policy is increasingly relying on market-based principles. Indeed, whereas in the past environmental problems were generally approached on the basis of a “command and control” philosophy, the virtues of market-based instruments such as emissions trading or environmental charges are currently widely acknowledged. Market-based instruments for pollution control are commonly regarded as a more efficient way of achieving environmental objectives than the more traditional approach of direct regulation.

For the water supply and sanitation sector, this tendency clearly manifests itself in the European Water Framework Directive (WFD), or more precisely Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (European Union, 2000). The environmental objectives of this Directive are stated in Article 4. With respect to surface water, deterioration of the status of all bodies of surface water should be prevented and good surface water status is to be reached by 2015. For artificial and heavily modified bodies of water, this objective confines to good ecological potential and good surface water chemical status. An essential aspect of the WFD is the coordination of administrative arrangements within river basin districts (Article 3). In this paper we will focus on Article 9, which deals with recovery of costs for water services.

According to Article 9 “*Member States shall take account of the principle of recovery of the costs of water services, including environmental and resource costs ... in accordance in particular with the polluter pays principle*” (European Union, 2000). By 2010, water-pricing policies have to provide adequate incentives for users to use water resources efficiently and thereby contribute to the environmental objectives of the Directive. The cost recovery should be disaggregated at least to the levels of industry, households and agriculture.

Hence, Article 9 of the European Water Framework Directive proposes a uniform approach based on a market-based philosophy. This does not imply that the WFD relies on market-based instruments as the sole approach towards better water quality. Although according to Article 9 cost recovery is believed to contribute to the achievement of the environmental objectives of the Water Framework Directive, the

European Commission does not consider pricing to be the unique solution to water quality and quantity problems (Commission of the European Communities, 2000). In fact, many other principles such as the precautionary principle, the prevention principle and the source principle may guide the allocation of water resources and it is clear that the polluter pays principle cannot be implemented in isolation.

The polluter pays principle refers to both prevention and control measures and has gradually been extended to include pollution damage costs. As such, the principle can thus be reconciled with other environmental principles of policies such as the prevention principle and the source principle. The prevention principle allows action to be taken to protect the environment at an early stage, the underlying idea being that it is better to prevent than to repair, whereas the source principle specifies that environmental damage should preferably be prevented at the source, rather than by using the 'end-of-pipe technology' (European Environment Agency, 2005a). The polluter pays principle adds the requirement that preventive actions or emission controls should be paid for by the polluter themselves. Measuring pollution levels or estimating environmental damages thus becomes more important, thus adding a potential source of disagreement about what methods to use.

The implementation of the polluter pays principle on which Article 9 of the WFD is based, is not straightforward, however. The governance of network industries is in fact based on many different considerations, such as the social objective of affordability, security of supply and political acceptability. In addition, other policy principles like the precautionary principle drive and shape environmental policies. Environmental policy principles such as the polluter-pays principle and the precautionary principle are widespread throughout European legislation. They have gradually obtained a formal character, to the extent that they have been included in the Treaty on European Union. The actual implementation of these principles depends on a series of factors. The fact that e.g. different pollution assimilative capacities of the environment, different social objectives and priorities attached to environmental protection and different degrees of industrialisation and population density justify differing national environmental policies was already recognised by the Organization for Economic Co-operation and Development (OECD) when the polluter-pays principle was put forward in 1972.

We conclude that the interpretation and actual implementation of the polluter pays principle depends on many considerations. We illustrate the conflicts that emerge when the principle is applied to the provision of services that satisfy basic human needs, as is the case for the water supply and sanitation sector. We analyse the implementation of cost recovery systems in the water sector from an institutional perspective.

2. The water value chain

A concept that is often used when analysing network industries is the value chain. The water value chain should not be confused with the water system (SERV, 2007). Whereas the water value chain is most commonly related to the provision of water

supply and sanitation services, the concept of water system is much broader and includes not only groundwater and surface water, but e.g. also the wider aquatic environment. It is used for a broader array of purposes, including the analysis of irrigation, fishery, transport, etc. (SERV, 2007). The water value chain as it is traditionally considered encompasses the activities related to the supply of drinking water and wastewater sanitation. It starts with the pumping of groundwater or capturing of surface water and ends with the reuse or disposal of treated wastewater. But as Figure 1 shows there are in fact a wide array of value chains that originate from the water system. It should be noted that In the daily practice of policy making the resulting values are not necessarily measured in monetary terms.

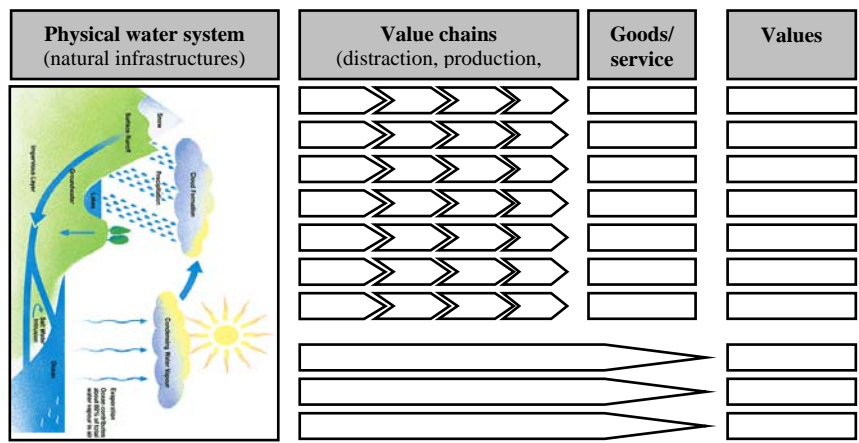


Figure 1: The water system as a source of value chains

Water supply and sanitation services should thus not be confused with water uses in the broader sense. Whereas water supply and sanitation services relate to the water value chain as depicted in Figure 2, water uses are related to the water system as a whole and should therefore receive a broader interpretation. According to the definition used by Roth (2001), water uses include water services as well as any other activity that has a significant impact on water. Recreational uses or navigation are examples of water uses. This paper focuses on water supply and sanitation services, and more particularly those supplied to the household sector. It thus focuses on the water value chain as it is most often interpreted, but taking the larger water system into consideration.

A typical feature when applying the concept of value chain to the water supply and sanitation sector is its cyclical character, as is depicted in Figure 2. The outer circle represents the collective water supply and sanitation cycle, which shows the flow of water from its abstraction to its disposal back into the environment. The arrows in this circle represent collective transport. Starting from the point of abstraction, the water flows to production facilities that treat the water so as to meet drinking water quality standards. It is then transported to the individual households. Although not depicted in the figure, it should be noted that in many cases water supply systems are subject to the problem of leakage. Whereas in the past most of the wastewater was disposed directly into the environment (dotted arrow on the left), the development of the sanitation sector added a collective treatment step to the water cycle, whereby the wastewater is transported to treatment facilities through the sewer system. Where

collective treatment is considered to be unfeasible from an economic or pragmatic point of view, individual treatment systems can be used.

It should be clear from the picture that, depending on whether the sanitation side of the water value chain is more or less developed, the water cycle is a closed loop. Due to the cyclical character of this water value chain, the disposal of wastewater in the environment eventually leads to its re-use. Up to a certain level of pollution, the natural environment serves as a natural system of wastewater treatment. But where sufficient adequate sanitation facilities are lacking and when the absorption capacity of the environment is exceeded, households find themselves confronted with the adverse consequences of this pollution at the input side of the cycle or within other associated water value chains. Currently more direct ways of re-use are being introduced as a way to conserve water resources. These re-use initiatives can be found both at the collective and individual level. The Intermunicipal Water Company of the Veurne region (IWVA), a water company in Belgium, shows that water supply can meet water sanitation through technology. In July 2002, IWVA started to produce infiltration water from wastewater effluent at the 'Torreele' plant, which was named after the local area. The wastewater treatment plant is operated by Aquafin. The techniques that are used are a combination of membrane filtration techniques. The infiltration water is used for groundwater recharge of a dune water catchment. The total drinking water demand in the area operated by IWVA approximates 5.5 million m³/year, and about 45% of this demand is fulfilled reusing wastewater effluent. Not only did the project reduce the natural groundwater extraction in the dune water catchments, the increased groundwater levels also enhanced the natural value of the dunes (IWVA, 2007).

In most European countries, the supply side of the water value chain is well established. Connection rates on the sanitation side are typically lower however. There are three major reasons why wastewater still reaches the environment without prior sanitation. The most obvious situation is where households are not connected to a collective sewer and do not make use of an individual treatment system. In some cases however, connection to the sewer system is provided, but the sanitation facilities are not yet operational. A third reason is the existence of mixed sewer systems, which transport both wastewater and rain water. In cases of heavy rainfall that exceeds the carrying capacity of the system, a large part of these mixed flows are disposed directly into the environment through a system of water overflows.

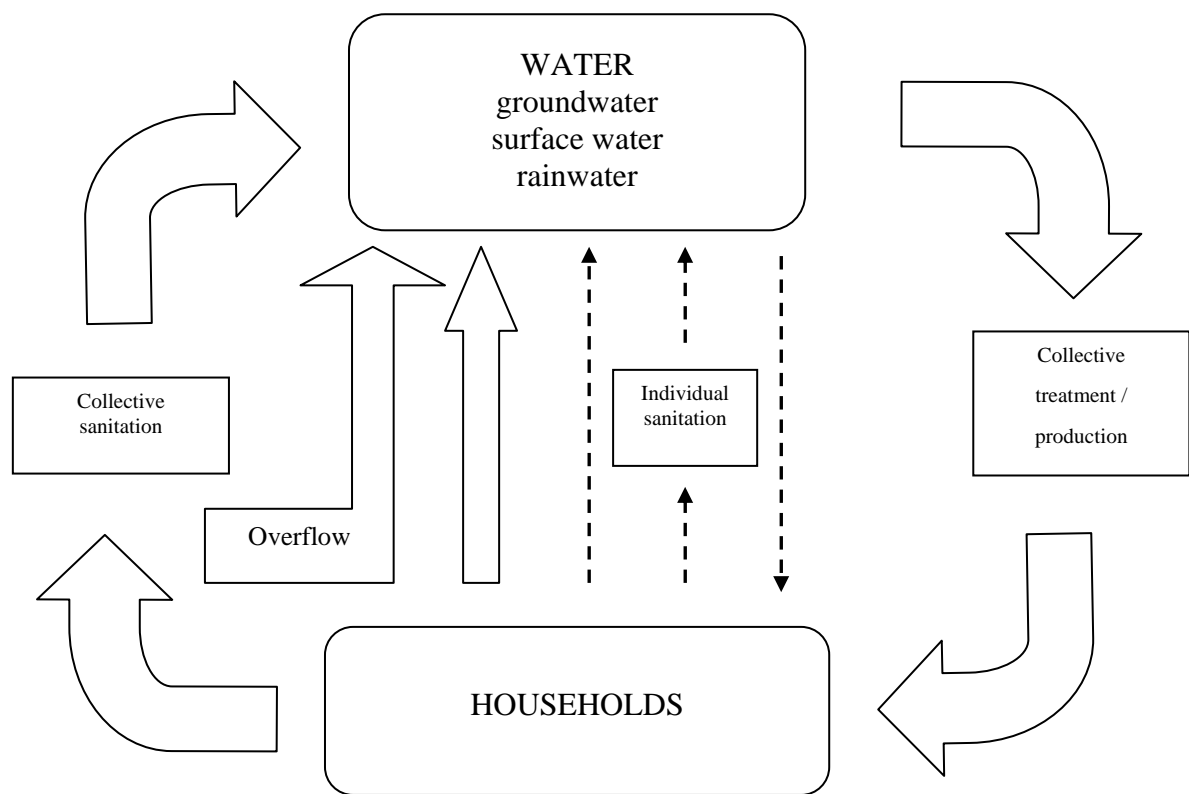


Figure 2: The water value chain for household water supply and sanitation

3. Valuing water supply and sanitation services.

The structure of water prices can show great variations. Flat rates, sometimes also called fixed charges, are not related to the amount of water consumption, and thus they do not require the use of metering devices. This does not necessarily mean that every household pays the same amount. Flat rates can be based on household characteristics (e.g. number of household members), or for example depend on house characteristics such as the size of the property or the size of the supply pipe. Variable pricing systems can take many forms. The most commonly known variable systems are uniform unit prices, increasing block rate pricing and decreasing block rate pricing. With uniform or constant unit prices, consumers pay the same volumetric marginal price for every level of consumption (Olmstead et al., 2007). With increasing block rate pricing, the prices paid by consumers increase with consumption levels, as opposed to decreasing block rate pricing where the per unit prices are lowest for the higher consumption levels.

In many cases water prices are a combination of fixed and variable elements (Commission of the European Communities, 2000). Although from an environmental point of view the emphasis is mostly on the incentive function of environmental charges, their revenue raising function should receive due consideration as well. Indeed, if one manages to reduce pollution levels, the incentive based revenues may vanish, since there is no ground for an environmental pollution charge anymore. So, fixed components are important from a financial point of view, as they provide stable

revenue streams, which are needed to maintain and further develop the water supply and sanitation network. Both variable and fixed components of water prices are thus important for the environmental and financial sustainability of the system. Yet, there may be trade-offs between a) capital and operational expenses, depending on technical choices and system solutions chosen, and b) the costs of the system and the degree to which externalities will be internalized – via a specific component in the tariffs.

The economic principle that the polluter should pay is designed to achieve a better allocation of resources by ensuring that prices of goods depending on the quality and/or quantity of environmental resources reflect more closely their relative scarcity (OECD, 1972). Yet, most environmental charges that have been introduced so far are not explicitly based on the estimation of the environmental costs caused by pollution or by resource use (European Environment Agency, 2005b). The importance of Article 9 of the Water Framework Directive lays in the explicit reference environmental and resource costs. This explicit requirement to include environmental and resource costs into water prices therefore seems to be a considerably innovative obligation. But it also entails numerous implementation difficulties.

Water prices can be defined in a general sense 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 (Commission of the European Communities, 2000). These prices – or better tariffs - can thus comprise different types of costs, such as the direct operational and capital expenses of the supply and sanitation systems, and allowances for the costs associated with external effects of drinking water production and (lack) of sanitation systems.

Water prices are currently mostly based on financial costs. Financial costs include the costs related to the operation and maintenance of the systems, as well as capital costs (principal and interest payment, and return on equity where appropriate) (Commission of the European Communities, 2000). The Water Framework Directive however explicitly refers to the inclusion of environmental and resource costs. Environmental costs represent the cost of damage imposed by water uses on the environment and ecosystems and on the users of the environment. Resource costs are the costs of foregone opportunities which other uses suffer when the resource is depleted beyond its natural rate of recharge or recovery. In that sense, resource costs are a concept that is similar to ‘opportunity costs’, a relative measure of the distance between the actual employment of a resource and alternative use, which may enhance the overall level of welfare (Siebert 1981).

The degree to which these different cost categories are recovered shows great differences among Member States. Even if the “cost of water services” were to be defined in exactly the same way, estimations of the costs can diverge, not only because of local conditions but also depending on the valuation methods that are used or the assumptions that have been made. It is important to keep in mind that despite the current emphasis on environmental and resource costs, these costs are seldom addressed in water prices and in many cases even the financial costs are not fully recovered (Commission of the European Communities, 2000). Price systems are also not the only way to pay for the costs that relate to water supply and sanitation. Abstraction or pollution charges are not necessarily included in water bills. The fact

that these charges are sometimes used to finance environmental agencies or funds shows that environmental concerns were already related to financial considerations in water management before the introduction of the Water Framework Directive (Roth, 2001).

Although it is suggested that there is a clear distinction between different cost categories, the picture is more complicated than it looks at first sight. These complications arise, firstly, from the characteristics of the water cycle, which relate the quality of the water in the natural system and in the supply network to technical choices made in the drinking water supply segment as well as in the sanitation segment of the network. Secondly, there is a joint-production effect, in the sense that investments in the sanitation and sewerage system not only improve the quality of the raw water intake of the drinking water segment, they also improve the environmental value of the water system, enhancing biodiversity and the values experienced by citizens, etc. A third consideration concerns the effect of the different ways of valuing the different costs and benefits.

Investments in sanitation infrastructure, which are considered as financial costs, are at the same time investments in the reduction of environmental costs. Stringent environmental regulation thus increases the financial costs, while at the same time reduces the remaining share of environmental costs. The need to focus on the inclusion of environmental and resource costs into water prices thus largely depends on the environmental standards that are in place. Assuming an acceptable level of water quality throughout the value chain, it might thus well be the case that an important burden of pollution damages would already be recovered if the financial costs of water supply and sanitation infrastructures would be fully reflected in the water bills.

The situation becomes even more ambiguous when trying to express the environmental and resource costs into monetary values. One valuation method that is often used is to take the costs of expenditures to reduce pollution damages to these acceptable levels as a lower-bound estimate for environmental costs. Strictly speaking, this averting expenditures method thus measures financial costs instead of environmental costs and makes a divide between the categories even more difficult. Other methods of valuation will most likely yield different outcomes. One example is the contingent valuation method, in which questionnaires are used to ask respondents to explicitly express their willingness to pay for cleaner water, the willingness to accept some level of pollution, etc. One has to consider the variety in culturally determined individual and group interests and preferences underlying the resulting values. This illustrates that there are large conceptual and practical difficulties in identifying, valuing and allocation the several types of costs associated with the different segments of the water value chain and the activities involved.

4. Cost-recovery in the water sector: conflicting interests?

The efficiency argument is one of the main advantages attributed to market-based instruments such as environmental charges. There are however many other important criteria that need to be considered when evaluating environmental policy. The OECD (1989) refers to administrative practicality, political acceptability, distributional

effects and consistency. Balancing these different criteria is not an easy task. In this section, we highlight some of the conflicts that may arise when implementing cost recovery schemes for water services based on the polluter pays principle.

Although European directives have brought about many significant environmental improvements, some of the barriers to the use of market-based instruments in environmental policy are drawn up by the same European Union. In the following paragraphs, we will focus on principles that are not directly related to environmental issues, but that nevertheless exert an important influence on the implementation of the polluter pays principle.

On a European level, the debate on the economic and/or social character of water supply and sanitation services is reflected in the ongoing discussions with respect to services of general (economic) interests. The use of the term “general interest” does not preclude economic concerns. In fact, services of general interest include services of both general economic and non-economic interest (Commission of the European Communities, 2003). The Commission of the European Communities (2003) distinguishes three categories of services of general interest: *services of general economic interest provided by large network industries*, *other services of general economic interest* and finally the category of *non-economic services and services without effect on trade*. Any activity that consists in offering goods and services on a given market is considered to be an economic activity (Commission of the European Communities, 2003). Labelling certain services as services of general economic interest is not only a matter of definition, but has a profound influence on the type of formal rules that are to be applied to the service under consideration. Competition and State aid rules, the freedom to provide services and the right of establishment are examples of formal rules that only apply to economic activities (Commission of the European Communities, 2003)

Contrary to e.g. telecommunications, postal services, electricity, gas and transport, water supply is not included in the category of *services of general economic interest provided by large network industries*, but regarded as one of the *other services of general economic interest*. Water sanitation is not explicitly mentioned, but waste management is considered to be part of this second category as well (Commission of the European Communities, 2003). Member States are in principle free to define services as services of general interest and lay down the corresponding requirements, as long as Community legislation is not violated (Commission of the European Communities, 2003). This implies that e.g. universal service obligations can vary between and - depending on the relevant policy level - within Member States.

The concern of affordability is a widely acknowledged public service obligation. Affordability “requires a service of general economic interest to be offered at an affordable price in order to be accessible for everybody” (Commission of the European Communities, 2003). It can also be related with “the relative importance of water service costs in users’ disposable income” (Commission of the European Communities, 2000). Many policy documents combine the concern for affordability with the reliance on economic principles. The fourth principle of the Dublin statement on water and sustainable development (ICWE, 1992) explicitly refers to water as an economic good, and states that water has an economic value in all its competing uses.

But this principle is at the same time combined with the prior recognition of the basic right to have access to clean water and sanitation at an affordable price.

Article 106 of the Consolidated version of the Treaty on the Functioning of the European Union (European Union, 2008b), states that “Undertakings entrusted with the operation of services of general economic interest or having the character of a revenue-producing monopoly shall be subject to the rules contained in the Treaties, in particular to the rules on competition, in so far as the application of such rules does not obstruct the performance, in law or in fact, of the particular tasks assigned to them. The development of trade must not be affected to such an extent as would be contrary to the interests of the Union.”. The Treaty on the Functioning of the European Union will enter into force after the ratification of the Treaty of Lisbon, but this article corresponds to the current Article 86 of the Treaty establishing the European Community (European Union, 2002). Public service obligations can thus under certain conditions prevail over internal market and competition rules (Commission of the European Communities, 2003). But despite this possibility to appeal to public service obligations, competitiveness and trade remain important aspects to take into account in the provision of services of general economic interest.

Proponents of increased competitiveness argue that competition is a way to achieve affordable water services, see e.g. the Green Paper on services of interest (Commission of the European Communities, 2003). According to this view, competition need not necessarily be in conflict with social concerns. In its White Paper on services of general interest (Commission of the European Communities, 2004), the Commission maintains that the objective of a competitive internal market can be reconciled with social concerns, and that the internal market has in fact improved the affordability of certain services. The Commission even puts forward the achievement of public service objectives within competitive open markets as one of the guiding principles of its approach. Critics however argue that the European Commission is unwilling to recognise the conflicts that arise between public service obligations and the internal market and competition rules. They argue that the latter prevail and that they are used to stimulate the further introduction of liberalisation in the area of services of general interest (see e.g. Hall, 2003).

Similar formal trade-offs can be found in the context of State aid rules. The Commission acknowledges that market mechanisms alone are not sufficient to fulfil public service obligations and that additional mechanisms are needed to ensure financial viability of the service provider (Commission of the European Communities, 2003). These mechanisms can be of a financial – e.g. subsidies or tax exemptions- or non-financial nature – e.g. the granting of monopoly rights. Commission Decision 2005/842/EC (Commission of the European Communities, 2005) lays down rules for the application of Article 86(2) of the EC Treaty to State aid in the context of services of general economic interest, thus addressing possible incompatibilities between public service obligations and State aid rules. Under certain conditions, costs to provide public service obligations can be compensated by Member States without violating State aid rules. These conditions are spelled out in the Community Framework for State aid in the form of public service compensation (European Union, 2005). Article 87 of the Treaty establishing the European Community (European Union, 2002) provides a way to address concerns of affordability without violating State aid rules. It states that “*aid having a social character, granted to individual*

consumers, provided that such aid is granted without discrimination related to the origin of the products concerned” is compatible with common market rules. At the level of individual consumers, there thus seems to be no immediate conflict between state aid and concerns of affordability.

The debate on services of general economic interest focuses mainly on this conflict of interests between public services obligations on the one hand, and internal market, competition and State aid rules on the other hand. As these rules influence the process of price formation, they also affect the implementation of the principle of cost recovery. But also the fulfilment of public service obligations impacts the achievement of cost recovery. Public service obligations often entail additional costs, thus complicating cost allocation. In its Green paper on services of general interest (Commission of the European Communities, 2003), the Commission acknowledges that history and cultural traditions play an important role in the organisation of services of general interest. Different views on how social concerns should be addressed are very likely to determine the interpretation of public service obligations and the way in which these services should be provided. This might in turn give rise to different ways and levels of cost-recovery.

The type of pricing system obviously influences the degree to which low income groups can meet the expense of water services. Several pricing systems that are used in the water sector, such as e.g. the increasing block tariff, involve some form of cross-subsidization. The use of cross-subsidies is often encouraged as a way to enhance affordability, as for example at the water and sanitation WEHAB meeting in Johannesburg (United Nations, 2002). Although this implies that part of the costs related to the water consumption is not recovered by the individual consumer of a particular amount of water, this is not necessarily a violation of Article 9 of the WFD. The recovery of costs aimed at in the Water Framework Directive is relevant at the aggregate level of households, industry and agriculture as consumer groups. This does however imply that cross-subsidies between sectors are considered to be more problematic.

In Flanders (Belgium), the ideas behind the polluter pays principle resulted into a single “integrated” invoice, which reflects both supply costs as well as a fee for wastewater remediation. This evolution is a first important step towards the implementation of Article 9 of the WFD. However, it does not mean that all environmental and resource costs are currently accounted for. Subsidies remain an important instrument in the development of the sanitation network, and the fact that every Flemish resident is entitled to 15m³ of water free of charge shows that the allocation of water supply and sanitation services is partially guided by social concerns and that the costs are partly socialized over all tax payers.

To some extent, the conflicts that were highlighted in this section are time-dependent. Increasing environmental awareness is not the only new development in the water sector. Cornut (2003) argues that the current emphasis on social concerns is in fact also relatively new. Although health concerns were prevailing, the early development of the water supply system actually reinforced social inequalities and universal access was not an issue at that time (Cornut, 2003). Even the health concerns were initially not invoked out of human considerations, but as a way to safeguard the workforce. After the Second World War, the development of the water network was focused on

the growth of the industrial economy (Cornut, 2003). The trade-offs that have to be made are thus continuously evolving, and depend on institutional, technological, economic and environmental concerns, which are partly guided by scientific progress.

5 Conclusion

According to Article 9 of the Directive, the costs of water services, including environmental and resource costs, will have to be recovered taking account of the polluter pays principle. Environmental damages, and thus also the monetary value that is attributed to them, depend on both temporal and spatial factors (Roth, 2001). The same level of pollution does not cause the same amount of environmental damage everywhere or at every point in time, and also the availability of the resource fluctuates both in time and in space. Both these quantitative and qualitative aspects affect the category of financial costs. To a certain extent, the distinction between financial, environmental and resource costs is an artificially constructed one, which depends on the stringency of environmental standards reflecting local preferences and ideology and the degree of compliance, reflecting the overall policy setting, institutional efficiency and broader patterns of governance.

The introduction of cost recovery for environmental and resource costs adds yet another requirement to pricing systems for water supply and sanitation services. Tariff systems indeed need to meet high expectations. Not only do they have to facilitate the recovery of financial costs for the service provider, they also have to play a key role in meeting both social and environmental objectives. Some of the trade-offs that have to be made are guided by formal rules. For the Members of the European Union, this is e.g. the case when issues of competitiveness or state aid are at stake. With this respect, Article 9 of the Water Framework Directive thus necessitates a reconsideration of the definition of public service obligations. Although the notions of universal service, continuity and affordability are the notions that are most commonly included in this definition, Member States have a certain degree of freedom in defining these concepts. They could thus include more explicit environmental considerations by paying more explicit attention to the sanitation component of water services.

In this article we have illustrated that the implementation of cost recovery in the water sector is guided by formal rules that are not necessarily rooted in environmental policy. Although beyond the scope of this article, informal rules should receive due consideration as well. Institutional economics, with its focus on both formal and informal rules, therefore provides an interesting perspective on the implementation of the polluter pays principle for the water supply and sanitation services.

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